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The Summer Quarter

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1934

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Second Term July 28 to September 1

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1933

JULY

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

AUGUST

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	..	..	..	..
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

SEPTEMBER

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
..	..	..	..	..	..	..

OCTOBER

Su	Mo	Tu	W	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
..	..	..	..	..	..	..

NOVEMBER

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..
..	..	..	..	..	..	..

DECEMBER

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

1934

JANUARY

Su	Mo	Tu	W	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
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FEBRUARY

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	..	..	..
..	..	..	..	..	..	..

MARCH

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
..	..	..	..	..	..	..

APRIL

Su	Mo	Tu	W	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..
..	..	..	..	..	..	..

MAY

Su	Mo	Tu	W	Th	Fr	Sa
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6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

JUNE

Su	Mo	Tu	W	Th	Fr	Sa
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10	11	12	13	14	15	16
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24	25	26	27	28	29	30
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JULY

Su	Mo	Tu	W	Th	Fr	Sa
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22	23	24	25	26	27	28
29	30	31	..	..	..	..
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AUGUST

Su	Mo	Tu	W	Th	Fr	Sa
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12	13	14	15	16	17	18
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26	27	28	29	30	31	..
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SEPTEMBER

Su	Mo	Tu	W	Th	Fr	Sa
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2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

OCTOBER

Su	Mo	Tu	W	Th	Fr	Sa
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7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
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NOVEMBER

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..
..	..	..	..	..	..	..

DECEMBER

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

CALENDAR

SUMMER QUARTER, 1934

June	18-19	Mon.-Tues.	Registration, first term
June	20	Wednesday	First term classes begin
July	4	Wednesday	Independence Day; a holiday
July	26	Thursday	Commencement convocation
July	28	Saturday	First term closes
			Registration for second term closes at 12 m.
July	30	Monday	Second term classes begin
September	1	Saturday	Second term closes

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AGRICULTURAL EDUCATION

Albert M. Field, Ph.D., Associate Professor

ART EDUCATION

Robert S. Hilpert, M.A., Assistant Professor
Elmer E. Harmes, B.S., Instructor
Gertrude D. Ross, B.S., Instructor

GENERAL EDUCATION

Harold Benjamin, Ph.D., Assistant Dean and Professor
Charles W. Boardman, Ph.D., Professor and Director of Student Teaching
Leo J. Brueckner, Ph.D., Professor
Harl R. Douglass, Ph.D., Professor
Fred Engelhardt, Ph.D., Professor
Wilford S. Miller, Ph.D., Professor
Dora V. Smith, Ph.D., Associate Professor
Palmer O. Johnson, Ph.D., Assistant Professor
John G. Rockwell, Ph.D., Assistant Professor
James G. Umstattd, Ph.D., Assistant Professor
Marvin J. Van Wagenen, Ph.D., Assistant Professor
Edgar B. Wesley, Ph.D., Assistant Professor
Walter C. Eells, Ph.D., Professorial Lecturer, Leland Stanford Jr. University
Jean Alexander, M.A., Instructor
Harry P. Cooper, M.A., Instructor
Marcia Edwards, M.A., Instructor
Oliver R. Floyd, Ph.D., Instructor
Mowat G. Fraser, B.A., B.Sc.(Oxon.), Instructor
Ingolf O. Friswold, M.A., Instructor
Lucien B. Kinney, Ph.D., Instructor
Leonard J. Luker, M.A., Instructor
S. E. Torsten Lund, M.A., Instructor
Mabel H. Wettleson, B.S., Instructor

HOME ECONOMICS EDUCATION

Wylle B. McNeal, M.A., Professor and Chief
Clara M. Brown, M.A., Associate Professor
Ella J. Rose, M.A., Assistant Professor

INDUSTRIAL EDUCATION

Homer J. Smith, Ph.D., Professor
Verne C. Fryklund, Ph.D., Instructor

PUBLIC SCHOOL MUSIC

Archie N. Jones, M.A., Assistant Professor
Abe Pepinsky, M.A., Assistant Professor
Gerald R. Prescott, B.A., Instructor and Bandmaster

DEMONSTRATION HIGH SCHOOL

Oliver R. Floyd, Ph.D., Principal and Instructor
Leslie Bergren, B.S., Instructor
Dorothy Bovee, M.A., Instructor
Richard M. Drake, M.A., Instructor
Lucien B. Kinney, Ph.D., Instructor
S. E. Torsten Lund, M.A., Instructor
Wilbur F. Murra, B.S., Instructor
Ruth A. Norman, M.A., Instructor
Winifred Sharpstene, B.S., Instructor
Mabel Wettleson, B.S., Instructor

PHYSICAL EDUCATION AND ATHLETICS

PHYSICAL EDUCATION FOR MEN

Frank McCormick, B.A., LL.B., Professor and Director of Athletics
Bernard W. Bierman, B.A., Professor and Head Football Coach
Louis J. Cooke, M.D., Professor and Assistant Director of Athletics
Louis F. Keller, M.A., Associate Professor
David MacMillan, B.S., Assistant Professor
Lowell P. Dawson, B.A., Instructor
Clarence Osell, B.S., Instructor
Ralph A. Piper, B.Phys.Ed., Instructor
W. Ray Smith, B.A., Instructor and Director of Intramural Athletics
Dave Woodward, Trainer

PHYSICAL EDUCATION FOR WOMEN

Gertrude M. Baker, M.A., Assistant Professor
Florence M. Warnock, M.A., Assistant Professor
Catherine Snell, B.S., Instructor
Helen M. Starr, B.S., Instructor

SCHOOL OF BUSINESS ADMINISTRATION

Russell A. Stevenson, Ph.D., Dean

Frederic B. Garver, Ph.D., Professor of Economics
Arthur W. Marget, Ph.D., Professor of Economics and Banking
J. Warren Stehman, Ph.D., Professor of Economics and Finance
Ralph Cassady, Ph.D., Assistant Professor of Economics and Marketing
Richard L. Kozelka, Ph.D., Assistant Professor of Economics and Statistics
Emerson P. Schmidt, M.A., Assistant Professor of Economics
John P. Dalzell, B.A., LL.B., Lecturer in Business Law
Ingvald W. Alm, B.S., Instructor in Economics and Accounting
Richard A. Graves, M.A., Instructor in Economics

INSTITUTE OF CHILD WELFARE

John E. Anderson, Ph.D., Professor and Director
Josephine C. Foster, Ph.D., Professor and Principal of the Nursery School and Experimental Kindergarten
Florence L. Goodenough, Ph.D., Professor
Marion L. Faegre, B.A., Assistant Professor of Parent Education
Neith E. Headley, M.A., Instructor and Teacher in Kindergarten
Mary L. Field, B.S., Teacher in Nursery School
Eleanor M. Thompson, B.S., Teacher in Nursery School

LIBRARY TRAINING

Frank K. Walter, M.A., M.L.S., University Librarian
Lura C. Hutchinson, B.A., Assistant Professor
Alma M. Penrose, B.A., B.L.S., Instructor

FOREWORD

"Society is an educational product." The new deal in social and economic affairs calls for a new deal in education. Our people have but the vaguest ideas of the origins and working processes of the social and economic structure. Group psychology and social biology have been largely disregarded. For these reasons we find ourselves in the present dilemma. If the reorganization of mankind is not to collapse, degenerate, or perish, then the individual mind has to be educated, disciplined, and equipped to the end that society shall not fail.

Every major economic depression in history has been followed by a revival in education. In this revival we believe that the nuclei which will ultimately become the sole educational and developmental units of the newborn society will be study groups and associations for moral and physical training. It is therefore reasonable to expect that the demand for educational leadership will grow rather than decrease with the development of our new social and economic revival.

The demand for trained educational leadership creates a potential need for more and better training of our educational leaders and a revision of educational curricula to meet this need. This potential need will become dynamic perhaps before many of us are ready to meet it.

The University of Minnesota is attempting to meet the need. In organizing its program of courses for the summer quarter of 1934, it has prepared its courses with particular application to the present and future needs of the "New Deal" in education and our economic reconstruction.

We believe that student, teacher, and educational administrator alike will find no more profitable way to spend a summer vacation, no more profitable place to invest vacation funds than to spend them in study at one or both of the University of Minnesota summer terms with a view to preparation for the educational demands of the New Deal.

THE SUMMER QUARTER

New courses have been prepared in the fields of art, art education, agricultural education, band training, business administration, chemistry, child welfare, dramatics, education, geography, history, home economics, journalism, library education, mathematics, medicine, music, nursing, political science, physical education for men, physical education for women, psychology, rural sociology, sociology, speech, and in many special subdivisions of these subjects.

This year special emphasis will be given to the courses in sociology in the second term of the summer quarter. In addition, a round table discussion of international relations will be conducted in the second term under the direction of the Department of Political Science during the week of July 30 to August 4.

Particular attention is called to the advantages of study in the second term when classes are smaller and more intimate, and the weather is decidedly cooler.

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

DURATION OF THE SESSION

The summer quarter consists of two terms. The first term, of six weeks, begins Monday, June 18, and closes Saturday, July 28. The second term, of five weeks, begins Saturday, July 28, and closes Saturday, September 1. First term classes begin on Wednesday, June 20, second term classes, on Monday, July 30.

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 INFORMATION

LOCATION

The main campus of the University of Minnesota is located on the north bank of the Mississippi River in the city of Minneapolis. 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 in the city of St. Paul, about one and a half miles from the main campus in Minneapolis. The Farm campus offers all the advantages of the main campus, for it is connected with the latter by an intercampus trolley line which gives free a regular, 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. The College of Agriculture has its own library, laboratories, museums, gymnasium, tennis courts, and grounds for other sports.

INTERCAMPUS CAR

For students who are registered for class work on both the Minneapolis campus and the University Farm campus, free transportation on the intercampus car is provided. Tickets will be issued to students registered in the College of Agriculture, Forestry, and Home Economics at the branch office of the registrar at University Farm; to those registered in other colleges, at the Service Department, 11 Administration Building, Minneapolis campus.

Students who are registered for classes on the Minneapolis campus and who live in the College of Agriculture dormitories will also be given free transportation. Tickets will be issued by the Service Department.

GENERAL OFFICES

The office of the director of the Summer Session is in Room 236 on the second floor of the Administration Building on the main campus. The offices of the registrar and cashier are on the first floor of the Administration Building. For the convenience of students registering in agriculture and home economics, branch offices are established on the second floor of the Administration Building, University Farm. Details of procedures to be followed in registering will be given out at these places. The several schools and colleges function in the control of students during the summer just as during any other quarter of the year. Students in one college

are free to elect courses in another college, however, on approval of the dean of the college in which the student is registered.

BUREAU OF RECOMMENDATIONS

The Bureau of Recommendations of the College of Education is operative during the summer quarter. 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 208, Burton Hall.

UNIVERSITY LIBRARY

The University Library is open to all students of the summer quarter. It includes about 660,000 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 largest and best university library buildings in the country. Its spacious reading rooms and a special floor with seminar library groups and discussion rooms for advanced students afford a greater seating capacity than any similar building yet erected. The library of the Department of Agriculture, with an excellent collection on agriculture and home economics, is located in the Administration Building at the University Farm. Branch libraries are maintained in a few of the schools and colleges, and there are smaller special collections conveniently grouped in the main library.

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

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

CORRESPONDENCE COURSES

The Correspondence Study Department of the General Extension Division affords an opportunity to students who come to the University only for the summer quarter 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 quarter a chance to complete some of their residence work at a time when many of them are free to do so. All those who are interested and who register for the summer quarter 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.

SHORT COURSE FOR CUSTODIANS

From June 18 to June 23, 1934, the General Extension Division will conduct a short course for janitors, engineers, and custodians of schools and other public buildings. This course will comprise an intensive practical training for ambitious men who have taken a serious interest in this vocation. Further information may be obtained by writing the General Extension Division, Department J, 402 Administration Building, University of Minnesota, Minneapolis.

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 children, the training of workers in the child welfare field, and the dissemination of information to parents, is offering a full program in the first term of the summer quarter, together with one graduate and one undergraduate course in the second quarter. Students, both undergraduate and graduate, can secure a well-rounded program.

During the first term a nursery school and kindergarten is operated by the institute.

For information as to courses and fees for the Nursery School and Kindergarten, see the section on the Institute of Child Welfare, pages 100-101.

MINNESOTA UNION

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

The Minnesota Union cafeteria will be open during the summer quarter, 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 on the Minneapolis campus. The University Farm post-office is in the Administration Building on the Farm campus. At the time of registration each student is assigned a post-office box in which he will receive all mail, announcements, and university communications. The mail box should be visited at least once a day. When leaving at the close of a term, students should give the postmaster a forwarding address.

OFFICIAL DAILY BULLETIN

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

STUDENTS' HEALTH SERVICE

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

An unusual opportunity for a complete physical examination is offered by the Students' Health Service to those in attendance during the summer quarter. 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 quarter and each year a large number of students have taken advantage of this opportunity. A charge of $4 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.

LIVING EXPENSES

The living expenses for students at the University are never very high, and this is true especially of the summer quarter. Good accommodations for room may be had from $10 to $12 per month. Meals can be secured for 75 cents per day and up. In addition to the cafeterias conducted on the campus by the University, several good restaurants are to be found in the immediate vicinity of the University. Further information concerning room and board may be obtained by addressing Mrs. Catharine 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 and Pioneer Hall.*

PIONEER HALL

The residence hall for men at the University of Minnesota was erected for the purpose of providing comfortable and attractive individual living quarters for men students. It is ideally located overlooking the Mississippi River on the East River Drive, one block east of the medical buildings. The building is quadrangle in form and is divided into eight houses, each house having a separate entrance. Approximately 32 students are accommodated in each house. Most of the rooms are arranged in three-room suites for two students—separate bedrooms and a common study. A few single and double rooms are provided for students who prefer this arrangement. Rooms are furnished with a combination wardrobe and dresser, bed, chair, study table, arm chair, rug, wastebasket, curtains, bed linen, and bed cover. Students are expected to furnish blankets, study lamps, towels, and other personal necessities.

The main dining hall will provide the residents of the houses three meals per day (cafeteria during the first term) if desired.

The rates for Pioneer Hall are for *room only* and are tabulated as follows:

	First Term 1934	Second Term 1934
Fourth floor rooms	$15.00	$12.50
Double rooms	20.00	16.50
Single rooms	22.50	18.50
Three-room suites for two men	25.00	21.00
Bay window suites for two men	27.50	23.00

(The rates for Pioneer Hall are for room only. Cafeteria meals—optional.)

Pioneer Hall will be open for room but not for board during the second term.

Students interested in residence in the hall should write to the director of Pioneer Hall, University of Minnesota, for a copy of the special bulletin and an application form. A $2 deposit fee must accompany application. Assignments will be made in the order of application.

SANFORD HALL

Sanford Hall, a residence hall for women, is on the Minneapolis campus. It accommodates 220 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, study table, easy chair, straight chair, and rug for each student. All bedding and the laundering of the same is furnished.

The rates during the summer quarter are with board in the first term and *without* board in the second term, and are as follows, payable at the time of registration:

	First Term (with board) 1934	Second Term (without board) 1934
Double rooms (4th floor)	$43.00	
Single rooms (4th floor)	49.00	$ 8.00
Double rooms	48.00	12.00
Single rooms	54.00	15.00

Reservations should be made as far in advance as possible. Applications, accompanied by a deposit of $2, should be sent direct to Sanford Hall, Uni-

versity 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 quarter, and is refunded when the regular charge is paid.

DEPARTMENT OF AGRICULTURE DORMITORIES

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

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

Rooms will be assigned, during registration, in the Farm campus Administration Building. Payment for the first term of the summer quarter must be made to the cashier, University Farm, at the time of assignment. Dormitories will be open Saturday, June 16. They will not be available during the second term.

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

ADMISSION AND REGISTRATION

ADMISSION

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

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

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

REGISTRATION

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

The regular registration days are:

For the first term, Monday, June 18, 9 a.m. to 4 p.m., and
Tuesday, June 19, 9 a.m. to 4 p.m.

For the second term, Saturday, July 28, 9 a.m. to 12 m.

The late registration fees are as follows:

For the first term for those completing the registration on

Wednesday, June 20	$2.00
Thursday, June 21	3.00
Friday, June 22	4.00
Saturday, June 23	5.00

No registrations are allowed for the first term after Saturday, June 23, 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 30	$2.00
Tuesday, July 31	3.00
Wednesday, August 1	4.00

No registrations will be accepted later than Wednesday, August 1, 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.

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

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

FEES

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

Tuition fee	$21.80
Incidental fee[1]	3.20
Total fee	$25.00
Part time (3 credits or less)	$11.80
Incidental fee[1]	3.20
Total	$15.00
General deposit	$2.00

[1] An incidental fee of $3.20 a term is charged each student for which the student receives the privileges of the Minnesota Union or Shevlin Hall, the Health Service, the *Summer Session Reporter* including the Official Daily Bulletin and the University post-office service.

Graduate students who have completed all their graduate work with the exception of their theses will be allowed to register in the summer quarter for *thesis work only* upon the payment of a flat fee of $5.

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 term.

For fees for students desiring legal time credit in the Medical School, see page 68.

For fees for students registered for clinical courses in the School of Dentistry, see page 84.

For fees for students registered for music courses, see page 45.

Refund of Fees

Students cancelling during the first week of either term for unavoidable reasons will be granted a four-fifths refund. After 3:00 p.m. Tuesday, June 26, no refunds will be granted for the first term. After Saturday noon, August 4, 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 auditors shall be the same as of registration for credit, except that "auditor" shall be indicated on both registration sheet and class card. It is expected in general that auditors will be registered in at least one course for credit, but this regulation may be waived in exceptional cases. Fees for auditors are the same as for students registered for credit.

CREDIT

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

AMOUNT OF WORK

In those colleges where the regular quarter load is 15 credits, a maximum of 7½ credits is considered a full program for either term. In those colleges where 16 or more credits is the average quarterly program, a maximum of 8 credits will be allowed. 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 filed before the end of the summer term.

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

DEGREES

Regular collegiate credit is given to qualified students for work in the summer quarter. For a detailed statement of the credit requirements for the various degrees, see the general information bulletin for 1933-34, pages 14-48, and the bulletins of the various schools and colleges of the University for the same year.

Work completed in the summer quarter is considered as residence credit.

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

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

2. *Recommendation of the faculty.*

3. *Residence requirement.*—Advanced standing will be allowed on certification from other recognized institutions and may be obtained also by examination held before a committee of the faculty appointed for that 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 Thursday, July 26, 1934.

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

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

INFORMATION

Correspondence with reference to the summer quarter and requests for circulars and additional information may be addressed to the director, Summer Session, or the registrar, University of Minnesota, Minneapolis, Minnesota.

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. The associate director of the Summer Session is in complete charge of all recreational activities, arranges their place on daily and weekly programs, and assumes responsibility for their being properly carried on. He has the assistance of the director of intramural athletics in conducting the recreational tours. There is a definite provision for their financial support, so that all events are available 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 convenient and pleasant 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 gather in 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 quarter. The University Theatre, a university dramatic student organization, functions throughout the summer and demonstrates the success attainable with student actors. For these offerings the very best of stage equipment and facilities is provided.

Informal social gatherings.—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 quarter life. A regular series of these events 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 excursions are arranged for the most advantageous hours, and it is a frequent event of a Saturday afternoon to see a party set out from the campus for a highly enjoyable tour. The cost is usually only the necessary street car or bus fare.

Physical activities.—Especial 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: an eighteen-hole golf course; 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-five 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 most of them with no extra charge except for towel service.

Tennis and golf tickets.—The use of the tennis courts is restricted to those holding tickets. Such tickets will be issued to regularly enrolled students of the summer quarter, upon payment of a fee of 50 cents for each term and presentation of the bursar's receipt for fees. Golf tickets are issued in the same manner without charge, but a greens fee of 50 cents is charged for each round. Application should be made to the Athletic Department, University Armory. Members of the university faculty and staff, and other non-students, may secure tennis tickets, good for one term, upon payment of $1.

Member's tickets.—Certain recreational events are open only to regular members of the summer quarter, 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.

SUMMER EMPLOYMENT

Students are advised not to engage in extra work during the summer; a full program of study during the warm weather should, with reasonable recreation, be a sufficiently heavy load. But for the benefit of those who feel compelled to aid themselves financially while in attendance, the service of the University Employment Bureau is always available. Many students are aided by this bureau which is on the basement floor of the Administration Building.

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.

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

Following each course is a statement, in parentheses, of credits, classes of students eligible, prerequisites, days of the week, class 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 prerequisites 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:

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
Adm, Administration Bldg
Aud, Cyrus Northrop Memorial Auditorium
B, School of Business Adm
BM, U.S. Bureau of Mines Bldg
Bo, Botany Bldg
Bu, Burton Hall
C, Chemistry Bldg
CWI, Child Welfare Institute
E, Main Engineering Bldg
Ed, Education Bldg
EE, Electrical Engineering Bldg
EH, Eustis Hospital
EMH, Elliot Memorial Hospital
Ex, Experimental Engineering Bldg
F, Folwell Hall
Gr, Greenhouse
IA, Institute of Anatomy
J, Jones Hall
L, Law Bldg
Lib, Library Bldg
M, Mines Bldg
ME, Mechanical Engineering Bldg
MeS, Medical Sciences Bldg
MGH, Minneapolis General Hospital
MH, Millard Hall
Mu, Music Bldg
O, Observatory
OT, Ore Testing Works
P, Pillsbury Hall
Ph, Physics Bldg
Phm, Pharmacy Bldg
Psy, Psychology Bldg
Pt, Pattee Hall
S, Stadium
SBH, State Board of Health Bldg
Sh, Shevlin Hall
UD, University Dispensary
UH, University of Minnesota Hospitals
WGm, Women's Gymnasium
WH, Wesbrook Hall
Z, Zoology Bldg

University Farm Buildings

Ad, Administration Bldg
Bch, Biochemistry Bldg
En, Engineering Bldg
HE, Home Economics Bldg
HH, Haecker Hall
ODH, Old Dairy Hall
PP, Plant Pathology and Botany
So, Soils Bldg

THE GRADUATE SCHOOL

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

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, or in three full summer quarters. Students must complete this work within six summers. In the first case, the candidate may (by special arrangement) be permitted to carry *in absentia* thesis work to complete the equivalent of three quarters. Students working for the Master's degree in summer terms or quarters must file the subjects of their theses before the completion of the first half of the required work. Theses of summer quarter students must be completed at least four weeks before the end of the term in which they take the degree.

A full statement of the requirements for advanced degrees may be found in the Graduate School bulletin and the special bulletin on graduate work in medicine.

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.

COLLEGE OF SCIENCE, LITERATURE, AND ARTS

GENERAL INFORMATION

The administrative officers of this college and their offices follow:

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

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

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

Some of the courses scheduled in this summer quarter bulletin by the Schools of Business Administration, Chemistry, and Medicine, the Colleges of Engineering and Architecture, 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.

BOTANY

FIRST TERM

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

7su.[1] Taxonomy and Classification of the Flowering Plants. A general study of the classification and relationships of flowering plants. (3 cred.; [5 cred. with additional field work; ar.] all; prereq. 1 or equiv.; MTWThF I, II; lect. 06Bo., lab. 4Bo.) Miss Mygrant.

12su.[1] General Morphology of Algae. Structure, evolution, and classification of the algae. (3 cred.; all; prereq. 1 or equiv.; MTWF III, MTWThF IV and 1 hr. ar.; 110 Bo.) Miss Tilden.

101su.[1] Biometric Principles. An introduction to the statistical analysis of biological, medical, and educational data; includes univariate and bivariate distributions, with computational techniques developed in laboratory. (3 cred.; prereq. 18 cred. in sci., math., or permission of instructor; lect. 5 hrs. ar., lab. 10 hrs. ar.; 202Bo.) Mr. Treloar.

[1] A laboratory fee of $2 is charged for this course.

125su.[1] Morphology and Taxonomy of Algae: Algal Types. A general survey based on studies in field and laboratory. Designed for teachers and research workers. (1-5 cred.; prereq. 15 cred. incl. 12, or consent of instructor; TTh I, II, III, IV or VI, VII, VIII, IX; 110 Bo.) Miss Tilden.

145su.[1] Correlational Analyses. Tutorial course, with outline, in theory and practical application of the Pearsonian methods of correlational analyses. (3 cred.; prereq. 101 or permission of instructor; meetings 3 hrs. ar., lab. ar.; 202Bo.) Mr. Treloar.

150su.[1] Advanced Phycology. Advanced studies in selected groups. (1-8 cred. per term; prereq. 15 cred. incl. 125 or 126, or consent of instructor; WF I, II, III, IV or VI, VII, VIII, IX; 110 Bo.) Miss Tilden.

153su. Statistical Interpretation. Tutorial course, with outline, in theory of statistical interpretation and its practical appliction; special reference given to small samples and Fisher's analysis of variance. (3 cred.; prereq. 101 or permission of instructor; meetings 3 hrs. ar.; 202Bo.) Mr. Treloar.

210su.[1] Research Problems in Algae. (1-8 cred.; ar.; 110 Bo.) Miss Tilden.

237su.[1] Research Problems in Biometry. (3 cred.; prereq. permission of instructor; ar.; 211Bo.) Mr. Treloar.

SECOND TERM

150su.[1] Advanced Phycology. Advanced studies of selected groups. Lectures, laboratory, and field work. (3 to 8 cred.; grad. only; prereq. 15 cred. incl. 124 or 126, or consent of instructor.) Full time work. To be given at the Forestry Station, Itasca Park, Minnesota. Miss Tilden.

ENGLISH

Courses in Literature

FIRST TERM

1su,3su. See under Courses in Composition.

21su. Introduction to English Literature. This course carries university credit for the first quarter of English 21-22-23. An intensive study of the leading writers of poetry and prose and of their historical background. Marlowe to Dryden. (5 cred.; all; prereq. English A-B-C, or Composition 4-5-6, or exemption from requirement; MTWThF II, IV; 301F.) Mr. Hessler.

33su. The Later English Novel. A study of the chief novelists of the last fifty years, including Hardy, Stevenson, Butler, Conrad, Galsworthy, Bennett. Lectures and class discussions. (3 cred.; all; prereq. English A-B-C, or Composition 4-5-6, or exemption from requirement; MTWF III and 1 hr. ar.; 311F.) Mr. Hillhouse.

55su. Shakespeare. The reading of *The Comedy of Errors, The Two Gentlemen of Verona, The Taming of the Shrew, The Merchant of Venice,*

[1] A laboratory fee of $2 is charged for this course.

Much Ado About Nothing, Twelfth Night, with collateral reading. *Midsummer Night's Dream, The Tempest,* to be read independently. (3 cred.; jr., sr.: prereq.;[1] MTWThF I; 306F.) Mr. Dunn.

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.;[1] MTWThF II; 302F.) Mr. Hillhouse.

62su. Milton. With some consideration of his contemporaries. (3 cred.; jr., sr.; prereq. 21-22 or 55-56; MTWThF IV; 205F.) Mr. Dunn.

74su. American Literature. This course carries university credit for the second quarter of English 73-74. (3 cred.; jr., sr.; prereq;[1] MTWThF II; 303F.) Mr. McDowell.

75su. Chaucer. Reading of tales from the Canterbury collection, with introduction dealing with the grammar and literary forms of fourteenth century English. (3 cred.; jr., sr.; prereq.;[1] MTWF III and 1 hr. ar.; 205F.) Mr. Ruud.

100su. Old English. Old English prose and poetry. The relation to modern English is particularly emphasized. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF I; 204F.) Mr. Ruud.

106su. Eighteenth-Century Poetry. From Pope to Burns, with special reference to the rise and growth of romanticism. This course carries university credit for the second quarter of English 105-106. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF II; 204F.) Mr. Moore.

107su. Eighteenth-Century Prose. Special study of fiction and the essay. This course carries university credit for the first quarter of English 107-108. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF IV; 204F.) Mr. Moore.

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

111su. Seventeenth-Century Prose. General survey of the prose of the century to 1660. This course carries university credit for the first quarter of English 111-112. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWF III and 1 hr. ar.; 204F.) Mr. Bush.

154su. American Novel. The history of the American novel from the beginning to the close of the nineteenth century. This course carries university credit for the first quarter of English 154-155. (3 cred.; jr., sr., grad.; prereq. 73-74; MTWThF I; 303F.) Mr. McDowell.

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

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

classics of English literature. This course carries university credit for the first quarter of English A-B-C. (6 cred.; all; prereq. placement test; MTWF III and 1 hr. ar., MTWThF IV; 302F.) Miss Armstrong.

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. (3 cred.; all; prereq. 9 cred. in comp.; MTWThF IV; 302F.) Miss Armstrong.

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. (3 cred.; all; prereq. placement test; MTWF III and 1 hr. ar.; 302F.) Miss Armstrong.

Csu. Freshman English. A continuation of Bsu. This course carries university credit for the third quarter of English A-B-C. (6 cred.; all; prereq. Eng. A-B; MTWThF II; 306F; MTWF III and 1 hr. ar.; 305F.) Miss Grandy.

3su. Freshman Literature. A continuation of English 1-2. This course carries university credit for the work in literature (types of poetry of English C). (3 cred.; all; prereq. 9 cred. in comp; MTWF III and 1 hr. ar.; 305F.) Miss 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 II; 306F.) Miss Grandy.

27su. Advanced Writing. The writing of essays with emphasis on structure and organization. Instruction largely in individual conferences. (3 cred.; soph., jr., sr.; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from requirement; MTWThF I; 205F.) Mr. Briggs.

Courses in Literature

SECOND TERM

2su. See under Courses in Composition.

56su. Shakespeare. A continuation of English 55. 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.;[1] MTWThF IV; 205F.) Miss Atkins.

73su. American Literature. This course carries university credit for the first quarter of English 73-74. (3 cred.; jr., sr.; prereq.;[1] MTWThF I; 303F.) Mr. Nichols.

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., grad.; prereq. 6 cred. above 50; MTWThF III; 303F. Mr. Nichols.

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

151su. Recent Poetry. Poetry in England and America since the death of Queen Victoria. The main tradition and tendencies now prevailing. (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50; MTWThF II; 205F.) Miss Atkins.

Courses in Composition

SECOND TERM

Bsu. Freshman English. A continuation of English A. This course carries university credit for the second quarter of English A-B-C. (6 cred.; all; prereq. Eng. A; MTWThF II, MTWThF IV; 204F.) Mr. Clark.

2su. Freshman Literature. A continuation of English 1. This course carries university credit for the work in literature (drama) of English B. (3 cred.; all; prereq. 9 cred. in comp.; MTWThF IV; 204F.) Mr. Clark.

5su. Freshman Composition. A continuation of Composition 4. This course carries university credit for the second quarter of Composition 4-5-6. (3 cred.; all; prereq. Comp. 4; MTWThF II; 204F.) Mr. Clark.

28su. Advanced Writing. Informal writing, involving description and narration. Instruction largely in individual conferences. (3 cred.; soph., jr., sr.; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from requirement; MTWThF III; 204F.) Mrs. del Plaine.

GEOGRAPHY

FIRST TERM

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

53su. Historical Geography. A study of the geography of past periods of American history. (3 cred.; jr., sr.; prereq. 1-2, or 11, or 41, or 10 cred. in hist. or pol. sci.; MTWThF I; 105Bu.) Mr. Brown.

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. 20 cred. in soc. sci. incl. 10 cred. in geog.; MTWThF III; 103Bu.) Mr. Hartshorne.

102su. Trade Route and Trade Centers. Major land and ocean routes, the nature of the traffic, ports and interior trade centers, their location and significance. (3 cred.; jr., sr., grad.; prereq. 41; MTWF IV and 1 hr. ar.; 103Bu.) Mr. Hartshorne.

133su. Climatology. The climatic elements, distribution of climatic types, and consideration of the effect of such types on human activities. (3 cred.; jr., sr., grad.; prereq. 11; MTWThF II; 105Bu.) Mr. Brown.

SECOND TERM

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

41su. Geography of Commercial Production. The principal commodities of world trade, with reference to areas of production and consumption and the geographic elements in their production. (5 cred.; soph., jr., sr.; prereq. 5 cred. in geog., or 10 cred. in econ. or soc., or 15 cred. in hist.; MTWF III-IV and 1 hr. ar.; 103Bu.) Mr. Hartshorne.

GEOLOGY

FIRST TERM

1su. General Geology. A study of the materials, structures, and processes of the earth. Lectures supplemented by laboratory work and field excursions. (5 cred.; all; no prereq.; TWThFS I-II; 110 P.) Mr. Stauffer.

GERMAN

FIRST TERM

1su. Beginning A. (5 cred.; all; no prereq.; MTWThF I, II; 209F.) Mr. Davies.

3su. Beginning C. (5 cred.; all; prereq. 2; MTWThF I, II; 207F.) Mr. Kroesch.

108su. Comparative Phonetics. Intended primarily for teachers of German but open also to teachers and students of other modern languages. (3 cred.; sr., grad.; MTWThF III; 207F.) Mr. Kroesch.

160su. Lyric Poetry. Eighteenth and nineteenth centuries. (3 cred.; sr., grad.; MTWF IV; 209F.) Mr. Davies.

GREEK[1]

FIRST TERM

Courses for Which No Knowledge of Greek Is Required

17su. Greek Sources of English (Everyday Greek). A brief course in Greek sources of English words. The practical purpose is to enable students to trace the origin and feel the force of English words derived from Greek, and especially of scientific terms. (2 cred.; soph., jr., sr.; prereq. one year of any foreign language; MTWTh I; 114F.) Mr. Hays.

42su. Greek Sculpture. Lectures, textbook work, assigned readings; stereoptican illustrations of the famous temples, statues, friezes, reliefs, and monuments of Greece. (2 cred.; soph., jr., sr.; no prereq.; MTWF II; 114F.) Mr. Savage.

44su. Greek Literature and Life. Lectures, textbook work, illustrative and assigned readings; stereopticon views. Recommended to those interested in literature, language, or ancient history. (2 cred.; soph., jr., sr.; no prereq.; MTWF III; 114F.) Mr. Savage.

[1] In addition to the courses listed above, the department is prepared to care for at least one graduate course.

45su. Greek Mythology. Lectures, textbook work, and illustrative readings, supplemented by occasional stereopticon views. The origin and interpretation of the myth; its relation to literature, art, and religion. (2 cred.; soph., jr., sr.; no prereq.; MTWTh IV; 114F.) Mr. Savage.

HISTORY

FIRST TERM

2su. Modern World, 1789–. A general survey of modern European developments from the beginning of the French Revolution. Part 2 of the freshman survey course (5 cred.; all; no prereq.; MTWF III-IV, Th IV, VII; 112Bu.) Miss Thompson.

7su. American History, 1789-1844. Part 1 of the general survey. With brief attention to the colonial foundation, the course deals chiefly with the Revolution and early national period. (3 cred.; soph., jr., sr.; no prereq.; MTWThF IV; 111Bu.) Mr. Babcock.

9su. American History, 1877–. Part 3 of the general survey; United States after Reconstruction. Industrial America in a world set-up. (3 cred.; soph., jr., sr.; no prereq.; MTWThF II; 211Bu.) Mr. Shippee.

62su. Survey of European Expansion. Beginnings of European colonization and expansion into the rest of the world. Policies and methods. (3 cred.; jr., sr.; MTWThF I; 211Bu.) Mr. Willson.

75su. England since 1815. Modern industrial England and the problems of economic and political evolution. (3 cred.; jr., sr.; MTWThF II; 112Bu.) Mr. Willson.

88su. American Colonial History. The British colonies in the seventeenth century; their establishment, institutions, etc. (3 cred.; jr., sr.; MTWThF I; 111Bu.) Mr. Babcock.

95su. History of American Diplomacy. International relations of the United States in the twentieth century. (3 cred.; jr., sr.; MTWThF IV; 221Bu.) Mr. Shippee.

96su. History of American Immigration. Study of immigrant stocks in the United States; their background and their transplantation. (3 cred.; jr., sr.; MTWThF I; 221Bu.) Mr. Stephenson.

Students registering for the following courses, which carry graduate credit, will attend class and do the required work in the survey course indicated, and will, in addition, meet with the instructor at hours to be arranged to discuss supplementary readings, etc. A special examination will be given at the completion of the course.

158su. European Expansion. (3 cred.; grad.; prereq. attend Hist. 62.) Mr. Willson.

190su. Topics in American History. (3 cred.; grad.; prereq. Hist. 88.) Mr. Babcock.

191su. Topics in Immigration. (3 cred.; grad.; prereq. Hist. 96.) Mr. Stephenson.

192su. American Diplomacy. (3 cred.; grad.; prereq. Hist. 95). Mr. Shippee.

SECOND TERM

8su. American History 1844-1877. Part 2 of the general survey course; the middle period of the nation's history. (3 cred.; soph., jr., sr.; no prereq.; MTWThF I; 211Bu.) Mrs. Tyler.

51su. Survey of Ancient History. Part 2 of the general survey. History of Greece. (3 cred.; jr., sr.; MTWThF I; 112Bu.) Mr. Deutsch.

61su. Survey of Later Modern European History. The World War and its aftermath in Europe. (3 cred.; jr., sr.; MTWThF II; 112Bu.) Mr. Deutsch.

94su. History of American Diplomacy. International relations from the Civil War to the end of the century. (3 cred.; jr., sr.; MTWThF III; 211Bu.) Mrs. Tyler.

Students registering for the following courses, which carry graduate credit, will attend classes and do the required work in the survey course indicated, and will, in addition, meet with the instructor at hours to be arranged to discuss supplementary readings, etc. A special examination will be given at the completion of the course.

151su. Topics in Ancient History. (3 cred.; grad.; prereq. attend Hist. 51.) Mr. Deutsch.

158su. Topics in Modern European History. (3 cred.; grad.; prereq. attend Hist. 61.) Mr. Deutsch.

192su. Topics in American Diplomacy. (3 cred.; grad.; prereq. attend Hist. 94.) Mrs. Tyler.

HOW TO STUDY

FIRST TERM

1su. How To Study. Training in techniques of learning. Stress will be laid on recitation methods, efficient reading, note-making, and budgeting time. (2 cred.; all; no prereq.; MTWThF II; 104J.) Mr. Bird.

JOURNALISM

FIRST TERM

NOTE.—A typewriter fee of $1 is charged for the summer quarter to students registered for journalism courses 11, 69, and 82.

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

69su. Newspaper and Magazine Articles. Lectures and conferences. Practice in writing the various forms of the non-fiction article for magazines and newspapers. (3 cred.; jr., sr.; prereq. 11 or 15 or consent of instructor; MTWThF II; 10 P.) Mr. Casey.

82su. Supervision of School Publications. A practical consideration of problems facing supervisors of high school newspapers, magazines, and yearbooks. (3 cred.; jr., sr.; prereq. consent of instructor; MTWThF IV; 10 P.) Mr. Barnhart.

113su. The Press and Foreign Affairs. An appraisal of the relationship between international amity and the reporting and interpretation of world news by the American and foreign press. (3 cred.; jr., sr., grad.; no prereq.; MTWF III, a fifth hour to be arranged; 14P.) Mr. Coggeshall.

133su. Propaganda and Censorship in the Modern World. The propaganda activities of governments, economic groups, political parties, and others seeking to control mass behavior by symbolic stimuli. (3 cred.; jr., sr., grad.; no prereq.; MTWThF IV; 14P.) Mr. Casey.

LATIN

FIRST TERM

73su. Advanced Grammar and Composition. Designed especially for teachers of Latin. (3 cred.; jr., sr.; prereq. four years of high school Latin; MTWThF IV; 109F.) Mr. Cram.

154su. Elegiac Poets: Catullus, Tibullus, Propertius, Ovid. (3 cred.; jr., sr., grad.; prereq. any two of the following courses: 51, 52, 53, 62, 63, 71, 73, or six years of Latin; MTWThF II; 109F.) Mr. Cram.

MATHEMATICS

FIRST TERM

5su. Higher Algebra. A collegiate treatment of the topics of elementary algebra for those who have had one year of elementary algebra. (5 cred.; all; prereq. 1 yr. elementary algebra; MTWThF VI-VII; 105F.)

6su. Trigonometry. A treatment of logarithms and plane trigonometry. (5 cred.; all; prereq. 3 or 5 or high school higher algebra; MTWThF I-II; 105F.) Mr. Oberg.

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

30su. Analytic Geometry. See College of Engineering, page 55.

50su. Calculus I. Differential Calculus. (5 cred.; jr., sr.; prereq. 30; MTWThF I-II; 104F.) Mr. Underhill.

72su. History of Ancient and Modern Mathematics. Historical development of fundamental mathematical notions; their origin in ancient times and their significance in the light of modern research. (3 cred.; jr., sr.; prereq. 50; MTWThF IV; 104F.) Mr. Jackson.

106su. Differential Equations. A first course in differential equations with emphasis on their applications in physics and geometry. (3 cred.; jr., sr., grad.; prereq. 51; MTWF III, Th V; 104F.) Mr. Underhill, Mr. Oberg.

110su. Selected Topics in Advanced Mathematics. An intensive course open to juniors, seniors, and graduates, who will be guided through confer-

ences in the study of assigned topics. (Cred. ar.[1]; jr., sr., grad.; prereq. 51; ar.) Mr. Jackson, Mr. Underhill.

137su. The Gamma Function and Related Topics. Fundamental properties of the Gamma function and formulas associated with it, as needed in pure mathematics, mathematical physics, and statistics. (3 cred.; jr., sr., grad.; prereq. 51; MTWThF II; 101F.) Mr. Jackson.

SECOND TERM

6su. Trigonometry.[2] (5 cred.; all; prereq. 3 or 5 or high school higher algebra; MTWThF III-IV; 105F.) Mr. Oberg.

51su. Calculus II. Integral Calculus. See College of Engineering, page 56.

MUSIC

FIRST TERM

The courses below, for which no special fee is indicated, may be taken by summer quarter students on payment of the regular summer quarter fee. Students who pay as much as $25 per term for special music fees may enroll for other courses in any department of the summer quarter, for an additional fee of $14 per term, making a total of $39 for general and special fees. All students who register for either the general courses or the special courses must pay the $2 deposit.

3su. Harmony. (3 cred.; no prereq.; MTWThF VI; quiz section ar.; 103Mu.) Miss Malcolm.

4su. Harmony. (3 cred.; no prereq.; MTWThF VII; quiz section ar.; 103Mu.) Miss Malcolm.

9Asu. Introduction to Music. Analytical and historical discussion of the elements, principles of structure, and various forms of music, designed to give a general survey of musical literature and the foundations of an appreciative attitude. This course covers the last half of the full year's work. (3 cred.; no prereq.; MTWThF II; quiz section ar.; 103Mu.) Mr. Ferguson.

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

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

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

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

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

43su. Chorus. (1 cred.; all; TTh IX; MuAud.) Mr. Killeen.

[1] The number of credits is 1 or more according to the amount of work done.

[2] This course will not be given unless fifteen students signify their intention of taking the course by notifying the Department of Mathematics (Room 119, Folwell Hall) before the close of the first term of the summer quarter.

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

76su. Form and Analysis. (2 cred.; no prereq.; MTWTh VIII; 3Mu.) Mr. Pepinsky.

PHILOSOPHY

FIRST TERM

1su. Problems of Philosophy. Introduction to philosophy through a study of its methods and results as seen in typical historic systems. (3 cred.; soph., jr., sr.; no prereq.; MTWThF III; 322F.) Mr. Castell.

3su. Ethics. A study of morality, both as to its principles and its practical applications. (3 cred.; soph., jr., sr.; no prereq.; MTWThF I; 322F.) Mr. Nilson.

115su. Contemporary Philosophy. Critical discussions of present tendencies as seen in the writings of Dewey, Russell, Santayana, Whitehead, and others. (3 cred.; jr., sr., grad.; prereq. 10 cred.; MTWThF II; 322F.) Mr. Castell.

PHYSICS

FIRST TERM

3su. Elements of Mechanics. A quantitative study of the general principles underlying Newtonian mechanics. First part of general course, 3, 13, 23, 33, 43. Course 4 should be taken in conjunction with this course. (3 cred.; all; prereq. Math. 4 or 6; lect. MTWThF I, T III; quiz Th IX; 133Ph.) Mr. Erikson.

4su.[1] Elements of Mechanics Laboratory. The laboratory part supplementing Course 3. (1 cred.; all; prereq. 3 or reg. in 3; MW VI-VII; 153Ph.) Mr. Erikson.

43su. Electricity. A quantitative study of the general principles governing electrical phenomena. Course 44 should be taken in conjunction with this course. (3 cred.; all; prereq. 3; lect. MTWThF II, M IV; quiz F IX; 166Ph.) Mr. Hill.

44su.[1] Electricity Laboratory. The laboratory part supplementing Course 43. (1 cred.; all; prereq. 3, 43, or reg. in 43; TTh VI-VII; 231Ph.) Mr. Hill.

107su. Modern Physics. Selected topics of present interest in kinetic theory of gases, electron theory, and the structure of matter, with discussion of current experiments and theories. (3 cred.; all; prereq. 12 cred. in phys., Math. 51; ar.) Mr. Hill.

114su. Elementary Physical Investigation. The experimental or theoretical study of physical phenomena the nature of laws of which are not as yet understood. (3 cred.; jr., sr., grad.; prereq. 104, Math. 51; ar.) Mr. Erikson, Mr. Hill.

148su.[1] Radioactivity. An analytical study of the theories and methods of investigation supplemented by laboratory technique. (3 cred.; jr., sr., grad.; prereq. 12 cred. in phys.; MWF VI-IX.) Mr. Erikson.

[1] A laboratory fee of $2 is charged for this course.

152su. X-Rays. A study of the production and nature of X-rays. (3 cred.; jr., sr., grad.; prereq. 12 cred. in phys.; MTWThF IV; 133Ph.) Mr. Erikson.

221su. Wave Mechanics and Molecular Structure. Introductory wave mechanics and its application to basic problems of atomic and molecular structure, with special emphasis on theories of polar and non-polar chemical binding. (3 cred.; jr., sr., grad.; prereq. 105, Math. 51; MTWThF III; 145Ph.) Mr. Hill.

SECOND TERM

23su. Heat. A quantitative study of the general principles governing heat phenomena. Course 24 should be taken in conjunction with this course. (3 cred.; all; prereq. 3; lect. MTWThF II, M IV; quiz F IX; 166Ph.) Mr. Miller.

24su.[1] Heat Laboratory. The laboratory part supplementing Course 23. (1 cred.; all; prereq. 4, 23, or reg. in 23; TTh VI-VII; 244Ph.) Mr. Miller.

33su. Optics. A quantitative study of the general principles governing optical phenomena. Course 34 should be taken in conjunction with this course. (3 cred.; all; prereq. 3; lect. MTWTh I, T III; quiz Th IX; 133Ph.) Mr. Valasek.

34su.[1] Optics Laboratory. The laboratory part supplementing Course 33. (1 cred.; all; prereq. 4, 33 or reg. in 33; MW VI-VII; 352Ph.) Mr. Valasek.

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

134.[1] Experimental Optics. Special experimental work in spectrometry, optical instruments, photometry, absorption, polarized light. (3 cred.; jr., sr., grad.; prereq. 34; TTh VI-IX, ThF III-IV.) Mr. Valasek.

136.[1] 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. (3 cred.; jr., sr., grad.; prereq. 34; TTh VI-IX, ThF III-IV.) Mr. Valasek.

154su.[1] X-Ray Spectroscopy. Theory of diffraction of X-rays by crystals. Emission and absorption spectra. Theory and systemization of X-ray spectra. Satellites of diagram lines and effects of chemical combination. (3 cred.; jr., sr., grad.; prereq. 152 and permission of instructor; TTh VI-IX, ThF III-IV.) Mr. Valasek.

POLITICAL SCIENCE

FIRST TERM

1-2-3su. American Government and Politics I. A survey of the American political system, with some consideration of the basic principles and

[1] A laboratory fee of $2 is charged for this course.

problems of government in the modern industrial age. (4 cred.; soph., jr., sr. no prereq., and fresh. with 10 cred. in hist., econ., or geog.; TWThF I-II; 209Bu.) Mr. Starr.

109su. Government and Business. Governmental powers; restraint of trade and manipulation of prices; business affected with a public interest, etc., some phases of the "New Deal," e.g., the NRA. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWThF I; 112Bu.) Mr. Young.

131-132su. Public Administration. Sources of administrative power; administrative areas and organization; the budget; purchasing; public service as a career; recent problems. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWThF IV; 209Bu.) Mr. Lambie.

134su. Current Political Problems. Parliamentary, presidential, and Federal government, reorganization proposals; public opinion and pressure groups; electoral, budgetary, and civil service reforms; the "New Deal"—temporary only, or permanent? (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWThF II; 221Bu.) Mr. Young.

135su. Government in Minnesota. The form and work of government in Minnesota. Relations between the national government and the state. Problems of finance, education, relief, highways, etc. (3 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; MTWF III, Th II; 111Bu.) Mr. Lambie.

148su. European Dictatorships. Description and evaluation of contemporary absolute government, especially in Soviet Russia, Italy, and Germany; organization and policies of political parties. (2 cred.; jr., sr., grad.; prereq. 9 cred. or consent of instructor; TWThF IV; 211Bu.) Mr. Starr.

261su. Seminar for Research in Selected Fields of Political Science. (Cred. ar.; prereq. consent of department.) Mr. Lambie, Mr. Young, Mr. Starr.

SECOND TERM

1-2-3su. American Government and Politics II. Continuation of 1-2-3su. (4 cred.; prereq. American Government and Politics I, or consent of instructor; TWThF III-IV, Th IV; 209Bu.) Mr. Field.

25su. World Politics. An introduction to the field of contemporary international relations; the policies of the great powers today; nationalism; imperialism; internationalism. (4 cred.; soph., jr., sr.; no prereq.; TWThF I-II; 209Bu.) Mr. Quigley.

112su. The Constitution and the New Deal. A study of the Agricultural Administration Act, the currency and banking acts, the NIRA program, and court decisions relating to the constitutionality of this legislation. (2 cred.; prereq. 9 cred. or consent of instructor; TWThF I; 221Bu.) Mr. Field.

183su. International Organization. The older international community and the League of Nations; international policy, legislation, and administration; the settlement of international disputes; sanctions. (2 cred.; jr.,

sr., grad.; prereq. 9 cred. or consent of instructor; TWThF IV; 211Bu.) Mr. Quigley.

262su. Seminar for Research in Selected Fields of Political Science. See 261su. Mr. Field, Mr. Quigley.

PSYCHOLOGY

FIRST TERM

For course in How To Study see page 43 of this bulletin.

1su. General Psychology. An introductory survey of psychology; its material, fundamental laws, applications, and relations to other sciences. (3 cred.; soph., jr., sr.; no prereq.; MTWThF II; 115Psy.) Miss Hevner.

1su,2su. General Psychology. Same as 1su. (6 cred.; soph., jr., sr.; no prereq.; MTWF III, MTWThF V; 115Psy.) Mr. Heron.

105su. Psychology of Beauty. Study of factors which constitute beauty of various kinds and for different individuals; analyses of examples in music, literature, painting, etc. (3 cred.; jr., sr., grad.; prereq. general psychology; MTWThF IV; 115Psy.) Miss Hevner.

109su.[1] Psychology of Individual Differences. Quantitative study of sex, race, physical traits, physical condition, family heredity, environment, and maturity in the causation of individual differences. (3 cred.; jr., sr., grad.; prereq. general psychology; MTWThF II; 109Psy.) Mr. Paterson.

113su.[1] Abnormal Psychology. A survey of various forms of abnormal behavior with special reference to their bearing on the problems of normal behavior. (3 cred.; jr., sr., grad.; prereq. general psychology; MTWF III, Th V; 109Psy.) Miss Heidbreder.

117su. Problems and Points of View in Contemporary Psychology. A survey of the more marked trends in contemporary psychological theory and research, as represented by behaviorism, gestalt-psychology, psychoanalysis, etc. (3 cred.; jr., sr., grad.; prereq. general psychology; MTWThF II; 211Psy.) Miss Heidbreder.

140su. Social Psychology. A critical study of experimental investigations of group behavior. The social significance of attitudes and instinct, habit, imitation, and suggestibility. (3 cred.; jr., sr., grad.; prereq. general psychology; MTWThF I; 115Psy.) Mr. Bird.

181su. Research Problems in General or Experimental Psychology. (2 cred.; jr., sr., grad.; prereq. advanced preparation and permission of instructor; ar.; ar.) Mr. Bird, Miss Heidbreder, Mr. Heron.

SECOND TERM

1su,2su. General Psychology. See 1su, 2su, First Term. (6 cred.; soph.; jr., sr.; no prereq.; MTWThF III-IV; 115Psy.) Mr. Longstaff.

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

ROMANCE LANGUAGES

FIRST TERM

Courses in French

1su. Beginning French. (4 cred.; all; no prereq.; TWThF I, II; 201F.) Mr. Olmsted.

4su. Intermediate French. Equivalent either to French 3 or French 4. (4 cred.; all; prereq. 3 or 2 with grade of C; MTWF III, TWThF IV; 202F.) Mr. Barton.

54su. French Conversation. (2 cred.; jr., sr.; prereq. 4; TWThF II; 203F.) Mr. Barton.

141su. Eighteenth Century French Comedy. (2 cred.; jr., sr., grad.; prereq. 70-71-72 or equiv.; TWThF IV; 201F.) Mr. Olmsted.

190su. Honors Course. The Realistic Novel; Guy de Maupassant. Directed work with conferences. (2 cred.; jr., sr., grad.; prereq. 70-71-72 or equiv.; TWThF I; 303F.) Mr. Barton.

259su. Research in French and Spanish. (Cred. ar.; grad.; hrs. ar.) Mr. Barton, Mr. Olmsted.

SOCIOLOGY

FIRST TERM

1su. Introduction to Sociology. An objective analysis of culture with special attention to social change. Survey of culture patterns, cultural processes, and social interaction. (3 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.; Sec. 1, MTWThF I, 109J, Mr. Willey; Sec. 2, MTWThF II, 109J, Mr. Weinfeld; Sec. 3, MTWF III, 2J, Th VI, 2J, Mr. Weinfeld.)

6su. Social Interaction. The basis and forms of social interaction and social relationships, with detailed attention to patterns of contemporary society. (3 cred.; soph., jr., sr.; prereq. 1; MTWF III, Th VI; 104J.) Miss Stone.

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

49su. The Socially Inadequate. Their significance in contemporary 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. 1 and 10 cred. in soc. sci. or psy.; MTWThF I; 104J.) Mr. Schmid.

52su. Elementary Case Work. An introduction to the problems and methods of social case work. (3 cred.; jr., sr.; prereq. 49; MTWThF I; 2J.) Mrs. 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; MTWThF II; 102F.) Mr. Vold.

91su.[1] Elementary Field Training in Case Work. Elementary social case work. Begins individual training for the practice of social case work. (4 cred. each qtr.; jr., sr.; prereq. 52 and consent of adviser in soc. work; ar.) Mrs. Doyle.

92su.[1] Continuation of 91.

101su. Social Organization. The organization and structure of social groups; the basic social processes of integration and disintegration of social institutions. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWF III, Th VII; 109J.) Mr. Chapin.

119su. The Family. The development of family unity or disunity; the rôles of the several members of the family; methods of investigation. (3 cred.; jr., sr., grad.; prereq. same as for 101; MTWThF IV; 109J.) Mr. Kirkpatrick.

130su. Advanced Case Work. A study of the adaptations of scientific knowledge; and an analysis of processes and techniques of interviewing. (3 cred.; sr., grad.; prereq. 92, 129; MTWThF II, 2J.) Mrs. Fenlason.

153-154-155su.[1] Advanced Field Training in Case Work. May be taken in specialized fields of child welfare and medical, as well as family, work. (1 to 5 cred. per qtr. ar. by adviser; jr., sr., grad.; prereq. 91 and 92; ar.) Mrs. Doyle.

200su. General Seminar. Ar. Staff.

SECOND TERM

1su. Introduction to Sociology. An objective analysis of culture with special attention to social change. Survey of culture patterns, cultural processes, and social interaction. (3 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.; Sec. 1, MTWThF I, 2J, Miss Stone; Sec. 2, MTWThF II, 104J. Mr. Weinfeld.)

6su. Social Interaction. The basis and forms of social interaction and social relationships, with detailed attention to patterns of contemporary society. (3 cred.; soph., jr., sr.; prereq. 1; MTWThF II; 109J.) Mr. Hoffman.

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

92su.[1] Elementary Field Training in Case Work. Continuation of 91. Elementary individual training for the practice of social case work. (4 cred. each qtr.; jr., sr.; prereq. 52 and consent of adviser in soc. work; ar.) Miss Leahy.

114su. Rural Social Institutions. Study of the problems of organization of selected rural institutions, especially religious, educational, civic, and recreational. (3 cred.; jr., sr., grad.; prereq. same as for 101; MTWF III, Th VI; 109J.) Mr. Murchie.

[1] Field work fee $3 each term.

131su. Rural Social Work. Primarily a course for students wishing to specialize in social work in the rural field. (3 cred.; sr., grad.; prereq. 92; MTWThF I; 109J.) Miss Vaile.

139su. Mental Case Work. A study of the intellectual and emotional factors in human adjustment and their significance in case work. (3 cred.; sr., grad.; prereq. 52, 91 and Psy. 144-145, or Prev. Med. 61 or simultaneously; MTWThF II; 2J.) Miss Leahy.

152su. Public Welfare Administration. The history of public welfare administration; special problems of state and county administration of public welfare activities. (3 cred.; jr., sr., grad.; prereq. 49, 52 and Pol. Sci. 1-2; MTWThF IV; 109J.) Miss Vaile.

153-154-155su.[1] Advanced Field Training in Case Work. May be taken in specialized fields of child welfare and medical, as well as family, work. (1 to 5 cred. per qtr. ar. by adviser; jr., sr., grad.; prereq. 91 and 92; ar.) Miss Leahy.

200su. General Seminar. Ar. Staff.

SPEECH

FIRST TERM

Speech Clinic.[1] For students who have particular speech defects such as cleft palate, stuttering, lisping, and inadequate social behavior. (Ar.; 410 F.) Mr. Bryngelson, Miss Hull.

41su.[2] Fundamentals of Speech. Speech as social adaptation and control. Emotional problems. Technique of body and voice. Oral reading. Public speaking. (3 cred.; soph., jr., sr.; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption; Sec. 1, MTWThF I, 301F; Sec. 2, MTWThF VI, 212F.) Mr. Fulton.

55su. Argumentation and Debate. Analysis, evaluation of evidence, briefing, and strategy. The state high school subject, and coaching problems, will receive special consideration. (3 cred.; jr., sr.; prereq. 41-42-43 or 45-46; MTWThF I; 308F.) Mr. Knower.

61su. Speech Correction. Introduction to the correction of speech disorders. Speech defects as symptoms of maladjustments and organic malformations. Literature of subject. (3 cred.; jr., sr.; prereq. 41-42-43 or 45-46; MTWThF II; 212F.) Mr. Bryngelson.

71su.[2] Elements of Play Production. Make-up and acting. Reading of plays. Stage equipment, organization and management. Participation in productions. Texts. (3 cred.; prereq. 41-42-43 or 45-46; MTWThF IV; 19Mu.) Mr. Ramsland.

81su.[2] Interpretative Reading. Esthetic theory of literature and of oral reading. Practice in reading for interpretation and mastery of technique. (3 cred.; jr., sr.; prereq. 41-42-43 or 45-46; MTWThF II; 308F.) Miss Hurd.

[1] The clinic will accept a limited number of non-student patients on the payment of a fee of $30 per term, or $50 for both terms.

[2] Students taking these courses are required to pay a laboratory fee of $1 each quarter

91su.[2] Stagecraft. Designing, building, painting, and lighting scenery; elements of the physical theater; related problems of the director and actor. (3 cred.; jr., sr.; prereq. 41-42-43 or 45-46 and 81-82-83, Eng. 55-56: MTWThF VII; 19Mu.) Mr. Riley, Mr. Lee.

101su. Advanced Speech Composition. Structure and oral style. Psychology of persuasion; critical study of models. Written speeches, reports. (3 cred.; jr., sr., grad.; prereq. 41-42-43 or 45-46 and 81-82-83, and Psy. 1-2, and 10 cred. soc. sci.; MTWThF IV; 308F.) Miss Hurd.

111su.[3] Direction. Practice and theory of stage direction; esthetics of the theater, analysis of the play, casting, rhythm, reading, organization for production. (3 cred., sr., grad.; prereq. Eng. 55-56, Speech 81-82-83; MTWThF III; 19Mu.) Mr. Riley.

115su. Playwriting and Production. Theory and practice of writing and producing plays. Composition of the play from the elementary scenario to the completed dialog. Registration limited to ten students. (2 cred.; sr., grad.; prereq. 71-72-73 and permission of the instructor; MTWTh V; Mu19.) Mr. Riley.

121su. Advanced Speech Problems. Introduction to research; fields and methods of study; reports of research are reviewed; emphasis on psychology of speech; projects, reports. (3 cred.; jr., sr., grad.; prereq. 41-42-43 or 45-46 and Psy. 1-2; MTWThF II; 409F.) Mr. Knower.

151su.[4] The Teaching of Speech. Orientation in problems of speech education. History, applications of psychology; objectives, programs, and methods; direction of extra-curricular activities; evaluation of texts. (3 cred.; jr., sr., grad.; prereq. 41-42-43, or 45-46 or equivalent, or permission of instructor; MTWThF VI; 308F.) Mr. Knower.

162su. Speech Pathology. Physiological and psychological aspects of organic and functional speech problems. Theories of stuttering. Diagnoses and treatment. Clinical observation. (3 cred.; jr., sr., grad.; prereq. 41-42-43 or 45-46 and 61, 67; MTWThF IV; 409F.) Mr. Bryngelson.

171su. History of the Theater. A comprehensive course in the history of drama, acting, and stagecraft of all countries from the primitive dance drama to the modern stage production. (3 cred.; sr., grad.; prereq. 41-42-43 or 45-46; 71-72-73; MTWThF IV; 19Mu.) Mr. Riley.

SECOND TERM

41su. Fundamentals of Speech. This course is identical with Fundamentals of Speech offered in the first term. Mr. Bryngelson.

92su. Stagecraft. A continuation of Speech 91su. Mr. Lee.

112su. Stage Direction. A continuation of Speech 111su. Mr. Riley.

[2] Students taking these courses are required to pay a laboratory fee of $3 each quarter.

[3] Students taking these courses are required to pay a laboratory fee of $1 each quarter.

[4] Carries credit in education.

116su. Playwriting and Producing. A continuation of 115su. Mr. Riley.
163su. Speech Pathology. A continuation of Speech 162su. Mr. Bryngelson.

ZOOLOGY

(Credit is given for acceptable work done at any accredited marine or freshwater biological station.)

FIRST TERM

1su.[1,2] General Zoology. Structure, physiology, embryology, classification, and evolution of animals. (5 cred.; all; no prereq.; lect. MTWF I, Th I, II; lab. MTWF II, III, IV; 313Z, 101Z.) Mr. Wodsedalek.

21su.[1] Histology. A brief course on the structure of the cell, tissues, and organs. (3 cred.; soph., jr., sr.; prereq. 1-2-3 or equiv.; MF I, II, III, IV, TTh I; 201Z.) Mr. Ringoen.

197su. Problems. Advanced work in some special line. (3 or more cred.; jr., sr., grad.; prereq. 1-2-3 and special requirements; ar.) Mr. Wodsedalek, Mr. Ringoen.

SECOND TERM

2su.[1,2] General Zoology. Continuation of 1su. (5 cred.; all; prereq. 1su or equiv.; lect. MTWF I, Th I, II; lab. MTWF II, III, IV; 211Z,101Z.) Mr. Eddy.

198su. Problems. Advanced work in some special line. (3 or more cred.; jr., sr., grad.; prereq. 1-2-3 and special requirements; ar.) Mr. Eddy.

[1] A laboratory fee of $2 is charged for this course.

[2] The entire course in elemenatry zoology includes both 1su and 2su. No credit is given for 1su until the satisfactory completion of 2su.

COLLEGE OF ENGINEERING AND ARCHITECTURE

ARCHITECTURE AND FINE ARTS[1]

FIRST TERM

21-22-23su. Beginning Freehand Drawing. (Page 68.) (2 cred. each; no prereq.; MTWF I-III or ar.; 417E.) Mr. Burton.

24-25-26su. Intermediate Freehand Drawing. (Page 68.) (2 cred. each; prereq. 23 or evidence of intermediate ability; MTWTh I-III or ar.; 417E.) Mr. Burton.

27-28-29su. Advanced Freehand Drawing. (Page 68.) (2 cred. each; prereq. 26 or evidence of advanced ability; MTWTh I-III or ar.; 417E.) Mr. Burton.

71su.[2] Painting. (Page 69.) (3 or 6 cred.; prereq. evidence of elementary ability; MTWF V-VII or ar.; 405E.) Mr. Burton.

72su.[2] Sculpture. (Modeling in clay.) (Page 69.) (3 or 6 cred.; prereq. evidence of elementary ability; MTWF I-III or ar.) Mr. Burton.

81su. Stage Design. (Page 71.) (2 cred.; no prereq.; MTWF I-III; 405E.) Mr. Burton.

82su. Advanced Stage Design. (Page 71.) (2 cred.; prereq. 81; MTWF I-III; 405E.) Mr. Burton.

121-122-123su.[2] Freehand Drawing. (Page 69.) (2 cred. each; prereq. 29; MTWF I-III; 405E.) Mr. Burton.

180su. Architecture and Decoration. (Page 71.) (2 cred.; no prereq.; TWF IV; 320E.) Mr. Mann.

221su.[2] Life Drawing and Figure Composition. (Page 69.) (2 cred.; prereq. completion of undergraduate freehand drawing; ar.) Mr. Burton.

DRAWING AND DESCRIPTIVE GEOMETRY[1]

FIRST TERM

1-2su. Engineering Drawing. (Page 89.) (3 cred. each; prereq. Solid Geometry; 18 hrs. ar.; 101E.) Mr. French.

3su. Descriptive Geometry. (Page 89.) (3 cred.; prereq. 2, M.&M. 11; lect., MTWThF I, 205E.; lab., 12 hrs. ar., 101E.) Mr. French.

4-5-6su. Engineering Drawing and Descriptive Geometry. (Page 89.) (2 cred. each; Chem. and Chem.E.; prereq. Solid Geometry; 12 hrs. ar.; 201E.) Mr. French.

7-8su. Engineering Drawing and Descriptive Geometry. (Page 90.) (3 cred. each; Chem. and Chem.E.; prereq. Solid Geometry; 18 hrs. ar.; 201E.) Mr. French.

[1] Page numbers in course descriptions refer to the bulletin of Engineering, Architecture, and Chemistry for 1933-34, where further information may be found.

[2] A fee of $1.50 is charged for this course.

SECOND TERM

(See first term descriptions of courses above.)

3su. Descriptive Geometry. (18 hrs. ar.) Mr. Schuck.
6su. Descriptive Geometry. (Chem. and Chem.E.; 12 hrs. ar.) Mr. Schuck.
8su. Drawing and Descriptive Geometry. (Chem. and Chem.E.; 18 hrs. ar.) Mr. Schuck.
21-22-23su. Drafting. (Page 90.) (2 cred. each; C.E.; prereq. 3; 12 hrs. ar.; 201E.) Mr. Schuck.
26su. Drafting. (Page 90.) (2 cred.; E.E.; prereq. 3; 12 hrs. ar.; 201E.) Mr. Schuck.
28su. Drafting. (Page 90.) (2 cred.; Aero.E.; prereq. 3; 12 hrs. ar.; 201E.) Mr. Schuck.

MATHEMATICS AND MECHANICS

FIRST TERM

11su. College Algebra. (See Math. 7, page 44 of this bulletin.)
12su. Trigonometry. (See Math. 6, page 44 of this bulletin.)
13su. Analytic Geometry. (Page 106.[1]) (5 cred.; prereq. 11 and 12; MTWF III-IV, Th IV-V, plus 2 hrs. to be ar.; 106E.) Mr. Herrick.
24su. Differential Calculus. (See Math. 50, page 44 of this bulletin.)

SECOND TERM

25su. Integral Calculus. (Page 107.[1]) (5 cred.; prereq. 24; MTWThF III-IV, plus 2 hrs. to be ar.; 136E.) Mr. Peebles.
26su. Technical Mechanics: Statics. (Page 108.[1]) (5 cred.; prereq., 25; MTWThF III-IV, plus 2 hrs. to be ar.; 205E.) Mr. Doeringsfeld.

MECHANICAL ENGINEERING[1,2]

FIRST TERM

WOODWORKING COURSES

11su.[3] Pattern Practice. (Page 111.) (2 cred.; no prereq.; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Richards.
14su.[3] Pattern Practice. (Page 112.) (2 cred.; prereq. Chem. 5, Dr. 2; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Richards.

Special Courses for Teachers

1su.[3] Machine Woodworking. (Page 111.) (2 to 4 cred.; no prereq.; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Richards.
4su.[3] Wood Turning. (Page 111.) (2 to 4 cred.; no prereq.; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Richards.

[1] Page numbers in course descriptions refer to the bulletin of Engineering, Architecture, and Chemistry for 1933-34, where further information may be found.

[2] The shops are open at the hours stated. The student will arrange his program with the instructor.

[3] A laboratory fee of $1.50 per credit is charged for this course.

5su-6su.[3] Woodworking and Wood Finishing. Woodworking tools and machinery; furniture design and construction; use of stains, varnishes, lacquers, etc., in wood finishing. Course designed to meet the needs of students in Interior Architecture. Lecture and laboratory practice. (2 cred. each; no prereq.; MT I-IX, WF I-IV, Th I-II or ar.; ME.) Mr. Richards.

10su.[3] Furniture Making. (Page 111.) (2 to 4 cred.; no prereq.; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Richards.

Machine Shop Work

17su.[3] Machine Shop Practice. (Page 113.) (2 cred.; Chem. and Chem.E.; no prereq.; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Cowie.

19su.[3] Machine Shop Practice. (Page 113.) (2 cred.; soph. E.E.; no prereq.; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Cowie.

71su.[3] Machine Shop Practice. (Page 113.) (3 cred.; soph. M.E. and Aero.E.; no prereq.; MT I-IX, WF I-IV, Th I-II, or ar.; M.E.) Mr. Cowie.

72su.[3] Advanced Machine Shop Practice. (Page 114.) (3 cred.; soph. M.E. and Aero.E.; prereq. 14; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Cowie.

Special Courses for Teachers

2su.[3] Bench Work. (Page 111.) (2 cred.; no prereq.; MT I-X, WF I-IV, Th I-II, or ar.; ME.) Mr. Cowie.

3su.[3] Elementary Machine Shop Practice. (Page 111.) (2 to 4 cred.; no prereq.; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Cowie.

7su.[3] Advanced Machine Shop. (Page 111.) (2 to 4 cred.; prereq. 3; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Cowie.

9su.[3] General Metal Work. (Page 111.) (2 to 4 cred.; no prereq.; MT I-IX, WF I-IV, Th I-II, or ar.; ME.) Mr. Cowie.

Forging, Heat Treating, and Welding[4]

13su.[3] Forge Practice. (Page 112.) (2 cred.; no prereq.; hrs. ar.) Mr. Hughes.

16su.[3] Forging, Heat Treating, and Welding. (Page 113.) (2 cred.; prereq. Chem. 5, Dr. 2; hrs. ar.) Mr. Hughes.

Special Courses for Teachers

9su.[3] General Metal Work. Heat treating, carburizing, soldering, brazing, gas and electric welding. Forging tools and hardening them. (2 to 4 cred.; no prereq.; hrs. ar.) Mr. Hughes.

[3] A laboratory fee of $1.50 per credit is charged for this course.

[4] Courses subject to cancellation if not sufficient enrolment.

9asu.[3] Welding Principles and Practice. Special course in theory and practice of welding. Includes gas welding, direct current, alternating current, and spot welding. Projects in iron, steel, brass, aluminum, etc. (2 to 4 cred.; no prereq.; hrs. ar.) Mr. Hughes.

9bsu.[3] Art Metal Work. Elementary projects in wrought iron, copper, brass, and pewter. Hot and cold forming and hammering. (2 to 4 cred.; no prereq.; hrs. ar.) Mr. Hughes.

9csu.[3] Art Metal Work. Continuation of Course 9b. Including work in drawing and upsetting to produce bowls, cups, and other articles with medium deep contours. (2 to 4 cred.; prereq. 9a; hrs. ar.) Mr. Hughes.

9dsu.[3] Art Metal Work. Continuation of Course 9c. Advanced projects involving deep drawing, embossing, enameling, soldering and brazing of assembled projects. (2 to 4 cred.; prereq. 9c; hrs. ar.) Mr. Hughes.

[3] A fee of $1.50 per credit is charged for this course.

SCHOOL OF CHEMISTRY[1]

INORGANIC CHEMISTRY

FIRST TERM

1su.[2] General Inorganic Chemistry (Non-metals). (Page 73.) (4 cred.; no prereq.; lect. MTWThF II, W VI; 326C.; lab. MTThF VI-VII; 290C.) Mr. Maynard.

4su.[2] General Inorganic Chemistry (Non-metals). (Page 73.) (4 cred.; prereq. high school chemistry; lect. MTWThF II, W VI; 325C.; lab. MTThF VI-VII; 290C.) Mr. Maynard.

6su.[2] General Inorganic Chemistry (Non-metals). (Page 73.) (5 cred.; no prereq.; lect. MTWThF II, W VI; 325C.; lab. MTThF VI-VII, TTh VIII, W VII-VIII; 290C.) Mr. Maynard.

9su.[2] General Inorganic Chemistry (Non-metals). (Page 74.) (5 cred.; prereq. high school chemistry; lect. MTWThF II, W VI; 325C.; lab. MTThF VI-VII, W VII-VIII, TTh VIII; 290C.) Mr. Maynard.

11su.[3] Qualitative Chemical Analysis. (Page 74.) (4 cred.; prereq. 3 or 5; lect. MTWThF II, W VI; 225C.; lab. MTThF VI-VII; 290C.) Mr. Barber.

12su.[3] Qualitative Chemical Analysis. (Page 74.) (5 cred.; prereq. 8 or 10; lect. MTWThF II, W VI; 225C.; lab. MTThF VI-VII, W VII-VIII, TTh VIII; 290C.) Mr. Barber.

14su.[2] General Inorganic Chemistry (Non-metals). (Page 74.) (5 cred.; no prereq.; lect. MTWThF II, W VI; 325C.; lab. MTThF VI-VII, W VII-VIII, TTh VIII; 290C.) Mr. Maynard.

105su.[3] Commercial Products and Their Analysis. A study of current commercial products, their composition and methods of analysis. (5 cred.; prereq. Anal. Chem. 1 and 2; lect. and lab.; hrs. ar.) Mr. Barber.

ANALYTICAL CHEMISTRY[1]

FIRST TERM

1su.[2] Quantitative Analysis (Gravimetric). (Page 75.) (5 cred.; prereq. qual. anal.; lect. or rec. TTh V, VI; 315C.; lab. MWF V-VIII, TTh VII-VIII; 310C.) Mr. Geiger.

7su.[2] Quantitative Analysis. (Page 76.) (4 cred.; prereq. qual. anal.; lect. or rec. WF V, VI; 215C.; lab. MTTh V-VIII, TW VII-VIII; 310C.) Mr. Geiger.

96su.[3] Senior Thesis. (Page 76.) (5 cred.; hrs. ar.) Mr. Geiger.

123-124su.[2] Advanced Analytical Chemistry. (Page 76.) (3 cred. each; prereq. Anal. Chem. 1 and 2; lect. or rec. hrs. ar.) Mr. Geiger.

[1] Page numbers in course descriptions refer to the bulletin of Engineering, Architecture, and Chemistry for 1933-34, where further information may be found.

[2] A laboratory fee of $2 is charged for this course.

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

203su. Selected Topics in Analytical Chemistry. (Page 77.) (Cred. and hrs. ar.) Mr. Geiger.

301su.[3] Research in Analytical Chemistry. (Page 77.) (Cred. and hrs. ar.) Mr. Geiger.

ORGANIC CHEMISTRY[1]

FIRST TERM

1su.[2] Elementary Organic Chemistry. (Page 77.) (4 cred.; prereq. 11 or 12; lect. MTWThF IV; 325C.; rec. TTh II; 215C.; lab. MWF I-III; 390C.; lab. conference TTh I; ar. C.) Mr. Smith.

139su.[3] Advanced Organic Chemistry Laboratory Work. (Page 78.) (2 or 3 cred.; prereq. 53.) Mr. Smith.

301su.[3] Research in Organic Chemistry. (Page 78.) (Cred. and hrs. ar.) Mr. Smith.

SECOND TERM

2su.[2] Elementary Organic Chemistry. (Page 77.) (4 cred.; prereq. Org. Chem. 1; lect. MTWThF I; 325C.; rec. TTh II; 215C.; lab. MWF II-IV, lab. conference TTh IV; ar. C.) Mr. Bartlett.

139su.[3] Advanced Organic Chemistry. (Page 78.) (2 or 3 cred.; prereq. Org. Chem. 53.) Mr. Bartlett.

301su.[3] Research in Organic Chemistry. (Page 78.) (Cred. and hrs. ar.) Mr. Bartlett.

PHYSICAL CHEMISTRY[1]

FIRST TERM

106su.[2] Physical Chemistry. Courses 106-107su when completed in two summer quarters are equivalent to Phys. Chem. 101f-102w-103s. (4½, 6, or 7½ cred., depending on amount of lab.; prereq. 2 yrs. coll. chem., 1 yr. coll. phys.; lect. and rec. MTWThF I-II; 115C.; lab. MTWTh VI-IX; 190C.) Mr. Livingston.

171su. Elements of Radioactivity. (2 cred.; TWThF III; 115C.) Mr. Lind.

211su.[3] Advanced Physical Chemistry Laboratory. (Page 79.) (Both subject-matter and hrs. may be arranged with the instructor.) Mr. Livingston.

301su.[3] Research in Physical Chemistry. (Page 80.) (Cred. and hrs. ar.) Mr. Lind, Mr. Livingston.

CHEMICAL ENGINEERING[1]

FIRST TERM

151su.[3] Chemical Manufacture (Inorganic). (Page 82.) (3 cred.; sr., grad.; prereq. 101; MTWThF I-IX, S I-IV; 90C.) Mr. Mann.

[1] Page numbers in course descriptions refer to the bulletin of Engineering, Architecture, and Chemistry for 1933-34, where further information may be found.

[2] A laboratory fee of $2 is charged for this course.

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

152su.[3] Chemical Manufacture (Organic). (Page 82.) (3 cred.; sr., grad.; prereq. 101; MTWThF I-IX, S I-IV; 90C.) Mr. Montillon.

301su.[4] Research in Chemical Engineering. (Page 83.) (Cred. and hrs. ar.) Mr. Mann, Mr. Montillon.

SECOND TERM

151su.[3] Chemical Manufacture (Inorganic). (Page 82.) (3 cred.; sr., grad.; prereq. 101; MTWThF I-IX, S I-IV; 90C.) Mr. Montonna.

152su.[3] Chemical Manufacture (Organic). (Page 82.) (3 cred.; sr., grad.; prereq. 101; MTWThF I-IX, S I-IV; 90C.) Mr. Ruth.

301su.[4] Research in Chemical Engineering. (Page 83.) (Cred. and hrs. ar.) Mr. Montonna, Mr. Ruth.

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

[4] A laboratory fee of $5 is charged for this course.

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

GENERAL INFORMATION

Through the summer quarter 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 quarter 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 quarter 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.

For details of admission requirements, see the bulletin of general information.

AGRICULTURAL BIOCHEMISTRY

FIRST TERM

4su. Introduction to Organic and Biochemistry. (Page 49.[1]) (5 cred.; soph., jr., sr.; prereq. 1 yr. chem.; MTWThF I, II; 113Bch.) Mr. Rogers.

[1] Page numbers in course descriptions refer to Part I of the College of Agriculture, Forestry, and Home Economics bulletin, where further information may be found.

203asu.[3] Research Problems. (Page 22.[2]) (1½ or 2½ cred.; grad.; prereq. permission of instructor; ar.) Mr. Gortner, Mr. Palmer, Miss Kennedy.

SECOND TERM

203bsu.[3] Research Problems. Second part of Course 203asu. (1½ or 2½ cred.; grad.; prereq. 203a; ar.) Mr. Gortner, Mr. Palmer, Miss Kennedy.

AGRICULTURAL ECONOMICS

FIRST TERM

110su. Economics of Agricultural Production. (3 cred.; jr., sr., grad.; prereq. 2 or equiv.; MTWThF III; 312HH.) Mr. Garey.

190su. Agricultural Statistics. (3 cred.; jr., sr., grad.; MTWThF IV; 312HH.) Mr. Cox.

SECOND TERM

200su. General Seminar in Agricultural Economics. (3 cred.; grad.; ar.) Mr. Waite.

AGRICULTURAL EDUCATION

For list of courses in Agricultural Education, see courses listed elsewhere in this bulletin under the College of Education.

AGRICULTURAL ENGINEERING

FIRST TERM

13su. Gas Engines. Theory, operation, adjustments, and repair of gasoline engines. Lecture and laboratory practice. (2 cred.; no prereq.; TWThF VII, VIII; 216En.) Mr. Torrance.

40su. Mechanical Training. Instruction and laboratory practice in the mechanical trades, including belts, pulleys and lacings, cement work (including construction of lily pools, seats, bird baths, and flagstone walks), leather sewing and riveting, electric wiring, edge tool sharpening, saw sharpening, painting and wood finishing, rope splicing, knots and hitches. (2 cred.; no prereq.; TWThF VII-VIII; 106En.) Mr. Berggren, Mr. Dent.

41su. Mechanical Training. A course in metal work, including soldering and sheet metal work, hammered pewter and copper work, cold metal work (including lamps, flower brackets, etc., pipe fitting and valves, forge work (including tempering and heat treatment), babbitting and bearings, oxyacetylene welding, brazing and cutting, electric arc welding. (2 cred.; no prereq.; TWThF VII-VIII; 106En.) Mr. Dent.

[2] Page numbers in course descriptions refer to Graduate School bulletin, where further information may be found.

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

AGRONOMY AND PLANT GENETICS

FIRST AND SECOND TERMS

AGRONOMY

201su. Research in Farm Crops. (Page 24.[2]) (3 to 9 cred.; grad.; ar.) Mr. Arny, Mr. Wilson.

PLANT GENETICS

241su. Research in Plant Genetics. (Page 25.[2]) (Grad.; ar.) Mr. Hayes, Mr. Powers.

244su. Laboratory Problems in Plant Breeding. (Page 25.[2]) (3 cred.; grad.; ar.) Mr. Powers.

DAIRY HUSBANDRY

FIRST TERM

208su. Research in Dairy Husbandry. (Page 48.[2]) (Prereq. preliminary graduate work.) Ar.

209su. Research in Dairy Products. (Page 48.[2]) (Prereq. preliminary graduate work.) Mr. Combs.

SECOND TERM

210su. Research in Dairy Husbandry. (Page 48.[2]) (Prereq. preliminary graduate work.) Ar.

211su. Research in Dairy Products. (Page 48.[2]) (Prereq. preliminary graduate work.) Mr. Combs.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

FIRST TERM

13su. Field Zoology. (Page 62.[1]) (1 cred.; fr.; no prereq.) Mr. Dawson.

FIRST AND SECOND TERMS

197su. Introduction to Research. Preparation for investigational work in lines of entomology. Advanced laboratory, field, and library work; training in the preparation of bibliographies and manuscripts; special problems. The following lines of work are open: Medical Entomology, Mr. Riley; Economic Entomology, Mr. Ruggles; Systematic Entomology, Mr. Mickel; Insect Transmission of Plant Diseases, Mr. Granovsky; Apiculture, Mr. Tanquary; Insecticides, Mr. Shepard. (2½ or more cred.; sr.; prereq. 9 hrs. ent., and other prescribed work.)

204su. Research in Entomology. Ample opportunity for research work in various phases of entomology will be afforded properly qualified stu-

[1] Page numbers in course descriptions refer to Part I of the College of Agriculture, Forestry, and Home Economics bulletin, where further information may be found.

[2] Page numbers in course descriptions refer to Graduate School bulletin, where further information may be found.

dents. 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.; ar.) Mr. Riley, Mr. Ruggles, Mr. Tanquary, Mr. Granovsky, Mr. Mickel, Mr. Shepard.

FORESTRY

Courses at Itasca Park

FIRST TERM

2su. Field Dendrology. (Page 64[1].) (1 cred.; soph.; prereq. 3 and 4.) Mr. Rosendahl.

5su. Field Silviculture. (Page 64.[1]) (2 cred.; soph.; prereq. one year's work in forestry or equivalent.) Mr. Cheyney.

6su. Field Mensuration. (Page 64.[1]) Field work in the methods for determining the volume, growth and yield of trees, and stands; use of the compass and mapping. (1 cred.; soph.; prereq. one year's work in forestry or equivalent.) Mr. Brown.

HOME ECONOMICS

FIRST TERM

Undergraduate Courses

4su. Textiles. (Page 67.[1]) (3 cred.; no prereq.; MTWThF I, II; 307HE.) Miss Weller.

35su. Home Management Laboratory. (Page 68.[1]) (4 cred.; jr., sr.; prereq. 34 or parallel, 83, 136 parallel, H.E.Ed. 40; ar.) Miss Studley.

57su. Batik and Other Crafts. (Page 68.[1]) (3 cred.; prereq. 3, 53 or equiv.; MTWThF VI, VII; 112HE.) Miss Segolson.

66su. Institution Equipment and Marketing. (Page 68.[1]) (3 cred.; jr., sr.; prereq. 61, 63, 83, or equiv.; MTWF VI, Th VII, VIII, IX, F VII, VIII; 203HE.) Miss Hunt.

70su. Nutrition Survey. (Page 68.[1]) (2 cred.; no prereq.; MTWF III; 203HE.) Miss Hunt.

82su. Food Management. (Page 69.[1]) (3 cred.; prereq. 80 or equiv.; MTWF III, IV, V; 207HE.) Mrs. Niles.

Graduate Courses

115su. Clothing Economics. (Page 69.[1]) (2 cred.; jr., sr.; prereq. 15 or equiv., Agr. Econ. 3; MTWF V; 307HE.) Miss Weller.

131asu. Home Management. House planning and equipment. (Page 69.[1]) (3 cred.; jr., sr.; prereq. 53 or equiv.; MTWThF I, II; 112HE.) Miss V. Goldstein.

[1] Page numbers in course descriptions refer to Part I of the College of Agriculture, Forestry, and Home Economics bulletin, where further information may be found.

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., grad.; prereq. 83 or equiv., H.E.Ed. 40 or equiv.; MTWThF VII; 213HE.) Mrs. Niles.

136su. Problems in Income Management. (Page 69.[1]) (2 cred.; jr., sr., grad.; prereq. 34, 83 or equiv.; MTWF III; 213HE.) Miss Studley.

150su. Art History and Appreciation. (Page 69.[1]) (3 cred.; jr., sr., grad.; prereq. 51 or permission of instructor; MTWF IV; 203HE.) Miss V. Goldstein.

170su. Nutrition of the Family. (Page 70.[1]) (3 cred.; jr., sr., grad.; prereq. 70, 80, Agr. Biochem. 4, Physiol. 4 or equiv.; MTWThF III; 313HE.) Miss Biester.

171su. Child Nutrition. (Page 70.[1]) (3 cred.; jr., sr., grad.; prereq. 170, H.E.Ed. 40, or equiv.; MTWThF IV, V, VI; 313HE.) Miss Biester.

182su. Experimental Cookery. (Page 70.[1]) (3 cred.; jr., sr., grad.; prereq. 80 or equiv.; MTWThF I, II; 170HE.) Miss Child.

205su. Home Economics Seminar. (1 cred.; prereq. permission of instructor; WF I; 313HE.) Miss Biester.

295su. Home Economics Problems. (3 cred.; prereq. permission of instructor; MTWThF IV, V; 107HE.) Miss Child.

HOME ECONOMICS EDUCATION

FIRST TERM

H.E.Ed.42su. Special Methods of Teaching Home Economics. (5 cred.; jr., sr.; prereq., H.E. 13, 53, 83, or equiv.; Psy. 1-2, Agr.Ed. 11 or Agr.Ed. 51 or equiv.; MTWThF IV-V; 213HE.) Miss Rose.

H.E.Ed.142su. Educational Measurement in Home Economics. (3 cred.; prereq. 42; MWF I-II; 203HE.) Miss Clara Brown.

H.E.Ed.143su. Home Economics Curricula. (2 cred.; prereq. 42 or equiv.; MTThF II; 213HE.) Miss Rose.

H.E.Ed.149su. Research Problems. (2 cred.; sr.; permission of instructor; MTWF VII; 213HE.) Miss Clara Brown.

HORTICULTURE

FIRST AND SECOND TERMS

190su,191su,192su. Special Problems. (Page 73.[1]) (2 to 4 cred.; jr., sr., grad.; ar.) Mr. Alderman, Mr. Brierley, Mr. Currence, Mr. Krantz, Mr. Angelo, Mr. Hutchins.

Thesis. Arrangements will be made for graduate students to work on their thesis problems throughout the term.

[1] Page numbers in course descriptions refer to Part I of the College of Agriculture, Forestry, and Home Economics bulletin, where further information may be found.

PLANT PATHOLOGY AND BOTANY

FIRST AND SECOND TERMS

206su. Research in Plant Pathology. (Page 116,[2] description for Course 203.) (Cred. ar.; grad.; PP.) Mr. Stakman, Mr. Christensen, Mr. Leach, Miss Dosdall.

210su. Research in Mycology. (Page 115,[2] description for Course 107.) (3 cred.; grad.; prereq. P.P. 105-106-107; PP.) Mr. Stakman, Miss Dosdall.

257su. Research Problems in Applied Plant Physiology. (Page 117.[2]) (Cred. ar.; grad.; PP.) Mr. Harvey.

[2] Page numbers in course descriptions refer to Graduate School bulletin, where further information may be found.

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 28; the second, from July 30 (classes begin July 30) to September 1. 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 quarter, who has the necessary preparation to benefit therefrom.

FEES—MEDICAL STUDENTS

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 $6, and a deposit of $15 for men, $5 for women. Students in certain courses are required to furnish microscopes.

Term fees are one half the quarter fees. Laboratory fees are not required under this plan. The schedule of total fees will therefore be:

	Per Quarter	Per Term
Tuition fee	$75.00 ($100.00)	$37.50 ($50.00)
Incidental fee	6.00	3.00
Deposit (Men)	15.00	15.00
Deposit (Women)	5.00	5.00

Fees must be paid on the above basis by all who elect the program of clinical subjects in the senior medical year; and by all who desire time credit on the medical course.

FEES—SUMMER SCHOOL STUDENTS

Students who do not desire to register for time credit toward a medical degree nor for a program of clinical subjects may pay on the above basis; or at their option they may pay the regular summer quarter fee of $25 per term, plus the laboratory and microscope rental fees in courses requiring them, and the deposit fee of $10.

CLINICAL YEARS

The Medical School offers a full regular program for any quarter of the senior year. In order to receive legal time credit toward the degree of doctor of medicine or bachelor of medicine in this institution, students must be matriculated in the Medical School; see the 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 unclassed 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 unclassed registration. Such students from other medical schools may take one of the programs listed below (except section clinics if already full) or, provided there is room in the classes, make up a special program from the courses offered. Admission to any course is conditioned upon the limit set by the department concerned.

Students from other institutions should consult the Medical School bulletin to make sure in what degree the courses listed fulfill their respective needs. They should consult the dean or 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)

No didactic courses for juniors are offered in the summer quarter nor is any division of the junior class in regular attendance. However, junior students of this or other schools who desire to extend their clinical knowledge may register for the courses offered below to the extent that they fulfill their needs and there is room in respective classes. No Minnesota junior may register for clerkship work for senior credit until he has passed the Junior Comprehensive Examination.

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, Obstetrics and Pediatrics Clerkship Quarter

Med. 30su; Obs. 30su, 35su; Path. 109su; Ped. 30su, 35su; Surg. 30su.

Division B, Medicine Clerkship Quarter

Med. 30su, 35su, 44su, 47su; Obs. 30su; Path. 109su; Ped. 30su; Surg. 30su.

Division D, Surgery Clerkship Quarter

Med. 30su; Obs. 30su, 35ysu; Path. 109su; Ped. 30su; Surg. 30su, 35su, 49su; O. and O. 36su, 37su, 38su.

Under the curriculum senior students are assigned to a particular clerkship and to particular dispensary clinics each quarter, for which see special 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 unclassed 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).

It is to be noted that the offering of many of these courses is dependent on the registration of a certain minimum number of students. To avoid delays and possible disappointment students, either at Minnesota or elsewhere, contemplating registration in any such course are requested to let their wishes be known, by correspondence or otherwise, well in advance of registration days. It will be the policy of the school to accommodate all students possible, provided fees can in any way be made to cover the cost of instruction. To this end if fewer than the stated minimum apply for any course, negotiations may be helpful and it may be possible to offer such a course either at an increased fee or by finding an instructor willing to give the course for the amount collected therefrom. The dean's office will be glad to assist in such arrangements.

OPPORTUNITY 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 of Minnesota Hospitals and Dispensary, the Minneapolis General Hospital, the Ancker Hospital, Glen Lake Sanatorium, and the Wilder Dispensary, St. Paul, will go on as usual during the summer quarter, and will be open to visiting physicians.

ELECTIVES

Various electives will be offered in the laboratory and clinical departments. See departmental statements in this bulletin and also special summer quarter programs of the Medical School (to be published later) for details.

GRADUATE COURSES

Attention is called to opportunities offered in Medical School departments to work during summer quarter for advanced degrees, either in laboratory or clinical branches.

GRADING

Regular medical students are subject to the comprehensive examination rules. These examinations cover all courses of respective years of the curriculum. The comprehensive examinations are offered at the end of the spring quarter and in the week before the opening of the University in

the fall. Students desiring to enter from another medical school with advanced standing are required to take the comprehensive examination for (at least) the year preceding the one they desire to enter. For admission to the junior year Part I of the National Board Examination is accepted in lieu of the comprehensive examination of the school. Summer quarter students, not candidates for a medical degree in this school, are subject to ordinary course examinations and are graded in the regular way.

NURSING STUDENTS

No beginning student 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 quarter is entirely in the hospitals, or in field service not involving instruction by members of the staff who are paid from the summer quarter budget, there will be no tuition or incidental 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 quarter budget, a tuition fee at the rate of $1 per clock hour for the courses pursued will be charged.

POSTGRADUATE STUDENTS

The School of Nursing admits postgraduate students at the beginning of each quarter for one-year courses. Such applicants must meet university entrance requirements and be graduates of accredited schools of nursing. For further information see bulletin of the School of Nursing.

NURSING TEACHERS AND ADMINISTRATORS

Special courses for teachers and administrative officers in nursing schools will be offered in the summer quarter. 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

The regular course in Medical Technology is offered during the summer quarter. No special arrangement for practical work can be made without the necessary prerequisites. See special bulletin on Medical Technology, or write to Dr. W. A. O'Brien, University of Minnesota Hospitals.

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 84.

ANATOMY

FIRST TERM

6su. 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 60. Application for admission must be made in advance to the secretary of the Students' Work Committee. Dr. Jackson, Dr. Erdmann, Dr. Blount, and assistants.

14su. Histology and Embryology. Minute structure and development of the tissues and organs, with special emphasis upon the oral region and digestive tract. (6 cred.; pre-junior dent.; prereq. Zool. 1-2, Anat. 9-10; MTWThFS I, II, III, IV; 102,213IA.) Laboratory fee $7.50, microscope fee $1.50. This course may also be taken for 5 credits with reduced laboratory work, as a substitute for Zoology 21, required for medical technicians. For this reduced course, the laboratory fee is $5; microscope fee $1.50. Dr. Rasmussen and assistant.

103su. Human Histology. Minute structure of the various tissues and organs. (9 cred.; 3d yr. med.; prereq. Zool. 1-2, Anat. 6-7; MTWThFS I, II, III, IV, MWF V; 102,215IA.) Laboratory fee $7.50. Dr. Rasmussen and assistant.

111su. Human Neurology. Morphology of the central nervous system and sense organs. (6 cred.; 4th yr. med. and others; prereq. Anat. 103, 107; MTWThF I, II, III, IV, S I, II; 102,213IA.) Laboratory fee $5, microscope fee $1.50. Dr. Rasmussen and assistant.

156su. Advanced Anatomy. Individual problems in gross anatomy, histology, embryology, or neurology. Includes advanced work for clinical graduate students. Permission by instructor required. (Cred. and hrs. ar.) Laboratory fee $1 per cred. Dr. Jackson or Dr. Rasmussen.

160su. Seminar on Human Growth. Permission by Dr. Boyd 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.) Dr. Jackson, Dr. Rasmussen.

SECOND TERM

7su. Gross Human Anatomy. Dissection of head, neck, thorax, and upper extremity. Continuation of 6su. (9 cred.; MTWThFS I, II, III, IV, TTh VI, VII, VIII, IX; 304-306IA.) Laboratory fee $7.50. Class limited to 60. Dr. Boyden, Dr. Blount, and assistants.

156su. Advanced Anatomy. See under First Term, Course 156. Permission by instructor required. (Cred. and hrs. ar.) Dr. Boyden.

204su. Research in Anatomy. See under First Term, Course 204. Permission by Dr. Boyden required. (Cred. and hrs. ar.)

BACTERIOLOGY

FIRST TERM

41su.[1] 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 I, II, III; 214, 201MH.) Laboratory fee $1.50, microscope fee $1.50. Mr. Gunderson, Mr. Ordal.

101su.[1] Special Bacteriology. The pathogenic bacteria, especially in relation to definite diseases; principles of infection and immunity. (4 cred.; 3d yr. med. and others; prereq. General Bacteriology; MTWThF VI, VII, VIII; 201,214MH.) Laboratory fee $1.50, microscope fee $1.50. Dr. Larson.

116su. Immunity. Laws of hemolysis. Quantitative relationships 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. Dr. Larson.

150su. Advanced Bacteriology. Opportunity of working out special problems. (Prereq. General Bacteriology; cred. and hrs. ar.) Laboratory fee $1 per credit. Dr. 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.) Dr. Larson.

MEDICINE

BOTH TERMS

Required Courses

30su. Clinic in Medicine. Sixth year, Divisions A, B, D. (22 hrs.; TTh 8:00-8:50; UH and MGH.) Dr. Fahr and others.

35su. Clinical Clerkship. The personal observation of patients in hospital; taking and recording of case histories; making of provisional diagnosis; and study of treatment. Sixth year, sections of Division A (200 hrs. cred.) See special schedule. Staff.

35vsu.[2] Admission Clerkship. Assignment to admission service, University of Minnesota Hospitals. Part of medical clerkship. Dr. Wetherby.

35xsu. Same as 35 at the Minneapolis General Hospital. Dr. Fahr and staff.

35ysu. Physical Diagnosis and Therapy. Conducted with sections in the following dispensary clinics: (1) general medicine; (2) heart clinic; (3) chest clinic; (4) metabolism; (5) gastrointestinal clinic. Sixth year. Part of Medical Clerkship, Course 35.

[1] Students may register for Courses 41 and 101 concurrently.

[2] Course 35su or the separate parts thereof including Med. 44 and 47 will be open as electives to prepared students other than Division A seniors to the extent that facilities permit.

35zsu. Clerkship in Tuberculosis. Two-week periods residence at Glen Lake Sanatorium. Seniors in medical clerkship quarter. Dr. Mariette and staff.

Elective Courses

25su. Physical Diagnosis and Therapy. Conducted with sections in the following dispensary clinics: (a) general medicine; (b) cardiac and vascular diseases; (c) respiratory diseases and tuberculosis; (d) food; (e) gastrointestinal. Elective for jrs. in summer to the extent of facilities. See special schedule. Dr. Wetherby.

102su.[1] The Respiratory Organs in Health and Disease. For students who desire training in preparation of scientific papers for publication. The student selects a problem pertaining to some part of the respiratory tract, which he pursues independently or in collaboration with instructor. Limited to 5 students. (Cred. and hrs. ar.; 5th and 6th yr.) Dr. Myers.

105su.[1] Problems in Pathological Physiology. Experimental work. One to four students. (Problems and cred. ar.; soph.; hrs. ar.; laboratory of Pathological Physiology, MH.) Dr. Fahr and staff.

106su.[1] Problems in Clinical Physiology. Experimental and clinical investigations of the pathological functions in cardiovascular, renal, gastrointestinal, and respiratory diseases. One to four students. (Problems and cred. ar.; jr., sr.; laboratory of Pathological Physiology, MH; MGH; UD.) Dr. Fahr and staff.

203su.[1] Research in Medicine. (Cred. ar.; hrs. ar.) Dr. Fahr.

Division of Nervous and Mental Diseases

Required Courses

44su. Nervous and Mental Diseases. Observation and study of cases in the University Dispensary; required of clerks in nervous and mental service at University of Minnesota Hospitals. (Credit included in clerkship, Medicine 35.) Dr. Berkwitz, Dr. Gray.

Elective Courses

121su. Resident Clerkship in Psychiatry. Two weeks or ar. at a state hospital. Dr. G. H. Freeman, Dr. Kilbourne, Dr. Patterson, and staffs.

124su.[1] Advanced Neuropathology. Individual gross and microscopic studies on existing preparations in neuropathology. Limit, 2 students. (Cred. and hrs. ar.; prereq. Path. 102; 133MH.) Dr. McKinley.

125su.[1] Problems in Neuropathology. The student will be assigned a topic for special study. Limit, 2 students. (Cred. and hrs. ar.; prereq. Path. 102; 133MH.) Dr. McKinley.

Division of Dermatology

Required Courses

47su. Diagnosis and Therapy. Observation and study of cases in the University Dispensary and Minneapolis General Hospital; a part of med-

[1] Permission of instructor required.

ical clerkship, Medicine 35. (40 or 24 hrs. cred.; see special schedule, sections of sr. class; daily 1:00-3:00.) Dr. Michelson, Dr. Sweitzer, Dr. Madden, and others.

Elective Courses

95su. Therapy of Syphilis. (Prerequisite, medical clerkship, 1 student; daily 1:00-3:00; UH.) Dr. Michelson and staff.

OBSTETRICS AND GYNECOLOGY

FIRST AND SECOND TERMS

Required Courses

30su. Obstetrics and Gynecology. Lectures, class clinics, and case analysis of the pathology of obstetrics and gynecology. (21 hrs.; sr.; MF 8:00-8:50.) Dr. Litzenberg and staff.

35su. Clinical Clerkship in Obstetrics and Gynecology. The study and care of assigned patients in the University of Minnesota Hospitals and Dispensary, Minneapolis, and Salvation Army Home, St. Paul; manikin practice, case histories, physical and laboratory examinations; parturition and bedside clinics, and operations. Includes 35xsu, 35ysu. (240 hrs.; prereq. Courses 20, 21, 22, 23; selection of Div. B, sr.; daily through one term, 9:00-5:00; UH.) Dr. Litzenberg and staff.

35xsu. Clinical Clerkship in Obstetrics and Gynecology. Part of Course 35su, but given at the Minneapolis General Hospital. (MTWThFS 9:00-5:00.) Dr. Urner and hospital staff.

35ysu. Residence in Obstetrics. Part of Course 35. (Ancker Hospital.) Dr. Barry and hospital staff.

55su. Prenatal Clinics. (Antepartum care of pregnant women at the various prenatal stations. One student at each station.) (Obs. 55asu, Margaret Barry Settlement House, T 1:30, Dr. Abramson; Obst. 55bsu, Emanuel Cohen Community Center, Th 1:30, Dr. Maland; Obs. 55csu, South Town Clinic, F 10:00, Dr. Hiebert.)

Elective Courses

50su. Gynecologic Clinic. Diagnosis and treatment of diseases of women. Limit four students. (34 hrs.; F 1:30-3:00; Wilder Dispensary.) Dr. Hartley.

51su. Gonorrhea in the Female. Limited to three jr. or sr. students. (T 7:00-9:00 p.m.; MGH.) Dr. Urner, Dr. Proshek, and staff.

51asu. Same as 51su. (F 7:00-9:00 p.m.)

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 9:30, Dr. Youbert Johnson; Obs. 55bsu, Emanuel Cohen Community Center, F 1:30, Dr. Maland; Obs. 55csu, South Town Clinic, T 10:30.)

OPHTHALMOLOGY AND OTO-LARYNGOLOGY

FIRST AND SECOND TERMS

Required Courses

36su. Clinic in Diseases of the Eye. Diagnosis and treatment of cases. Part of the required section clinics, surgical clerkship period. (35 hrs.; UD.) Dr. Burch, Dr. Macnie, Dr. Camp, Dr. Hansen, Dr. Hymes.

37su. Clinic in Diseases of the Ear. Diagnosis and treatment of cases. Part of section clinics, surgical clerkship period. (18 hrs.; UD.) Dr. Newhart, Dr. Fjelstad, Dr. Bryant, Dr. Rosenberger, Dr. Clark, Dr. Lee.

38su. Clinic in Diseases of the Nose and Throat. Diagnosis and treatment of cases. Part of required section clinics, surgical clerkship period. (18 hrs.; UD.) Dr. Boies, Dr. Rosenberger, Dr. Williams, Dr. Clark, Dr. Lee.

Elective Courses

121su. Operative Clinic in Eye. Limited to six students. (12 hrs. cred.; Th 3:00-4:30; UH.) Dr. Burch, Dr. Macnie, Dr. Camp, Dr. Hansen, Dr. Hymes.

123su. Operative Clinic in Ear, Nose, and Throat. Limited to six students. (13 hrs. cred.; F 3:00-4:30; UH.) Dr. Newhart, Dr. Rosenberger.

PATHOLOGY

BOTH TERMS

104su. Autopsies. Post-mortem technique; examination of fresh organs, etc. (Prereq. 101; cred. and hrs. ar.; 110 IA.) Staff.

109su. Clinical Pathological Conference. Presentation of clinical data on selected cases and of the pathological specimens from the same, with discussions of etiology and diagnosis. Required in clerkship period. Elective for others. (1 cred.; F 4:00-4:50; 104IA.) Staff.

109xsu. Clinical Pathological Conference. (Elective; Th 11:30-12:30; MGH.) Staff.

111su. Conference on Autopsies. (1 cred.; T 12:30 to 2:00 p.m.; 104IA.) Staff.

201su. Research. Students of the necessary preliminary training may elect research, either as major or minor in pathology. Permission required. (Cred. and hrs. ar.) Dr. Bell, Dr. Clawson, Dr. McCartney, Dr. Noble, Dr. O'Brien.

NOTE.—All courses may be taken either or both terms.

PEDIATRICS

FIRST AND SECOND TERMS

Required Courses

30su. Amphitheater Clinic. Detailed consideration of diagnosis, prognosis, prophylaxis, and treatment in individual clinical cases representing all

phases of pediatric practice. (Sr. and other prepared students; S 8:00-9:00 a.m.; Eustis Amphitheater.) Dr. McQuarrie and senior staff.

35su. Clinical Clerkship in Pediatrics. Patients in the pediatric wards, dispensaries, and special clinics are assigned to individual students for history taking, complete examination, treatment, and "follow-up" observation under supervision. Bedside clinics for one hour daily. One sixth of class on pediatric clerkship at one time, part of work at the University of Minnesota Hospitals, the other part at the Minneapolis General Hospital. Required time for each student, daily from 9:00 a.m. to 5:00 p.m. for 6 weeks. Dr. McQuarrie, Dr. Huenekens, Dr. C. A. Stewart, and staffs.

Elective Courses[1]

101su. Advanced Study of Contagious Diseases. Group conferences and demonstrations of special diagnostic and therapeutic procedures.

102su. Advanced Study of Nutritional or Other Non-Contagious Diseases. Both clinical and experimental subject-matter included.

103su. Weekly Seminar for Detailed Discussion of Fundamental Subjects Related to Pediatrics.

104su. Common Behavior Disturbances in Childhood. Their recognition and management.

205su. Pediatric Research. Special problems in the various subdivisions of the pediatric field may be selected for study. Students may collaborate with members of the staff or with other students where suitable arrangements can be made.

PHARMACOLOGY

FIRST AND SECOND TERMS

7su. Metrology. For student nurses. Systems of weights and measures; equivalents; preparation of percentage solutions; dosage; together with appropriate laboratory exercises and problems. (1½ cred.; 22 hrs.; 101MH.) Dr. Hirschfelder, Dr. Bieter, Dr. Wright, Miss Gordon.

8su. Elementary Pharmacology. For student nurses. A study of the history, uses, classification, and preparation of drugs; methods of administration; principles of dosage, etc., together with appropriate laboratory exercises. (2½ cred.; 33 hrs.; 101MH.) Dr. Hirschfelder, Dr. Bieter, Dr. Wright, Miss Gordon.

109su.[2] Pharmacological Problems. Experimental study of special topics in pharmacology, with a review of the literature. (3 cred. or ar.; prereq. physiology; 3:00-6:00 p.m., or hrs. ar.; 132MH.) Laboratory fee $1 per credit. Dr. Hirschfelder, Dr. Bieter, Dr. Wright.

203su.[2] Research in Pharmacology. (Grad. and advanced students; hrs. and cred. ar.; permission required. 132MH.) Dr. Hirschfelder, Dr. Bieter, Dr. Wright.

[1] To be arranged for with Dr. McQuarrie and staff.
[2] Permission required.

FIRST TERM

108su.[1] Prescription Writing. (1 cred.; 11 hrs.; hrs. ar.; 102MH.) Dr. Wright.

115su. 115xsu. General Pharmacology for Medical and Dental Students. The history, origin, nature, pharmacal preparations, uses and pharmacological and therapeutic actions of drugs. Laboratory exercises upon the chemical composition and mode of action of typical and important drugs in the test tube and upon animals and man. Lectures and laboratory may be taken separately. (MTWThF V to VIII incl. or ar.; 101MH.) Dr. Hirschfelder, Dr. Bieter, Dr. Wright.

For medical students: 115su, 44 hours of lecture, 11 hours of conference, 66 hours of laboratory, 8 credits. Laboratory fee $5.

For dental students: 115xsu, 44 hours of lecture, 22 hours of laboratory, 5 credits. (This course is the equivalent of 4w.) Laboratory fee $2.

SECOND TERM

105su.[1] General Pharmacology. Narcotics, hypnotics, opiates, etc. (2 cred.; 22 hrs.; hrs. ar.: 102MH.) Dr. Bieter.

106su.[1] General Pharmacology. Antiseptics. (2 cred.; 22 hrs.; hrs. ar.; 102MH.) Dr. Bieter.

NOTE.—Sophomore Comprehensive Examination includes Pharm. 115su. Junior Comprehensive Examination includes Pharm. 105su, 106su, and 108su.

Students from other schools can arrange to complete all required work in pharmacology by registering for 115su, 105su, 106su, and 108su.

PHYSIOLOGY

FIRST TERM

4su.[3] Human Physiology. A brief course for academic and home economics students. Lectures, demonstrations, recitations. (4 cred.; prereq. high school or college biology and chemistry; rec. and dem., MTWThFS I, II.) Dr. Lyon or Dr. King and assistant.

58-59su.[3] Human Physiology. An intermediate course for academic, dental, physical education students, and others. (6 cred.; prereq. general chemistry and anatomy or zoology; lect., rec., and dem., MTWThFS I, II; lab. MTWFS III, IV, Th III, V.) Laboratory fee $3. Dr. Lyon or Dr. King and assistant.

100su.[2] Physiologic Chemistry. Metabolism of carbohydrates, fats, and proteins in health and disease. (7 cred.; prereq. organic chemistry and physics; lect. MTWThF I; 214MH; lab. MTWF II, III, IV, Th II, IV, V; 310MH.) Laboratory fee $5. Lectures only, 4 cred., may be registered for as 100xsu; laboratory only, as 100ysu. Dr. McClendon and assistant.

[1] Offered if four or more students apply. But see p. 70.
[2] Courses 100, 101, 103, 104 will be offered if ten students apply. But see p. 70.
[3] Courses 4 and 58-59 and will be offered if fifteen or more apply.

103su.[2] 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.[4] MTWFS III-IV, Th IV-V; 301,315MH.) Laboratory fee $5. Lectures only, 5 cred., may be registered for as 103xsu. Dr. Scott and assistant.

113su.[3] 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 equiv.; 310 MH.) Laboratory fee $1 per credit. Dr. Scott, Dr. King.

153su.[3] 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.; 310 MH.) Laboratory fee $1 per credit. Dr. McClendon.

203su.[3] Research in Physiology. (Cred. and hrs. ar.) Dr. Scott, Dr. King.

204su.[3] Research in Biophysics. (Cred. and hrs. ar.) Dr. Stenstrom.

205su.[3] Research in Physiologic Chemistry. (Cred. and hrs. ar.) Dr. McClendon.

SECOND TERM

101su.[2] Physiologic Chemistry. Metabolism of inorganic substances. (7 cred.; prereq. Physiol. 100; lect. MTWThF I; 214MH; lab. MTWF II, III, IV, Th II, IV, V; 310 MH.) Laboratory fee $5. Lectures only, 4 cred., may be registered for as 101xsu.; laboratory only, as 101ysu. Dr. Hemingway and assistant.

104su.[2] 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; lect. MTWThFS I; rec. and lab.[4] II, III, IV; 301,315MH.) Laboratory fee $5. Lectures only, 5 cred., may be registered for as 104xsu. Dr. Greisheimer and assistant.

113su.[3] Problems in Physiology. Continued as in first term. Dr. Greisheimer.

153su.[3] Problems in Physiologic Chemistry. Same as 153su, first term, given above. Dr. Hemingway.

203su.[3] Research in Physiology. (Cred. and hrs. ar.) Dr. Greisheimer.

204su.[3] Research in Biophysics. (Cred. and hrs. ar.) Dr. Stenstrom.

205su.[3] Research in Physiologic Chemistry. (Cred. and hrs. ar.) Dr. Hemingway.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

FIRST TERM

53su. Elements of Preventive Medicine. Susceptibility, resistance, and immunity to disease; methods of spread and the prevention of communi-

[2] Courses 100, 101, 103, 104 will be offered if ten students apply. But see p. 70.

[3] Permission required.

[4] Students who find it more convenient may arrange to do part of their laboratory work in the afternoon.

cable and degenerative diseases; importance of heredity and environment; proper types and protection of food, water, and milk. (3 cred.; prereq., 12 cred. in biological science, or by permission; MTWThF II; 129MH.) Dr. Radl.

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 pre-school and school age as to malnutrition, physical defects, cardiac and nervous disorders. (2 cred.; jr., sr., public health nurses only; prereq. 40, 52, or 53; MTWF III; 116MH.) Dr. Boynton.

60su. Tuberculosis and Its Control. History of tuberculosis movement and campaign in the United States. Early diagnosis and treatment. Tuberculosis in children. The psychology of tuberculosis, supervision of returned sanatoria patients. State program for the eradication of tuberculosis; legislation. (2 cred.; jr., sr.; prereq. 40, 52, or 53; MTWTh IV; 15MeS.) Dr. Myers.

61su. Mental Hygiene. Factors underlying emotional maladjustment and mental diseases; relation to social work; social agencies and psychiatric practice; illustrative case material. (3 cred.; jr., sr.; prereq. Psy. 1, 2; MTWThF V; 113MeS.) Dr. deBerry.

62su. Principles of Public Health Nursing. Development, principles, and 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 health nurses; prereq. 53 or equiv.; MTWThF I; 116MH.) Miss Butzerin.

64su. Field Practice in Infant Welfare Nursing. 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. (4 cred.; public health nurses; prereq. 62; hrs. and place ar.) Miss Butzerin, Miss Peck.

67su. Field Practice in Tuberculosis Sanatorium. Observation and practical care of pulmonary, osseous, laryngeal tuberculosis; tuberculous enteritis; general sanatorium treatment; special treatment; exercise; laboratory; occupational therapy and the reading of literature on tuberculosis. (2 cred.; public health nurses; prereq. 60, 62; hrs. and place ar.) Miss Butzerin.

68su. Field Practice in Visiting Nursing. Lectures, demonstrations, supervision, and field practice in bedside care of general and maternity patients; communicable diseases, tuberculosis, and mental cases with special emphasis upon recognition of social problems, co-operation with social agencies, and accurate record keeping. (5 cred.; public health nurses; prereq. 62; hrs. and place ar.) Miss Butzerin, Miss Houlton.

80su. Health of the School Child. For teachers and others interested in the health and development of the school child. Mental and physical growth; discovery of physical defects; exercise; fatigue; emotional problems; health habits; diseases of school children; practical problems

of health supervision and health instruction. (3 cred.; prereq. 40, 52, or 53; will be waived for teachers and school nurses, but credit granted only after completion of prerequisites; MTWThF VI; 116MH.) Dr. Ellis.

101su. Public Health Administration and Field Work. Demonstrations of health agencies at work; boards of health, laboratories, filtration, pasteurization, and garbage disposal plants. Presentation of actual health problems. (2 cred.; groups of 10-15 med. stud. for 6 wks. [18 hrs.]; sr. medics; prereq. 100; hrs.—see Clerkship Schedule, Medical School.) Dr. Boynton and Health Service 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.) Dr. Boynton and Health Service staff.

SECOND TERM[1]

64su. Field Practice in Infant Welfare Nursing. Same as first term.

67su. Field Practice in Tuberculosis Sanatorium. Same as first term.

68su. Field Practice in Visiting Nursing. Same as first term.

101su. Public Health Administration and Field Work. Same as first term.

200su. Research. Same as first term.

SURGERY

BOTH TERMS

Required Courses

30su. Class Clinic in Surgery. Divs. A, B, and D seniors. (11 hrs. cred.; W 8:00-8:50; UH.) Dr. Wangensteen, Dr. Peyton.

35su.[2] Clinical Clerkship. The personal study of assigned patients; case histories, laboratory examinations, provisional diagnoses with suggestions as to therapy; attendance at operation of such studied cases and observation of postoperative management. Participation in operations of assigned classes as third assistant. Sixth year, 300 hours. (UH.) Surgical staff.

35usu. Reading Course. A weekly recitation during the clerkship period on assigned surgical reading, with a standard textbook of surgery as a guide. Quiz and lecture. Part of Course 35. Surgical staff.

35vsu. Anesthetics and Dressings. Administration of anesthetics under supervision and dressing of wounds of hospital patients under supervision of hospital staff. Part of Course 35. (UH.) Dr. Knight and others.

35wsu. Minor Surgery Clinic, Including Proctology. Sections daily in the Out-Patient Department; a part of Course 35. Sixth year. Dr. Hayes, Dr. McKinney, Dr. Bratrud, Dr. J. K. Anderson.

35xsu. Clinical Clerkship. The personal study of assigned patients; case histories, laboratory examinations, provisional diagnoses with suggestions

[1] No additional fee for public health nursing field work during second session, if student has been enrolled in the first session.

[2] Course 35 or the separate parts thereof, including 41 and 49, will be open as electives to properly prepared students, to the extent that facilities permit.

as to therapy; attendance at operation of such studied cases and observation of postoperative management. Participation in operation of assigned cases as third assistant, surgical therapy malignancies. Part of Course 35. (MGH.) Minneapolis General Hospital staff.

35ysu. Clerkship on Fractures. Under the supervision of the hospital staff the student participates in the care of fractures. Part of Course 35. (MGH.) Staff.

35zsu. Tumor Clinic. Diagnosis and demonstration of malignancies removed at operation and autopsy. Sixth year. One division each quarter. Part of Course 35. Staffs of the Departments of Surgery and Pathology.

41su. Orthopedic Clinic. In the Out-Patient Department; a part of surgery clerkship. See special schedule. (11 hrs.; sr.; MF 1:00-3:00; UD.) Dr. Evans.

49su. Genito-Urinary Clinic. In the Out-Patient Department; a part of surgery clerkship. See special schedule. (22 hrs.; sr.; daily 1:00-3:00; UD.) Dr. Wright, Dr. Creevy, Dr. Wethall.

Elective Courses

53su. Problems in Clinical Investigation. Limit 8 students. (Cred. and hrs. ar.; sr.) Dr. Wangensteen, Dr. Creevy, Dr. Peyton, Dr. Manson.

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; UD.) Dr. Fansler, Dr. J. K. Anderson.

56su. Bedside, Diagnostic Clinic. Eight students. (12 hrs.; jr., sr.; ar.; MGH.) Dr. Robitshek.

67su. Problems in Experimental Surgery. Limit 10 students. (Cred. and hrs. ar.; sr.) Dr. Wangensteen, Dr. Creevy, Dr. Peyton, Dr. Manson.

X-RAY

BOTH TERMS

Required Courses

35x,y,zsu is offered as part of clerkships in Medicine, Pediatrics, and Surgery (see medical bulletin).

Elective Courses

85su. Plate Reading. Limit 4 students. (Cred. and hrs. ar.; jr. or sr.; UH.) Dr. Rigler and others.

88asu. X-Ray Diagnosis. Four to 10 students. (22 hrs.; jr. or sr.; M 9:00-11:00; MGH.) Dr. Ude.

88bsu. X-Ray Diagnosis. Four to 10 students. (11 hrs.; jr. or sr.; W 1:00-2:00 p.m.; UH.) Dr. M. B. Hanson.

95su. Clinic in X-Ray Therapy. Limit 3 students. (11 hrs. cred.; jr. or sr.; M 10:00-11:00; UH.) Dr. Stenstrom.

95asu. Same as 95su. (W 9:00-10:00.)

95bsu. Same as 95su. (F 9:00-10:00.)

100su. Surgical Roentgenological Conference. Part of Surg. 35. For surgical clerks and graduate students. Dr. Rigler.

103asu. Physical Therapy Clinic. (Cred. and hrs. ar.; T.) Dr. Stenstrom.

103bsu. Physical Therapy Clinic. (Cred. and hrs. ar.; Th.) Dr. Stenstrom.

107su. Medical-Roentgenological Conference. Part of Med. 35. For medical clerks and graduate students. Dr. Rigler.

108su. Pediatric-Roentgenological Conference. For pediatric clerks and graduate students. Dr. Rigler.

200su. Research in Roentgen Diagnosis. (Cred. and hrs. ar.) Dr. Rigler.

205su. Research Related to Radiation Therapy. (Cred. and hrs. ar.) Dr. Stenstrom.

207su. Roentgen and Radium Therapy. Treatments of patients under supervision both with medium and high voltage machines and with radium. Problems in connection with these treatments will be thoroly discussed. (Cred. and hrs. ar.) Dr. Stenstrom.

NURSING INSTRUCTION

FIRST TERM

Courses for graduate nurses. See also courses in Preventive Medicine and Public Health. A special circular of the nursing courses will be mailed on application to the director, School of Nursing, University of Minnesota.

52su. Teaching of Principles and Practice of Nursing. A course for graduate nurses who are teaching or supervising nursing practice. This course offers opportunity for the studying of nursing procedures taught first year students. Techniques of these procedures will be demonstrated and discussed. The course will include sources of material and references which will aid in the teaching of the principles of technique and the preparation of lesson plans. (3 cred.; TTh VI-VIII.) Miss Thompson, Miss Parisa.

53su. Research Techniques Applied to Nursing. Time studies, questionnaires, and other methods of compiling and analyzing data on nursing problems together with the study of graphic methods of presentation of data. (2 cred.; MW III-IV.) Miss Gordon.

70su. Ward Administration. Principles of administration and their application to ward management. A study of the opportunities for clinical teaching through efficient ward administration. (2 cred.; MW VIII, IX.) Miss Hodgkins.

72su. Teaching and Supervision in Schools of Nursing. Principles of teaching applicable in schools of nursing. Planning of class work. Use of case studies, ward clinics and demonstrations, and assignment of practice, as methods of clinical teaching. Methods of evaluating students' work. Principles of supervision and their application for the improvement of nursing practice. (5 cred.; MTWFS III, IV.) Miss Petry.

73su. Administration and Organization of Schools of Nursing. This course is planned for graduate nurses who are concerned with the problems of administration and organization in nursing schools. Present day administrative problems and objectives in nursing education. Excursions. (2 cred.; MW VI, VII.) Miss Densford.

SCHOOL OF DENTISTRY

Courses will be offered in the School of Dentistry as follows:

Clinical Practice. Clinical work will be offered in each of the following divisions under the direction of the division chairman: Crown and Bridge Work, Dr. Wells; Operative Dentistry, Dr. Walls; Orthodontia, Dr. Rudolph; Prosthetic Dentistry, Dr. Flagstad; Oral Surgery, Dr. Griffith; Major Oral Surgery of the Mouth and Jaws, Dr. Waldron. (Jr., sr., grad.; MTWThF 9:00-12:00 a.m., 2:00-5:00 p.m., and S 9:00-12:00 a.m.)

Fees: full time, $30; half time, $15, for each term. In addition each student pays an incidental fee of $3.20, and a general deposit fee of $5.[1]

Courses in contributing departments are announced elsewhere in this bulletin. See particularly Anatomy, Bacteriology and Immunology, Pathology, Pharmacology, Physiology.

[1] Student registering for half time in dentistry and for part time in other departments will not be required to duplicate the incidental fee.

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 course for which they have satisfied the prerequisite as stated under each course.

For all general matters, relating to admission, advanced standing, credits, honor points, curricula, and requirements for graduation, students should consult the 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 adviser in the department concerned in order to learn the requirements of the special curriculum they will need to complete.

SUMMER DEMONSTRATION HIGH SCHOOL

The University High School will conduct a session during the first term of the summer quarter. Instruction will be offered in English, Mathematics, General Science, Chemistry, Biology, History, Social Studies, and other high school subjects. The school is a six-year high school comprising grades seven to twelve. The courses will be organized to provide individual attention to the needs and capacities of the pupils.

Students registered in Ed.T. 16su will be assigned to observation and practice teaching in the classes of the high school. The courses in special methods will be correlated with the high school classes in the appropriate fields. (MTWThF I, II, III, IV; Ed.)

MINIMUM FEE FOR GRADUATE STUDENTS

Graduate students who have completed all their graduate work with the exception of their thesis will be allowed to register in the summer quarter for *thesis work only* upon the payment of a flat fee of $5.

DETAILED DESCRIPTION OF COURSES

For detailed description of courses and curricula in Education see Part I, bulletin of the College of Education.

AGRICULTURAL EDUCATION

FIRST TERM

Agr.Ed.144su. The Student Centered Course of Study. An analysis of the problems of organizing courses in agriculture to utilize and to facilitate the student's participation in farming. Special emphasis on the techniques of individualized instruction. Introduction to the procedures in

providing occupational information and counseling for rural youth. (3 cred.; MTWThF II; 105Ad(UF).) Mr. Field.

Agr.Ed.185su. Special Problems in Agricultural Education. A survey of current problems involved in the organization and conduct of agricultural education in the secondary schools with special emphasis on the program of activities of the Future Farmers of America. Opportunity for intensive study of specific problems related to local school programs. (3 cred.; MTWThF IV; 105Ad(UF).) Mr. Field.

Agr.Ed.224su. Graduate Problems. An introduction to problems of research in agricultural education. Opportunity for study and planning of individual problems. (Cred. ar.; hrs. ar.; 209Ad(UF).) Mr. Field.

ART EDUCATION

FIRST TERM

Integrated offerings selected for their pertinence to today's social needs and grouped according to their emphasis:

Emphasis on Theory

ArtEd.83su. Problems in Art Education. Symposium on successful experiments bearing upon the art education deserving a place in the New Deal. (3 cred.; sr., teachers of experience and others approved by instructor; MTWTh VI and 1 hr. ar.; 207bJ.) Mr. Hilpert.

Emphasis on Appreciation

ArtEd.55,56,57su. Fundamental Art Principles. The enjoyment of the visual arts. No technical requirements. (3 cred. each sec.; no prereq.; Sec. 1 Appreciation of Fine Arts, MTThF II and 1 hr. ar.; 109J. Mr. Harmes; Sec. 2 Appreciation of Industrial Art, MTWTh VII and 1 hr. ar.; 109J.) Mr. Hilpert, Mr. Harmes.

Emphasis on Participation

ArtEd.1-2-3, 20-21-22su. Fundamental Design Principles with Experience in Color. (2½ cred.; no prereq.; MTThF I-II; 207aJ.) Mr. Hilpert.

ArtEd.23-29su. Representation in Various Media. (1½ cred.; no prereq.; MWF III-IV; 203J.) Mr. Harmes.

Emphasis on Tools and Processes

Experience in simple handicrafts selected from several courses with reference to their recreational value.

ArtEd.32,33,41,46su.[2] Simple Handicrafts. Experience with paper, clay, and metal. (2½ cred.; no prereq.; MTThF VI-VII; 10 J.) Miss Ross.

ArtEd.37,38,40,44,45su.[2] Simple Handicrafts. Experience in textile processes. (2½ cred.; no prereq.; MTThF III-IV; 10 J.) Miss Ross.

[2] A laboratory fee of $1.50 is charged for this course.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

FIRST TERM

Ed.Ad.124su. Public School Administration. (3 cred.; sr., grad.; prereq. 10 hrs. in ed.; MTWF III; 1 hr. ar.; 210 Bu.) Mr. Engelhardt.

Ed.Ad.128su. Special Problems in Educational Administration. (1 cred.; prereq. Ed. 124, 125, 126; MT IV; 210 Bu.) Mr. Engelhardt.

Ed.Ad.153su. Supervision of English in the Elementary Schools. (2 cred.; sr., grad.; prereq. Ed. 63 or equiv.; MTWTh VII; 204aEd.) Miss Smith.

Ed.Ad.154su. Supervision of Social Sciences in the Elementary Schools. (3 cred.; sr., grad.; prereq. Ed.T. 181 or equiv.; MTWThF I; 204aEd.) Mr. Wesley.

Ed.Ad.167su. The Junior High School. (2 cred.; sr., grad.; prereq. 10 hrs. in ed., including Ed. 51; MTWF IV; 106Pt.) Mr. Douglass.

Ed.Ad.169su. Extra-curricular Activities. (2 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51; MTWTh II; 106Pt.) Mr. Benjamin.

Ed.Ad.174su. The Junior College. (2 cred.; prereq. 10 hrs. in ed. or consent of instructor; MTWTh I; 204bEd.) Mr. Eells.

Ed.Ad.175su. Financial Aspects of Public School Business Administration. (3 cred.; sr., grad.; prereq. 124, 125; MTWThF II; 210 Bu.) Mr. Friswold.

Ed.Ad.205su. Seminar in Educational Administration. (No cred.; MTWTh V; 210 Bu.) Mr. Engelhardt.

Ed.Ad.218su. Seminar in Secondary School Problems. (No cred.; grad.; prereq. consent of instructor; Th IV-V; 204aEd.) Mr. Douglass.

Ed.Ad.264su. High School Administration. (2 cred.; grad.; prereq. 18 hrs. in ed. including Ed. 51; MTWF III; 106Pt.) Mr. Douglass.

See also Industrial Education for the course, Ind. 110su.

SECOND TERM

Ed.Ad.113su. High School Curriculum. (3 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51; MTWThF VI; 210 Bu.) Mr. Umstattd.

Ed.Ad.123su. Supervision of High School Instruction. (2 cred.; sr., grad.; prereq. 10 hrs. in ed.; MTWTh II; 100 Pt.) Mr. Boardman.

Ed.Ad.150su.[1] Supervision and Improvement of Instruction. (3 cred.; sr., grad.; prereq. Ed.T. 181 or equiv.; MTWThF I; 106Pt.) Mr. Brueckner.

Ed.Ad.160su. Supervision of Elementary School Subjects. (3 cred.; sr., grad.; prereq. Ed.Ad. 150; MTWThF II; 106Pt.) Mr. Brueckner.

Ed.Ad.218su. Seminar in Secondary School Problems. (No cred.; grad.; prereq. consent of instructor; Th IV-V; 204aEd.) Mr. Boardman.

Ed.Ad.265su. High School Administration. (2 cred.; grad.; prereq. 18 hrs. in ed. including Ed. 51, or consent of instructor; MTWTh III; 100 Pt.) Mr. Boardman.

[1] A laboratory fee of $1 per credit is charged for this course.

EDUCATIONAL PSYCHOLOGY

FIRST TERM

Ed.Psy.60su.[3] Introduction to Statistical Methods. (3 cred.; jr., sr.; prereq. 6 cred. in psy.; MTWThF II; 102L.) Mr. Van Wagenen.

Ed.Psy.111su. Educational Measurements in the Elementary School. (3 cred.; jr., sr., grad.; prereq. Ed. 51 or equiv.; MTWThF I; 102L.) Mr. Van Wagenen.

Ed.Psy.116su. Advanced Statistical Methods in Education. (2 cred.; sr., grad.; prereq. 60 or equiv.; MTWTh II; 204bEd.) Mr. Eells.

Ed.Psy.153su. Research Problems. (1 cred.; sr., grad.; prereq. consent of instructor; ar.) Mr. Rockwell, Mr. Van Wagenen.

Ed.Psy.158su. Psychology of Adolescence. (3 cred.; sr., grad.; prereq. Ed. 51 or equiv.; MTWThF VI; 210 Bu.) Miss Edwards.

Ed.Psy.184su. Mental Deficiency. (3 cred.; sr., grad.; prereq. Ed. 51 or equiv.; MTWThF I; 301Psy.) Mr. Rockwell.

Ed.Psy.193su. Psychology of Learning. (2 cred.; sr., grad.; prereq. 12 cred. in psy. and ed. psy.; MTWF III; 301Psy.) Mr. Rockwell.

SECOND TERM

Ed.Psy.134su.[2] Mental Tests. (2 cred.; jr., sr., grad.; prereq. Ed. 51; MTWTh III-IV; 211Psy.) Mr. Miller.

Ed.Psy.154su. Research Problems. (1 cred.; sr., grad.; prereq. consent of instructor; ar.) Mr. Miller.

GENERAL EDUCATION

FIRST TERM

Ed.51su. Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. 6 cred. in psy.; MTWThF VI; 204bEd.) Instructor ar.

Ed.52su.[1] Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. Ed. 51 or consent of instructor; MTWThF II; 206Pt.) Mr. Umstattd.

Ed.53su. Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. Ed. 52 or consent of instructor; MTWThF I; 106Pt.) Mr. Friswold.

Ed.208su. Methods in Educational Research. (3 cred.; grad.; MTWThF IV; 204bEd.) Mr. Johnson.

SECOND TERM

Ed.51su. Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. 6 cred. in psy.; MTWThF II; 210 Bu.) Mr. Miller.

Ed.52su.[1] Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. Ed. 51 or consent of instructor; MTWThF I; 210 Bu.) Mr. Umstattd.

[1] A laboratory fee of $1 per credit is charged for this course.
[2] A laboratory fee of $1.50 per credit is charged for this course.
[3] A laboratory fee of $1 is charged for this course.

Ed.53su. Introduction to Secondary School Teaching. (3 cred.; jr., sr.; prereq. Ed. 52 or consent of instructor; MTWThF III; 210 Bu.) Mr. Luker.

HISTORY AND PHILOSOPHY OF EDUCATION

FIRST TERM

H.Ed.3su. Educational Sociology. (3 cred.; jr., sr.; prereq. 6 cred. in psy.; MTWF III and 1 hr. ar.; 206Pt.) Mr. Fraser.

H.Ed.101su. Historical Foundations of Modern Education. (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.; MTWThF II; 101L.) Miss Alexander.

H.Ed.103su. History of Modern Elementary Education. (3 cred.; jr.. sr., grad.; prereq. 6 cred. in psy. Not open to those who have had H.Ed.1; MTWThF IV; 101L.) Miss Alexander.

H.Ed.131su. Comparative School Systems. (2 cred.; prereq. 9 cred. in ed.; MTWF III; 100 Pt.) Mr. Benjamin.

HOME ECONOMICS EDUCATION

FIRST TERM

H.E.Ed.42su. Special Methods of Teaching Home Economics. (5 cred.; jr., sr.; prereq. H.E. 13, 53, 83, or equiv.; Psy. 1-2, Agr. Ed. 11 or Ed. 51 or equiv.; MTWThF IV-V; 213HE.) Miss Rose.

H.E.Ed.142su. Educational Measurement in Home Economics. (3 cred.; prereq. 42; MWF I-II; 203HE.) Miss Clara Brown.

H.E.Ed.143su. Home Economics Curricula. (2 cred.; prereq. 42 or equiv.; MTThF II; 213HE.) Miss Rose.

H.E.Ed.149su. Research Problems. (2 cred.; sr.; permission of instructor; MTWF VII; 213HE.) Miss Clara Brown.

INDUSTRIAL EDUCATION

FIRST TERM

Ind.44su. Equipment and Management. (3 cred.; all; prereq. Ind. 40 and 42 or consent of instructor; MTWThF IV; 112Bu.) Mr. Fryklund.

Ind.70su.[1] Methods in Shop Subjects. (3 cred.; all; prereq. Ind. 40 and 42 or consent of instructor; MTWThF II; 112Bu.) Mr. Fryklund.

Ind.101su. Tests in Industrial Subjects. (3 cred.; jr., sr., grad.; prereq. Ed.Psy. 55 or 60 or Ed. 51; MTWThF I; 112Bu.) Mr. Smith.

Ind.110su. Guidance in the Schools. (3 cred.; jr., sr., grad.; prereq. Ed. Psy. 55 or Ed. 51; MTWF III and 1 hr. ar.; 112Bu.) Mr. Smith.

Shop and drawing courses.—All degree candidates should keep in mind the maximum of forty-five quarter credits, in shopwork and drawing combined, which is enforced in this department. Twenty quarter-credits of shopwork and ten of drawing are required. Arrangements for campus

enrolments will be made by Mr. Fryklund and for Dunwoody enrolments by Mr. Smith.

NOTE.—Shop and drawing courses in wide variety are described elsewhere in this bulletin. (See Architecture and Fine Arts, Drawing and Descriptive Geometry, Mechanical Engineering, and Agricultural Engineering.)

Special arrangement has been made with the Department of Mechanical Engineering, main campus, which will materially strengthen the offering in manipulative subjects. It is hoped that sufficient numbers will enroll to make possible special sections for teachers, particularly in the afternoon, to be out of conflict with lecture courses scheduled in the earlier half of the day. Chief attention will be directed to forging and art-smithing, woodwork of various types, and machine-shop practice.

The usual offering will be made in Agricultural Engineering, Farm campus, in a variety of types of mechanical training. These courses are suited to the purposes of general industrial instruction in the smaller towns which are typical of our state.

Students may pursue shop and drawing courses at Dunwoody Institute, without fees other than those paid to the University, except a one-dollar deposit which is refunded in most cases. The types of instruction there made available will be determined by the demand and students are urged to write us of their desires. Hours spent at Dunwoody will vary by special arrangement and the suggested enrolment is for two or three credits at the rate of twenty-four clock-hours per credit.

There will be no departmental lecture courses in the second summer term. There will be, however, many courses outside the department which are required or elective in the four-year curriculum and which are appropriate for graduate study. Second term programs may well be planned and approved while the first term is in progress.

Correspondence is invited upon such matters as credit transfer, Smith-Hughes certification, and graduate status. A copy of the four-year curriculum will be mailed upon request. Please address inquiries to Professor Homer J. Smith, 222 Burton Hall.

PUBLIC SCHOOL MUSIC

FIRST TERM

Mu.Ed.4su.[1] Applied Instrumental Technique (Strings). (2 cred.; no prereq.; MTWThF I; 4Mu.) Mr. Pepinsky.

Mu.Ed.6su.[1] Applied Instrumental Technique (Woodwinds). 2 cred.; no prereq.; MTWThF VI; 4NMA.) Mr. Prescott.

Mu.Ed.53su.[1] High School Methods. (2 cred.; no prereq.; MTWF III; 4Mu.) Mr. Jones.

Mu.Ed.54su.[1] Operetta Conducting. (2 cred.; no prereq.; MTWTh II; 4Mu.) Mr. Jones.

Mu.Ed.57su.[1] Theory of Conducting. (2 cred.; no prereq.; MTWTh IV; 4Mu.) Mr. Jones.

Mu.Ed.58su.[1] Orchestra Conducting. (2 cred.; no prereq.; MTWTh VII; 4Mu.) Mr. Pepinsky.

Mu.Ed.63su.[1] Band Conducting. Arranging, scoring, and conducting of band music. This class is organized into a band and each member conducts the ensemble on band literature adapted to beginning, intermediate, and advanced organizations. (2 cred.; no prereq.; TTh 7:30 p.m.; 4NMA.) Mr. Prescott.

Mu.Ed.64su.[1] Band Organization. Band literature and methods employed in the inauguration and development of public school bands; scheduling and

[1] A laboratory fee of $1 per credit is charged for this course.

teaching of the full band, sectionals, and technic classes; administrative problems and methods. (2 cred.; no prereq.; TWThF IX; 4NMA.) Mr. Prescott.

THEORY AND PRACTICE OF TEACHING

FIRST TERM

Ed.T.16su.[1] Practice Teaching. (3 or 5 cred.; sr., grad.; prereq. passing mark on qualifying examination and consent of instructor; MTWThF; ar.) Mr. Floyd.

Ed.T.30su. Principles of Kindergarten and Nursery School Education. (3 cred.; jr., sr.; prereq. C.W.80; MTWTh III and 1 hr. ar.; 202Pt.) Mrs. Foster.

Ed.T.32su.[1] Plastic Materials. (3 cred.; jr., sr.; prereq. Ed.T. 30; MTWThF VII and 1 hr. ar.; 202Pt.) Miss Headley.

Ed.T.33su. Rhythms, Games, and Music. (2 cred.; jr., sr.; prereq. Ed.T. 30; MTWTh I; 100 Pt.) Miss Thompson.

Ed.T.52asu.[1] The Teaching of Composition in Junior and Senior High Schools. (2 cred.; sr.; prereq. Ed. 53; TWThF VII; 111Ed.) Mrs. Wettleson.

Ed.T.53asu.[1] The Teaching of Literature in Junior and Senior High Schools. (2 cred.; sr.; prereq. Ed. 53; TWThF VIII; 111Ed.) Mrs. Wettleson.

Ed.T.56su.[1] Teachers' Course in Secondary School Mathematics. (4 cred.; jr., sr.; prereq. passing mark on qualifying examination; TWThF VI, VII; 205aEd.) Mr. Kinney.

Ed.T.62su.[1] The Teaching of Secondary School Science. (4 cred.; jr., sr.; prereq. passing mark on qualifying examination; TWThF V, VI; 215Ed.) Mr. Lund.

Ed.T.85su.[1] Methods and Observation. (1 cred.; jr., sr.; prereq. Psy. 1-2, Ed.T. 30 or simultaneously; F VI and observation hrs. ar.; 202Pt.) Miss Headley, Miss Thompson.

Ed.T.122su. Literature for Adolescents. (2 cred.; jr., sr., grad.; prereq. Ed. 53 or junior-senior high school teaching experience; MTWTh II; 100 Pt.) Miss Smith.

Ed.T.151su.[1] The Teaching of Speech. Orientation in problems of speech education. History, applications of psychology; objectives, programs, and methods; direction of extra-curricular activities; evaluation of texts. (3 cred.; jr., sr., grad.; prereq. Sp. 41-42-43 or 45-46 or equiv., or permission of instructor; MTWThF VI; 308F.) Mr. Knower.

Ed.T.164su.[1] Clinical Methods and Practice in Speech Pathology. (3 cred.; sr., grad.; prereq. Ed.Psy. 143-144, Sp. 41, 42, 43, 61, 67, 162, and permission of instructor; TTh III, other hrs. ar.; 306F.) Mr. Bryngelson.

Ed.T.181su.[1] Foundations of Elementary School Methods. (3 cred.; jr., sr., grad.; prereq. 9 hrs. in ed. incl. Ed. 61 or equiv.; MTWF III, and 1 hr. ar.; 206Pt.) Mr. Cooper.

[1] A laboratory fee of $1 per credit is charged for this course.

Ed.T.193su. Foundations of Secondary School Methods. (3 cred.; sr., grad.; prereq. Ed.T. 53; MTWThF II; 204aEd.) Mr. Johnson.

Ed.T.194su.[1] Advanced Course in Methods of Teaching English. (2 cred.; sr., grad.; prereq. Ed.T. 52-53-54 or equiv.; MTWTh IV; 100 Pt.) Miss Smith.

Ed.T.201su.[1] Advanced Course in Methods of Teaching History and Social Studies. (3 cred.; grad. and teachers; prereq. consent of instructor; MTWF III, 1 hr. ar.; 204bEd.) Mr. Wesley.

[1] A laboratory fee of $1 per credit is charged for this course.

PHYSICAL EDUCATION AND ATHLETICS

PHYSICAL EDUCATION FOR MEN

Credit for courses taken in the summer quarter will be given toward a regular teacher's certificate in physical education where the courses are included in the physical education major.

The gymnasium, tennis courts, baseball diamonds, running track, and handball and squash courts will be available to students in the summer quarter. The swimming pools in the Armory and University Farm gymnasium will be open for recreational swimming from 2:30 to 5:30 p.m. each day except Saturdays.

FIRST TERM

Asu. 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.) Mr. Osell.

4su. Beginning Swimming. Instruction for men who are unable to swim. Altho the correct form is stressed from the very beginning and no attempt is made to hurry the learner, most men will be able to swim the length of the pool in two or three weeks. Different strokes will be taught as the ability of individuals warrants. (1 cred.; MTWTh VII; A.) Mr. Piper.

5su. Human Anatomy. A study of the bones, joints, muscles, tissues, and various systems of the body. Especially designed as preparation for kinesiology. (3 cred.; MTWThF VI; 206A.) Dr. Cooke.

6su. Golf for Beginners. (Ar.)

10su. Advanced Swimming. For those who can swim at least forty yards. Instruction in the form of various strokes, diving, life-saving, water games, and stunts. Designed to aid those men who may be called upon to teach swimming in schools, playgrounds, or camps as well as for men who wish to improve their own performance. By special arrangement with the instructor credit for Phys.Ed. 10, Minor Sports, may be received for this course. (1 cred.; MTWThF VI.) Mr. Piper.

20su. Physical Education Activities for Secondary Schools. Games of low organization, relays, stunts, tumbling, pyramid building, simple rhythms, calisthenics, marching, and simple apparatus exercises. All activities adapted to secondary school level and arranged in progression. May be substituted for 19 or 21. (1 cred.; MTWThF V; South Wing, A.) Mr. Piper.

24su. Methods of Teaching Physical Education. Lectures and quizzes on terminology and technique of teaching. (2 cred.; MTWTh I, II, June 20 to July 10; 206A.) Mr. Keller.

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 VII; 206A.) Dr. Cooke.

29su. Orthopedic and Remedial Procedures. 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.; FS III-IV; 206A.) Dr. 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.; MTWTh VI; 202S.) Mr. Woodward.

31su. History of Physical Education. A historical survey of physical education from ancient times to the present. Special consideration of different systems of physical education and contemporary developments. (2 cred.; no prereq.; MTWTh IV; 204A.) Mr. Keller.

32su. Principles of Physical Education. Study of the aims and scope, and the biological aspects of physical education, with special reference to its place in education; comparative value of various activities; activities suitable to different sexes, ages, varying conditions. (3 cred.; MTWThF III; A.) Mr. Keller.

33su. Organization and Administration of Physical Education and Athletics. Problems of organization, administration, and supervision. Arrangement of programs in physical education activities. Discussion of place of athletics in the program; schedule making; construction; equipment, and care of gymnasia and athletic fields. (2 cred.; TWThF V; 206A.) Mr. McCormick, Mr. Piper.

36su. Kinesiology. A discussion of the principles and mechanics of bodily movements; the relation of posture to health and efficiency; the effects of various exercises upon the tissues and organs of the body. (2 cred.; MTWTh III; 206A.) Mr. Osell.

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 I-II, June 20 to July 10; 202S.) Mr. Bierman.

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 I-II, July 11 to July 28; 202S.) Mr. MacMillan.

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.; sr.; no prereq.; MTWThF VII; 202S.) Mr. MacMillan.

46su. Intramural Athletics. Practice in intramural activities and discussion of their organization in an all-around physical education program. Practice and rules study in such sports as touchball, diamond ball, handball, volley ball, squash, tennis, and golf. (2 cred.; MTWThF III; 106A.) Mr. Smith.

47su. Football Offensive Strategy. Material to use in work with quarterbacks during the season or off seasons. Choice of plays on different parts of the field and under various playing conditions. Series and sequence plays, taking advantage of opponents' weaknesses, use of quick kicks, passes, plunges, and running plays. (1 cred.; FS IV; 202A.) Mr. Dawson.

48su. Organization of Boy Scout, Playground, and Camp Activities. Especially designed to assist men leading groups in leisure time activities and to train others to qualify as scout masters, playground directors, and camp leaders. (2 cred.; MTWTh IV; A.) Mr. Osell, Mr. Piper.

49su. Tests and Measurements in Physical Education. A study of the history and development of the various types of tests and of their validity, reliability, and practical applications as methods of classification and grading. (2 cred.; MTWTh I-II, July 11 to July 28; 206A.) Mr. Keller.

PHYSICAL EDUCATION FOR WOMEN

Course 2 is open also to men.

For hours when the swimming pool will be open for incidental use, see Course 30.

The Washington Avenue tennis courts and the university golf course are open to students. Charges: tennis $1 for each term of the summer quarter; golf 50 cents for 18 holes (45 cents if one buys a coupon book of ten tickets).

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 $1. Tickets for General Swimming (30su) are 15 cents apiece or eight for $1. They pay for rental of swimming suit, towel, and sheet.

Maximum course fee for students taking two or more courses in physical education, $2 per term.

Certain courses carry credit toward the teacher's certificate in physical education. See Courses 2 and 5.

Students desiring to enroll in Intermediate or Advanced Swimming must pass a test before registering. Test will be conducted on registration days.

FIRST TERM

2su. Teachers' Course in Play. 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; observation and practice teaching on playground. This course carries university credit for Physical Education 43-44 and 80 if preceded by specified prerequisites. Portion covering practical work in folk dances and games may be taken alone for one credit. Shower bath fee, $1.50. (4 cred.; no prereq.; lect. MTWThF I; games and folk dancing MTWThF II; practice teaching MTWTh VII; 201,153WGm.) Miss Warnock, Miss Starr.

5su. Methods of Coaching and Conducting Organized Games for the Junior and Senior High School. Special techniques for team games and individual sports; methods of teaching. Organization of extra-curricular activities, e.g., athletic associations, after-school programs, tournaments suited to various games, play days. Practice in skills and practice teaching within the group. Shower bath fee, $2. (3 cred.; prereq. permission of department; MTWThF II, MTWF III, MTWThF IV, F V; 201,153WGm.) Miss Snell.

6su. Health Education for the Elementary and Junior High School. This course deals with principles, methods, and materials for the teaching of health education in the elementary and junior high schools. Close correlation with physical education will be stressed and possible correlations with other subjects will be indicated. Class periods will be devoted to lectures and discussions. Practical individual projects will be outlined and encouraged. (2 cred.; no prereq.; MTWF III; 201WGm.) Miss Warnock.

7su. Tennis for Beginners. (No cred.; no prereq.; TTh 7:00 a.m.; 151WGm.)

8su. Golf for Beginners. Limited to 20. (No cred.; no prereq.; Sec. 1 WF 7:00 a.m., Sec. 2 WF I, Sec. 3 WF II; 151WGm.) A period for elective practice will be arranged for members of the classes.)

9su. Teachers' Course in Fundamentals of Physical Education for the Elementary and Junior High School. Course content and methods of teaching fundamental skills with specific application to games and self-testing activities for both boys and girls in the grades and junior high school. Methods of organization and physical capacity tests. Lectures, discussion, motor experience, and practice in the technique of teaching. Motor experience alone may be taken for 1 credit; lectures and discussion may be taken for 2 credits. Shower bath fee $1.50. (3 cred.; no prereq.; motor experience MTWF III; lectures, discussion, and practice MTWThF IV; 201,151WGm.) Miss Baker.

10su. Fundamentals of Rhythm for the Elementary and Junior High School. The fundamental elements of rhythm are applied to all types of rhythmic activity usable in the grade and junior high school; special applications are made to rhythms for little children, folk and clog dancing, and social dancing. Includes some reference to method of approach. Not a skills course primarily. (1 cred.; no prereq.; MTWThF 7:00 a.m.; 153WGm.) Miss Baker.

15su. Human Anatomy. A study of the human body with lectures, demonstration, and opportunity for dissection. Offered especially for students of physical education. Laboratory fee $3.50. (6 cred.) (Not offered in 1934.)

16su. Fundamentals of Rhythm in Clog and Tap Dancing. Primarily an intensive skill experience in routines, dances, and basic steps in clog and tap dancing. (1 cred.; no prereq.; MTWThF I; 153WGm.) Miss Snell.

30su. General Swimming. No registration necessary. (No cred.; no prereq.; MTWThF V.)

32su. Elementary Swimming. Class instruction given. Shower bath fee $1. Sections limited to 25. (No cred.; prereq. phys. exam.; students may take equiv. of Phys.Ed. 22 by registering for two sections; Sec. 1 MW IV, Sec. 2 TTh IV, Sec. 3 MW VII; 51WGm.) Miss Starr.

33su. Intermediate and Advanced Swimming. Class instruction given. Class will be divided into intermediate and advanced sections as result of test. Sections limited to 25. Shower bath fee $1. (No. cred.; prereq. swim. test, phys. exam.; Sec. 1 TTh VII, Sec. 2 TTh VIII; 51WGm.) Miss Starr.

34su. Camp Swimming and Water Front Safety. Methods, content, and organization of swimming instruction, full and part-time camp season. Regulations for canoeing and boating trips. Red Cross junior and senior life-saving tests. Trips to camps and canoe practice. (2 cred.; lect. MWF III; practice in pool TTh VI; 201,51WGm.) Miss Starr.

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 and Architecture. 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.

FIRST TERM[1]

Econ.3su. The Mechanism of Exchange. (3 cred.; no prereq.; 3rd qtr. fr., soph., jr., sr.; MTWThF II; 102B.) Mr. Alm.

Econ.6su. Principles of Economics (elementary course). (3 cred.; no prereq.; soph., jr., sr.; MTWThF V; 6B.) Mr. Cassady.

Econ.14su. Elements of Statistics. (3 cred.; prereq. 4 or 6-7; soph., jr., sr.; MTWF III and 1 hr. ar.; 102B.) Mr. Graves.

Econ.20su. Elements of Accounting. (3 cred.; no prereq.; 3rd qtr. fr., soph.; MTWThF I; 302B.) Mr. Alm.

B.A.51su. Business Law: Contracts. (3 cred.; prereq. 4 or 6-7; jr., sr.; MTWThF I; 102B.) Mr. Dalzell.

B.A.77su. Survey in Marketing. For the summer quarter this course is equivalent to Econ. 85. (3 cred.; no prereq.; jr., sr.; MTWThF IV; 102B.) Mr. Cassady.

[1] For course descriptions see Part I of the bulletin of the School of Business Administration.

B.A.101su. Advanced General Economics. (Value and distribution.) For the summer quarter this course is the equivalent of Econ. 103. (3 cred.; prereq. 4 or 6-7; jr., sr., grad.; MTWThF I; 202B.) Mr. Garver.

B.A.146su. Investments. (3 cred.; prereq. 4 or 6-7; jr., sr., grad.; MTWThF IV; 202B.) Mr. Stehman.

Econ.149su. Business Cycles. (3 cred.; prereq. 141 or B.A. 142; jr., sr., grad.; MTWF III and one hr. ar.; 202B.) Mr. Marget.

B.A.155su. Corporation Finance. For the summer quarter this course is equivalent to Econ. 160. (3 cred.; prereq. 4 or 6-7; jr., sr., grad.; MTWThF V; 202B.) Mr. Stehman.

B.A.165su. The Economics of Public Utilities. For the summer quarter this course is equivalent to Econ. 154. (3 cred.; prereq. 3, and 4 or 6-7; jr., sr., grad.; MTWThF II; 202B.) Mr. Garver.

Econ.166su. International Economic Problems. (3 cred.; prereq. 4 or 6-7; jr., sr., grad.; MTWThF V; 102B.) Mr. Marget.

SECOND TERM[1]

Econ.7su. Principles of Economics. A continuation of Econ. 6su. (3 cred.; prereq. 6; soph., jr., sr.; MTWThF II; 102B.) Mr. Kozelka.

B.A.102su. Advanced General Economics. A continuation of B.A. 101su. For the summer quarter this course is the equivalent of Econ. 104. (3 cred.; prereq. 101 or 103; jr., sr., grad.; MTWThF II; 202B.) Mr. Schmidt.

B.A.142su. Money and Banking (advanced course). For the summer quarter this course is the equivalent of Econ. 141. (3 cred.; jr., sr., grad.; prereq. 3, and 4 or 6-7; MTWThF III; 102B.) Mr. Kozelka.

Econ.161su. Labor Problems and Trade Unionism. (3 cred.; prereq. 4 or 6-7; jr., sr., grad.; MTWThF IV; 202B.) Mr. Schmidt.

[1] For course descriptions see Part I of the bulletin of the School of Business Administration.

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 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.

NURSERY SCHOOL AND KINDERGARTEN

The Nursery School will be in session from 9:00 a.m. to 1:00 p.m. beginning June 18 and closing July 27. Applications for the enrolment of children will be received at the office of the institute. The fee will be $20 for tuition, including orange juice, and lunch at noon. A few additional children can be accommodated from 9:00 to 11:45 a.m. with no lunch served but including orange juice at a tuition fee of $15.

The Kindergarten will be in session from 9:00 a.m. to 11:45 a.m. beginning June 18 and closing July 27 at a tuition fee of $10 including orange juice. If parents of children in either the Nursery School or Kindergarten wish the institute to undertake the responsibility of transportation, an additional fee of $8 per child will be charged if the child lives in the southeast district.

FIRST TERM

C.W.40su. Child Training. (3 cred.; jr., sr.; prereq. Psy. 1-2; MTWTh I and two hrs. observation as ar.; 202Pt.) Mrs. Faegre.

C.W.80su. Child Psychology. (3 cred.; jr., sr.; prereq. Psy. 1-2; MTWThF V and 1 hr. ar.; 202Pt.) Miss Morgan.

C.W.130su. The Development of the Young Child. (3 cred.; sr., grad.; prereq. 12 cred. in child welfare or psy. or equiv., and permission of instructor; MTWThF II and 1 hr. ar.; 202Pt.) Mr. Anderson.

C.W.170su. Parental Education in Child Care and Training. (3 cred.; sr., grad.; prereq. 8 cred. in C.W. or H.E. 34, 35, and 44 or 15 cred. in ed. or psy., or soc., or prev. med.; MTWThF IV and 1 hr. ar.; 202Pt.) Mrs. Faegre.

C.W.233su. Research in the Development of the Young Child. (Cred. ar; grad. students only; hrs. ar.) Mr. Anderson, Mrs. Foster.

C.W.270su. Readings in Child Development. Independent readings and reports in any field of child development which meet the approval of the

instructor. (Cred. ar.; grad. students only; hrs. ar.) Mr. Anderson, Mrs. Foster.

The following courses, Ed.T. 30 and 85, listed under Theory and Practice of Teaching, page 91, are offered by the institute.

SECOND TERM

C.W.40su. Child Training. (3 cred.; jr., sr.; prereq. Psy. 1-2; MTWThF psy., ed. psy., or soc.; MTWTh IV; 202Pt.) Miss Goodenough.

C.W.140su. Behavior Problems. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.; MTWTh IV; 202Pt.) Miss Goodenough.

C.W.270su. Readings in Child Development. Independent readings and reports in any field of child development which meet the approval of the instructor. (Cred. ar.; grad. students only; hrs. ar.) Miss Goodenough.

LIBRARY TRAINING

FIRST TERM

Academic credit is given only to students with at least two full years of approved work of collegiate grade. "No-credit" students will be admitted only with the approval of the Library Division of the Minnesota State Education Department (in the case of residents of Minnesota) or of the director of the Division of Library Training (in the case of others not residents of Minnesota). Admission of "no-credit" students will be limited to candidates under appointment or promise of appointment to definite library positions. Candidates for "no-credit" standing should in every case present written evidence of such appointment or promise of appointment.

Lib.Meth.102su. Cataloging. Elements of dictionary cataloging. Lectures and problems. (3 cred.; MTWThF I; 5Lib.) Miss Hutchinson.

Lib.Meth.104su. Classification. Introduction to the Dewey Decimal Classification: subject headings, author numbers, shelf and accession records. (3 cred.; jr., sr.; MTWThF II; 5Lib.) Miss Penrose.

Lib.Meth.112su. Reference. Essential reference books and other material. Methods of reference work. (3 cred.; MTWThF IV; 5Lib.) Miss Hutchinson.

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SCHOOL OF BUSINESS ADMINISTRATION

FACULTY

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Russell Alger Stevenson, Ph.D., Dean of the School of Business Administration
John J. Reighard, M.A., C.P.A., Assistant Dean of the School of Business Administration
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George Filipetti, Ph.D., Professor of Economics and Business Administration
Frederic B. Garver, Ph.D., Professor of Economics
Alvin H. Hanson, Ph.D., Professor of Economics
William L. Hart, Ph.D., Professor of Mathematics
Herbert Heaton, M.A., M.Com., Litt.D., Professor of Economic History
Oscar B. Jesness, Ph.D., Professor of Agricultural Economics
Arthur W. Marget, Ph.D., Professor of Economics and Finance
Bruce D. Mudgett, Ph.D., Professor of Economics and Statistics
Donald G. Paterson, M.A., Professor of Psychology
J. Warren Stehman, Ph.D., Professor of Finance
Roland S. Vaile, M.A., Professor of Marketing
Warren C. Waite, Ph.D., Professor of Agricultural Economics
Jeremiah S. Young, Ph.D., Professor of Political Science
Eugen Altschul, Ph.D., Visiting Professor of Economics (Emergency Committee in Aid of Displaced German Scholars and the Rockefeller Foundation)
Ernest A. Heilman, Ph.D., Associate Professor of Accounting
Edwin C. Johnson, Ph.D., Associate Professor of Agricultural Economics
Charles A. Koepke, M.S. (M.E.), Associate Professor of Industrial Engineering
Clare L. Rotzel, B.C.S., C.P.A., Associate Professor of Accounting
William H. Stead, Ph.D., Associate Professor of Economics
Arthur M. Borak, Ph.D., Assistant Professor of Economics
Ralph Cassady, Ph.D., Assistant Professor of Marketing
Ernestine C. Donaldson, M.A., Assistant Professor of Secretarial Training
Richard Hartshorne, Ph.D., Assistant Professor of Geography
Richard L. Kozelka, Ph.D., Assistant Professor of Economics and Statistics
Walter R. Myers, Ph.D., Assistant Professor of Economics and Finance
Harry J. Ostlund, B.A., Assistant Professor of Accounting
Emerson P. Schmidt, M.A., Assistant Professor of Economics
Robert M. Weidenhammer, Ph.D., Assistant Professor of Economics
John P. Dalzell, B.A., LL.B., Lecturer in Business Law
Howard P. Longstaff, Ph.D., Lecturer in Psychology

Harlan L. McCracken, Ph.D., Lecturer in Economics
Benjamin W. Palmer, M.A., LL.B., Lecturer in Business Law
Raimund W. Goldschmidt, Ph.D., Visiting Lecturer in Economics (Twin City Jewish-American Lectureship Fund)
Ingvald W. Alm, B.Sc. in Bus., Instructor in Economics and Accounting
Judson O. Burnett, M.A., Instructor in Economics and Accounting
Helen G. Canoyer, M.A., Instructor in Economics and Marketing
Richard H. Crawford, B.A., Instructor in Economics and Business Administration
William C. Dachtler, B.S., Instructor in Business Administration
Edward G. Eriksen, B.B.A., Instructor in Economics and Accounting
Erwin A. Gaumnitz, B.B.A., Instructor in Economics and Statistics
Richard A. Graves, M.A., Instructor in Economics and Insurance
Norma K. Henry, B.S. in Bus., Instructor in Secretarial Training
Oscar E. Heskin, M.A., Instructor in Economics
Reuel I. Lund, M.A., C.P.A., Instructor in Economics and Accounting
Laurence R. Lunden, B.A., Instructor in Economics
Oswald Nielsen, Ph.B., Instructor in Economics and Accounting
Ronald B. Shuman, M.A., Instructor in Economics
Tillman M. Sogge, B.A., Instructor in Economics and Business Administration
Herbert Tout, M.A., Instructor in Economics
Glen R. Treanor, B.A., Instructor in Economics
Arthur R. Upgren, B.A., Instructor in Economics
Nina L. Youngs, B.A., Instructor in Accounting and Statistics
Francis M. Boddy, B.B.A., Assistant in Economics
Carl D. Corse, B.B.A., 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 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 thoro 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, traffic, secretarial training, statistics, and insurance.

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 methods in the solution of problems which have developed as a result of recent trends in industry and commerce. The further development in large-scale administration which is likely to occur in the future will increase the importance of the technical equipment of the manager in his scientific approach to business problems. Accounting and statistics constitute the basic tools of the quantitative measurements essential to the analysis of these business problems. These subjects, therefore, are given a prominent place in the curriculum. Principles of accounting and the elements of statistics should usually be completed 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. Supplementary 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.

Every modern business unit conducts its operations in a complex, but organized, business and economic world. Its contacts with the legal, financial, banking, transportation, governmental, and labor institutions with which it must deal call for a special understanding of the organization of these fields in their relation to the business enterprise. This need is met by a special group of courses required in each sequence in the School of Business Administration. This core group, comprising courses in business law, corporation finance, money and banking, transportation, public finance, public utilities, personnel management, labor problems, and economics, forms the nucleus around which the various sequences are built and constitutes the foundation for the specialized professional training in business administration which the school provides.

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 accordance 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 cooperative 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 and Architecture.

Students entering from other colleges and universities of recognized standing are admitted with the consent of the dean, provided the credits which are presented for admission and approved are substantially equivalent to those of the pre-business sequences of the University. Provision is made for satisfying deficiencies in certain required courses in accounting, statistics, and mechanism of exchange when applicants for admission have not had these courses. In general ninety credit hours are a necessary minimum for admission.

SPECIAL STUDENTS

A limited number of high school graduates who have reached the age of twenty-four and can furnish evidence 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.

Registration in courses in Business Administration is not open to students of other schools or colleges of the University without special permission, except for those courses which are announced in the bulletin of the school or college concerned.

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. The grade of D carries no honor points and for a grade of F, or failure, one honor point for each credit hour is subtracted from the total earned.

STUDENTS' WORK COMMITTEE

Students who fail to earn the same number of honor points as credits are failing to make progress toward a degree and are considered as showing unsatisfactory scholarship. The Students' Work Committee co-operates in advising all such students and adjusting the program of work in each case. If these measures are not effective in improving the quality of scholarship, the committee may require the student to withdraw his registration even tho he may be receiving passing grades. 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 this standard will not be recommended for the degree.

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.

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.

GRADUATION HONORS

The degree of bachelor of business administration "with distinction" is awarded to any student who has maintained a scholarship record of at least two honor points per credit in the curriculum of the school, as well as in all pre-business work, and who in addition has either (1) submitted a thesis showing unusual attainment on a topic on business administration or economics, or (2) satisfied a faculty committee in an oral examination that he possesses unusual ability and originality. A candidate for graduation honors must meet the scholastic requirements at the time that he gives notice of his candidacy, which must be not later than the beginning of the second quarter prior to graduation. He must have completed at least three fourths of the work in his curriculum (one quarter of which must be in residence at the University of Minnesota) and must maintain his scholastic standing. The faculty committee will determine in consultation with the candidate whether he will be permitted to elect an examination or a thesis in order to qualify for graduation honors. In the latter case the thesis must be submitted in final form not later than four weeks before graduation.

REGISTRATION

Before any student may register in the School of Business Administration a complete record of his college work must be approved by the dean's office. The procedure is as follows:

Students transferring from other colleges of the University.—Each pre-business sophomore should fill out a "Notice of Change of College" form at the general information window in the registrar's office during his last quarter in the Junior College. The registrar will then send a transcript of his work to the dean's office of the School of Business Administration and the student will be notified as to his status after the grades for the quarter have been recorded.

Students transferring from other institutions.—Each student must submit a transcript of his work done in the other institution to the university examiner. A copy of the "Record of Advanced Standing" must then be presented to the dean's office of the School of Business Administration for approval.

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.

This period of time may be shortened by not more than one academic quarter by the granting of quality credits (maximum, fifteen credits) that is, for each five honor points in excess of one honor point per credit hour, a quality credit will be granted as applicable to the number of credit hours required for the degree. Quality credits earned while the student is en-

rolled in the School of Business Administration serve to replace elective credit hours but may not be applied as credit hours in required core group or sequence courses.

The degree of bachelor of business administration is conferred on students who have earned or have been granted a minimum of ninety credits in the School of Business Administration with at least one honor point per credit. The candidate must have completed the required courses set forth in some one of the various sequences. In addition he must pass the comprehensive examination covering the core group of courses.

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 instruction, and the student must present evidence of at least six months of successful experience in a responsible business position.

EMPLOYMENT OF STUDENTS

Every effort is made to find positions for those students and graduates who have made good scholastic records. 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.

FEES

Tuition fees (per quarter)	
Residents of Minnesota	$30.00
Non-residents	40.00
Credit hour tuition fee (unclassed students, auditors, and others carrying less than full work)	
Residents of Minnesota	2.75
Non-residents	3.75
Incidental fee (per quarter)	6.00
Matriculation deposit‡ (first quarter only)	
Men	15.00
Women	5.00
Special fees	
Secretarial Training*	2.50
Examination for removal of condition	1.00
Examination for credit (after the first 6 weeks in residence)	5.00
Special examination	5.00
Chemistry deposit	5.00
Graduation fee	7.50

* Required of all students who register for one or more of the following courses: Economics 32, 33, 34, 37, 38, 39, 40, 41, 42.

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

Penalty Fees

A penalty fee for late registration, late change of registration, or late payment of fees shall be $2 prior to the day classes begin, on and after which the penalty increases at the rate of $1 per day, provided that no student shall pay more than $10 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 Associated Students

All activities and interests of the students are centralized in an organization known as the Associated Students of Business Administration. This organization includes all students registered in this school and functions actively through a board of directors which represents the general student body. The board supervises such activities as the School of Business Administration Book Exchange, the annual School of Business Administration banquet, and school elections.

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 (both men and women) who have completed two terms' work in the school are eligible. Election of new members takes place in the spring for juniors and in the fall for seniors. Total membership is limited to one fifteenth of the juniors and one tenth of the seniors enrolled in the school.

Beta Alpha Psi

Beta Alpha Psi, national accounting fraternity, has a chapter at the University of Minnesota. Elections are based on scholarship in accounting and special interest in this field and are held twice each year. To be eligible for election students must have completed at least two courses in advanced accounting.

University Business Women's Club

This is an organization of business, pre-business, and commercial education 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.

SCHOLARSHIPS AND AWARDS

American Bankers' Association Loan Scholarship

The American Bankers' Association has allocated two loan scholarships of $250 each to the University of Minnesota. These loan scholarships are available to students majoring in banking and finance. Applications are made to a committee on which there is representation from the Bankers' Association.

Wayne E. Butterbaugh Scholarship Memorial Loan Fund

It is the purpose of this fund to contribute to the development of scholastic work in the field of traffic management and the funds are available to students who have indicated a special interest in this field. Loans are made in accordance with the general university regulations.

F. D. Lindquist Loan Fund

The sum of $500 is available as a loan to students in the School of Business Administration in need of financial assistance.

Minneapolis Women's Advertising Club Scholarship Loan Fund

The funds were obtained through lecture courses conducted by the Minneapolis Women's Advertising Club in co-operation with the University Business Women's Club. The loan scholarships, which are restricted to senior women in the School of Business Administration, are awarded in the spring of the junior year to cover the expenses of the senior year. All awards are made on the basis of scholarship, character, and need.

Alpha Kappa Psi Tablet

A tablet was presented to the school in 1926 by Alpha Kappa Psi, professional commerce fraternity, which maintains a chapter at the University. This tablet is placed in a prominent position in the corridors of the Business Building. According to the terms of the gift, each year the names of the three senior students 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 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

GENERAL REQUIREMENTS

I. To be eligible for admission to the School of Business Administration, the student must present ninety (90) credits, in addition to credits given for physical education, earned in a recognized college or university with one honor point per credit or a smaller number of earned credits which, together with quality credits, will total a minimum of ninety (90). One quality credit is granted for every five honor points in excess of one honor point per credit.

Quality credits earned in the Junior College may be applied only toward the ninety credits required for admission to the School of Business Administration. In other words, a student who has a surplus of honor points above the number required to complete ninety credits may not apply these for credit in the School of Business Administration. Any excess credits, however, other than quality credits, may be applied toward electives in the School of Business Administration.

The credits for admission shall be earned in the following groups:

A. Required Credits:

1. Freshman Composition (Comp. 4-5-6), Freshman English (Eng. A-B-C), or exemption from requirement.
2. Nine credits in mathematics or *one* of the following laboratory sciences: botany, chemistry, physics, zoology, geology.
3. Nine 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 Principles of Economics: General Course (Econ. 6-7), or the equivalent. It is recommended that beginning freshmen take Business Organization: Production (Econ. 1), Business Organization: Marketing (Econ. 2), The Mechanism of Exchange (Econ. 3), and Principles of Economics (Econ. 4).

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:

   The Mechanism of Exchange (Econ. 3)
   Elements of Statistics (Econ. 14)§
   Principles of Accounting (Econ. 25-26)¶

* Social Statistics (Soc. 45) not accepted in fulfillment of this requirement.

§ Credit not granted in Econ. 14 to students who have had Social Statistics (Soc. 45).

¶ Students who have had a high school course or experience in bookkeeping will be admitted to Econ. 25 by passing a placement test. For other students Elements of Accounting (Econ. 20) is a prerequisite to Econ. 25.

Students who do not elect the above courses during the freshman and sophomore years will be required to take Money and Banking (B.A. 57), Elementary Accounting: Combined Course (B.A. 62), and Statistics Survey (B.A. 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. General Psychology (Psy. 1-2). This course is a prerequisite for courses in Advertising, Foreign Trade, Merchandising, Personnel Management, Secretarial Training, and Insurance.
   b. Commerce Algebra (Math. 8), and Mathematics of Investment (Math. 20) are required of students who take the Accounting, Insurance, or Finance sequence.
   c. Commerce Algebra (Math. 8), and Trigonometry (Math. 6) are required of students who take the Statistics sequence.
   d. Students in the Foreign Trade sequence are required to have a reading knowledge of at least one foreign language. Nine credits in Political Science are prerequisite for International Law (Pol. Sci. 181-182), which is required in this sequence.
   e. Secretarial Training: Typewriting (Econ. 32-33). Required of students who take the Secretarial sequence.

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 (Chem. 1-2-3)
2. Six credits in Types and Breeds of Livestock (Animal Husbandry 10-11)
3. Nine credits in Rhetoric (Rhet. 1-2-3)
4. Ten credits in General Botany (Bot. 1 and election from 2, 5, 7, 12, 21, 22)
5. Three credits in Rural Economics (Ag. Econ. 8)
6. Five credits in Elements of Dairying (Dy. Husb. 1)
7. Three credits in Agricultural Engineering (Ag. Eng. 13, 28, 31, or 37)
8. Eight credits in Principles of Economics (Ag. Econ. 1-2)
9. Nine credits in General Zoology (Zool. 14-15-16)
10. Three credits in General Farm Crops (Agron. 1)
11. Three credits in Elements of Accounting (Econ. 20)*
12. Six credits in Principles of Accounting (Econ. 25-26)
13. Five credits in Mathematics (Math. 5 or 8)
14. Three credits in Fruit Growing (Hort. 6) or Vegetable Growing (Hort. 32)
15. Five credits in Farm Finance (Ag. Econ. 50)
16. Six credits in Psychology (Psy. 1-2)
17. Sufficient work from the following list to make a minimum of 102 credits:
    a. Five credits in Argumentation (Rhet. 11) or Public Speaking (Rhet. 22)
    b. Five credits in Agricultural Physics (Ag. Eng. 23)
    c. Five credits in Commerce Algebra (Math. 8) or applied mathematics
    d. Five credits in General Bacteriology (Bact. 41)
    e. Fifteen credits in Agricultural Biochemistry and Soils (Agr. Biochem. 4, and either 5 or 6 and Soils 6)
    f. Two credits in Mechanical Drawing (Ag. Eng. 3)

* 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.

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* 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 for this course.

FRESHMAN YEAR

Fall	Credits	Winter	Credits	Spring	Credits
M. & M. 11 College Algebra	5	M. & M. 12 Trigonometry	5	M. & M. 13 Analytic Geometry	5
Chem. 4 General Inorganic Chemistry	4	Chem. 5 General Inorganic Chemistry	4	Qualitative Analysis	5
or		or		Rhet. 6 Rhetoric	3
Chem. 14 General Inorganic Chemistry	5	Chem. 15 General Inorganic Chemistry	5	Draw. 3 Descriptive Geometry	3
Rhet. 4 Rhetoric and Composition	3	Rhet. 5 Rhetoric and Composition	3	M.E. 11, 12, or 13 Shop Practice	2
Draw. 1 Engineering Drawing	3	Draw. 2 Engineering Drawing	3	P. H. 2 Hygiene and First Aid	0
M.E. 11, 12, or 13 Shop Practice	2	M.E. 11, 12, or 13 Shop Practice	2	Mil. 3 Military Science and Tactics	0
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		18

SOHOMORE YEAR

Fall	Credits	Winter	Credits	Spring	Credits
M. & M. 91 Calculus	4	Phys. 23 Heat	3	M. & M. 84 Technical Mechanics	5
Phys. 3 Mechanics and Sound	3	Phys. 24 ‡Heat Lab.	1	Phys. 43 Electricity	3
Phys. 4 ‡Mechanics and Sound Lab.	1	Econ. 3 Mechanism of Exchange	5	Phys. 44 ‡Electricity Lab.	1
Econ. 8 General Economics	3	Econ. 9 General Economics	3	Econ. 14 Elements of Statistics	5
M.E. 17 Machine Shop	2	Econ. 20 Elements of Accounting	3	Econ. 25 Principles of Accounting	3
M.E. 70 Mechanical Tech.	1		15		17
	14				

* See bulletin of College of Engineering and Architecture for description of courses.
‡ A fee of $2 a quarter is charged for this course.

IV. Students may follow specially arranged five-year programs in engineering and business and obtain a degree in chemical, civil, electrical, or mechanical engineering and a degree in business administration. These combined programs give full preparation for both the technical and the management phases of the selected fields. For description of these programs see page 25.

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.

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 chairman of the Students' Work Committee.

JUNIOR YEAR

	Credits
Business Law (B.A. 51, 52, 53)	9
Money and Banking: Advanced Course (B.A. 142)	3
Advanced General Accounting (B.A. 139)	3
Corporation Finance (B.A. 155)	3
Survey in Marketing (B.A. 77)*	3
Transportation: Services and Charges I (B.A. 71)	3
Business Statistics (B.A. 112)	3
Report Writing (B.A. 100)	1
Production Management (B.A. 89)	3
	31

SENIOR YEAR

	Credits
Advanced General Economics (B.A. 101-102)	6
Labor Problems and Trade Unionism (Econ. 161)	3
Elements of Public Finance (B.A. 58)	3
Economics of Public Utilities (B.A. 165)	3
	15

* Required of those who have not received credit in Business Organization: Marketing (Econ. 2).

COMPREHENSIVE EXAMINATION

Candidates for the degree of bachelor of business administration from the School of Business Administration are required to pass a comprehensive examination covering the content of the core group of courses. This examination will usually be taken in the final quarter of residence.

I. GENERAL BUSINESS

Advisers, Mr. Mudgett, Mr. Cassady, and Mr. Schmidt

This sequence 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 of Commercial Production (Geog. 41) (to be taken preferably in the junior year), Cost Accounting (General Survey) (B.A. 130), Business Policy (B.A. 109), and Business Cycles (Econ. 149).

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
Botany
Economics and Business Administration
English Literature, Composition, Speech
Geography
Geology and Mineralogy
History
Journalism
Mathematics
Modern Foreign Languages
Philosophy
Political Science
Psychology
Sociology
Zoology

II. ACCOUNTING

Advisers, Mr. Reighard, Mr. Heilman, and Mr. Alm

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. Commerce Algebra (Math. 8) and Mathematics of Investment (Math. 20) are Junior College prerequisites for this sequence. Students in this sequence are not required to take Advanced General Accounting (B.A. 139).

JUNIOR YEAR

	Credits
Core group requirements	28
Cost Accounting (B.A. 132)	5
Accounting Practice and Procedure (B.A. 138)	5
Accounting Practice Laboratory (B.A. 92)	1
Electives	6
	45

SENIOR YEAR

	Credits
Core group requirements	15
Auditing and Public Accounting (B.A. 135)	3
Business Cycles (Econ. 149)	3
Business Policy (B.A. 109)	3
Three of the following:	
Cost Accounting Methods (B.A. 133)	
Income Tax Accounting (B.A. 134)	
Internal Auditing (B.A. 136)	9
Senior Topics Course: Accounting (B.A. 181-182A)	
Practice Course (B.A. 183)	
Electives	12
	45

RECOMMENDED ELECTIVES

	Credits
Income Tax Accounting	3
Internal Auditing	3
Senior Topics Course: Accounting	3
Practice Course	3
Cost Accounting Methods	3
Finance Management	3
Personnel Administration	3
Commercial Policies	3
Fire and Marine Insurance	3
Casualty Insurance	3
Government and Business	3
Office Organization and 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. Special emphasis is placed on the use of advertising in constructive merchandising. For those especially interested in copy writing, additional work in English Composition is recommended. For those especially interested in illustration and layout, work in freehand drawing is recommended. The courses in textiles and in color and design are recommended to those interested in department store advertising.

Students interested in newspaper advertising should consult the Department of Journalism in the College of Science, Literature, and the Arts.

The Department of Journalism offers courses in preparation for professional work in the advertising departments of (1) the daily newspaper, (2) the weekly newspaper. Attention is also given to advertising in specialized magazines, such as trade and class publications.

Students interested in the commercial art side of advertising may apply to the University College where a special program can be arranged.

General Psychology (Psy. 1-2) is a Junior College prerequisite for this sequence.

JUNIOR YEAR

	Credits
Core group requirements	31
Psychology of Advertising (Psy. 56)	3
Advertising (B.A. 88)	3
Introduction to Reporting (Jour. 13)*‡	3
Editing for Non-Majors (Jour. 41)‡	3
Newspaper and Magazine Articles (Jour. 69)‡	3
Electives	0
	46

SENIOR YEAR

	Credits
Core group requirements	15
Graphic Arts (Draw. and Desc. Geom. 64,65,66)	6
Advanced Advertising Procedure (B.A. 194-195-196)	3
Senior Topics Course: Marketing (B.A. 182C)	3
Advertising and Newspaper Typography (Jour. 55)‡	3
Electives	14
	44

RECOMMENDED ELECTIVES§

	Credits
Senior Topics Course: Marketing	6
Advanced Writing	6
Social Psychology	3
Freehand Drawing	6
Sales Management	3
Public Speaking	6
Textiles	3
Application of Color and Design	6

IV. AGRICULTURAL BUSINESS

Adviser, Mr. Jesness

This line of specialization is intended for students in the College of Agriculture who wish to prepare for some branch of business which relates to agriculture, such as the marketing of farm products, farm finance,

* To be taken in the sophomore year when possible.

‡ A fee of $1 a quarter is charged all students registering for Journalism courses with the exception of Journalism 5. In addition a laboratory fee of $1 for Journalism 41 and $1 per credit for Journalism 55 is charged.

§ Permission may be obtained by individual students to substitute one from this list of electives for Production Management (B.A. 89) in the core group.

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 (B.A. 155), Survey in Marketing (B.A. 77), Production Management (B.A. 89), 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
Agricultural Prices (Ag.Econ. 30)	3
Market Prices (Ag.Econ. 131)	3
Electives	6
	45

SENIOR YEAR

Substitutions may be made for Labor Problems and Trade Unionism (Econ. 161), and Economics of Public Utilities (B.A. 165), in the core group requirements for students in this sequence.

	Credits
Core group requirements	9
Agricultural Statistics (Ag.Econ. 90)	5
Advanced Agricultural Statistics (Ag. Econ. 191)	3
Methods of Price Analysis (Ag.Econ. 135)	3
Advanced Farm Finance (Ag.Econ. 150)	3
Land Economics (Ag.Econ. 170)	3
Business Cycles (Econ. 149)	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 and Trade Unionism	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. Commerce Algebra (Math. 8.), and Mathematics of Investment (Math. 20) are Junior College prerequisites for this sequence.

JUNIOR YEAR

	Credits
Core group requirements	31
Electives	14
	45

SENIOR YEAR

	Credits
Core group requirements	15
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. 181-182B)	6
Comparative Banking: British Systems (Econ. 124)	3
Business Cycles (Econ. 149)	3
The Securities Market (B.A. 148)	3
Electives	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 (General Survey)	3
State and Local Taxation	3
Commercial Policies	3
Geography	5 to 9

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. Students following this sequence are required to have a reading knowledge of at least one foreign language. General Psychology (Psy. 1-2) is a Junior College prerequisite for this sequence.

JUNIOR YEAR

	Credits
Core group requirements	31
Geography of Commercial Production (Geog. 41)	5
Foreign Exchange (B.A. 145)	3
Advertising (B.A. 88)	3
Electives	3
	45

SENIOR YEAR

	Credits
Core group requirements	15
Commercial Policies (Econ. 176)	3
Foreign Trade (B.A. 177)	3
International Law (Pol. Sci. 181-182)*	6
Business Cycles (Econ. 149)	3
Electives	15
	45

RECOMMENDED ELECTIVES

	Credits
A senior topics course	3 to 9
Finance Management	3
Economic History	3 to 6
Foreign Languages	
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: Services and Charges II	3

VII. PERSONNEL MANAGEMENT

Adviser, Mr. Stead

Basic training (1) to 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 is offered in this program. General Psychology (Psy. 1-2) is a Junior College prerequisite for this sequence.

* Nine credits in political science are prerequisite for International Law.

JUNIOR YEAR

	Credits
Core group requirements	31
Labor Movements (Econ. 162)	3
Personnel Administration (B.A. 167)	3
Advanced Personnel Administration (B.A. 168)	3
Electives	5
	45

SENIOR YEAR

	Credits
Core group requirements	15
Labor Legislation and Social Insurance (Econ. 164)	3
Psychology in Personnel Work (Psy. 160)	3
Vocational Psychology (Psy. 130)	2
Senior Topics Course: Personnel Management (B.A. 180-181-182D)	9
Psychology of Individual Differences (Psy. 125-126)	6
Electives	7
	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
Theory of Statistics	6
Office Organization and Management	3

VIII. MERCHANDISING

Adviser, Mr. Vaile

This sequence is designed to prepare the student for work in the merchandising department either of manufacturing, wholesaling, or retailing establishments. General Psychology (Psy. 1-2) is a Junior College prerequisite for this sequence.

JUNIOR YEAR

	Credits
Core group requirements	31
Psychology of Advertising (Psy. 56)	3
Advertising (B.A. 88)	3
One of the following:	
Sales Management (B.A. 68) / Retail Store Management (B.A. 69)	3
Electives	5
	45

SENIOR YEAR

	Credits
Core group requirements	15
Senior Topics Course: Marketing (B.A. 180-181-182C)	9
Transportation: Services and Charges II (B.A. 72)	3
Commercial Policies (Econ. 176)	3
Business Cycles (Econ. 149)	3
Electives	12
	45

RECOMMENDED ELECTIVES

	Credits
Advanced Writing	6
Geography of Commercial Production	5
Foreign Trade	3
Textiles	3
Personnel Administration	3
Government and Business	3
Fire and Marine Insurance	3

IX. SECRETARIAL TRAINING

Adviser, Miss Donaldson

This sequence is designed for students who intend to become secretaries, office managers, correspondence supervisors, and chief file clerks. General Psychology (Psy. 1-2) and Secretarial Training: Typewriting (Econ. 32-33) are Junior College prerequisites for this sequence.

JUNIOR YEAR

	Credits
Core group requirements	31
Advanced Writing (Comp. 27-28)	6
Secretarial Training: Shorthand (Econ. 37-38-39)‡	9
Secretarial Training: Typewriting (Econ. 34)‡	1
Elective	0
	47

SENIOR YEAR

	Credits
Core group requirements	15
Office Organization and Management (B.A. 86)	3
Secretarial Procedure (Econ. 40-41-42)‡	9
Senior Topics Course: Secretarial Practice (B.A. 180-181E)	6
Electives	10
	43

‡ A fee of $2.50 per quarter is charged all students who register for one or more of these courses.

RECOMMENDED ELECTIVES

	Credits
Life Insurance	3
Advertising	3
Investments	3
Economic History	3 to 6
Cost Accounting (General Survey)	3
Personnel Administration	3
Geography of Commercial Production	5
Government and Business	3
Public Speaking	5 to 10
Psychology in Personnel Work	3
Psychology of Advertising	3
Business Cycles	3
Introduction to Sociology	5

X. INDUSTRIAL ADMINISTRATION

Adviser, Mr. Filipetti

This sequence follows the two-year pre-business curriculum 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

	Credits
Core group requirements	31
Strength of Materials (M. & M. 85)	4
Transportation: Services and Charges II (B.A. 72)	3
Principles of Accounting (Econ. 26)	3
Electives	4
	45

SENIOR YEAR

	Credits
Core group requirements	15
Cost Accounting (General Survey) (B.A. 130)	3
Personnel Administration (B.A. 167)	3
Senior Topics Course: Production Management (B.A. 180-181-182G)	9
Business Cycles (Econ. 149)	3
Electives	12
	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
Casualty Insurance	3
Fire and Marine Insurance	3

B. Engineering

	Credits
Contracts and Specifications	3
Estimating	3

XI. FIVE-YEAR COMBINED COURSES IN ENGINEERING AND BUSINESS ADMINISTRATION

Adviser, Mr. Filipetti

The School of Business Administration and the College of Engineering and Architecture offer five-year combined courses which enable a student to complete the requirements for the Bachelor's degrees in both engineering and business administration. For this purpose the School of Business Administration will accept seventy-four (74) credits in business subjects in conjunction with one of the regular engineering curricula to satisfy the requirements for the degree of bachelor of business administration as provided in the sequence which follows. Freshmen or other students considering this program should consult Mr. Filipetti.

SECOND YEAR

	Credits
General Economics (Econ. 8-9)	6
Business Law (Econ. 28)	3
	9

THIRD YEAR

	Credits
Principles of Accounting (Econ. 29, 26)	6
Survey in Marketing (B.A. 77)	3
	9

FOURTH YEAR

	Credits
Labor Problems and Trade Unionism (Econ. 161)	3
Personnel Administration (B.A. 167)	3
Cost Accounting (General Survey) (B.A. 130)	3
Statistics Survey (B.A. 70)	4
Business Statistics (B.A. 112)	3
Transportation: Services and Charges I (B.A. 71)	3
Money and Banking: Advanced Course (B.A. 142)	3
Elements of Public Finance (B.A. 58)	3
Production Management (B.A. 89)*	3
	28

FIFTH YEAR

	Credits
Senior Topics Course: Production Management (B.A. 180-181-182G)	9
Business Cycles (Econ. 149)	3
Corporation Finance (B.A. 155)	3
Advanced General Accounting (B.A. 139)	3
Advanced General Economics (B.A. 101-102)	6
Economics of Public Utilities (B.A. 165)	3
Report Writing (B.A. 100)	1
	28

* Elementary Industrial Engineering (M.E. 83), 3 credits, may be substituted.

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 group of courses required of all juniors and seniors in the School of Business Administration with the exception of Labor Problems and Trade Unionism (Econ. 161), Production Management (B.A. 89), and Transportation: Services and Charges I (B.A. 71), for which suitable courses in mathematics may be substituted.

JUNIOR YEAR

	Credits
Core group requirements	25
Theory of Statistics (Econ. 113-114)	6
Analytic Geometry (Math. 30)	5
Investments (B.A. 146)	3
Electives	6
	45

SENIOR YEAR

	Credits
Core group requirements	12
Senior Topics Course: Statistics (B.A. 180-181-182F)	6-9
Cost Accounting (General Survey) (B.A. 130)	3
Calculus I and II (Math. 50, 51)	10
Business Cycles (Econ. 149)	3
Electives	8-11
	45

RECOMMENDED ELECTIVES

	Credits
Calculus III	5
Mathematical Theory of Statistics	9
Logic	5
Foreign Exchange	3
History of Economic Ideas	3

It is advisable, wherever possible, for the student who intends to take the Statistics sequence, to take Analytic Geometry (Math. 30) during the sophomore year, thereby giving opportunity to take Calculus I and II (Math. 50, 51) as a junior and either Calculus III (Math. 52) or Mathematical Theory of Statistics (Math. 121-122-123) as a senior.

XIII. TRAFFIC AND TRANSPORTATION

Adviser, Mr. Schmidt

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	31
Geography of Commercial Production (Geog. 41)	5
Trade Routes and Trade Centers (Geog. 102)	3
Commercial Policies (Econ. 176)	3
Sales Management (B.A. 68)	3
	45

SENIOR YEAR

	Credits
Core group requirements	15
Transportation: Services and Charges II (B.A. 72)	3
Cost Accounting (General Survey) (B.A. 130)	3
Fire and Marine Insurance (B.A. 60)	3
Senior Topics Course: Traffic and Transportation (B.A. 181-182I)	6
Foreign Trade (B.A. 177)	3
Electives	12
	45

RECOMMENDED ELECTIVES

	Credits
Office Organization and Management	3
Personnel Administration	3

XIV. INSURANCE

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 certificate of chartered life underwriter, which is granted to those who satisfy the requirements of the American College of Life Underwriters. General Psychology (Psy. 1-2), Commerce Algebra (Math. 8), and Mathematics of Investment (Math. 20), are Junior College prerequisites for this sequence.

JUNIOR YEAR

	Credits
Core group requirements	31
Life Insurance (B.A. 59)	3
Fire and Marine Insurance (B.A. 60)	3
Advertising (B.A. 88)	3
Psychology of Advertising (Psy. 56)	3
Electives	2
	45

SENIOR YEAR

	Credits
Core group requirements	15
Casualty Insurance (B.A. 61)	3
Investments (B.A. 146)	3
The Securities Market (B.A. 148)	3
Senior Topics Course: Insurance (B.A. 182H)	3
Business Cycles (Econ. 149)	3
Electives	15
	45

RECOMMENDED ELECTIVES

	Credits
Social Psychology	3
Sales Management	3
State and Local Taxation	3
Economic History	6
Government and Business	3
Personnel Administration	3
Introduction to Sociology	5
Recent Social Legislation	3

XV. DEPARTMENT STORE TRAINING FOR WOMEN

Adviser, Mr. Cassady

This sequence is designed for women who plan to become junior executives in merchandise institutions, either in selling or non-selling departments. As means to this end, actual store experience and broad foundation training in art and in home economics are offered in addition to courses in business administration.

Arrangements will be made for candidates in this sequence to spend not less than 15 hours per week in one of the co-operating department stores throughout the two years, for which they will receive not more than a total of five credits. The time will be divided between selling and non-selling departments. Students will be paid for their work by the co-operating department stores at the usual rate for part time sales people.

No student will be permitted to carry more than 13 credits in any quarter while doing part time work, except by special permission of the adviser and the dean. The additional credits required for graduation in two years may be earned either (a) by attending summer school, or (b) by earning quality credits. Students in this sequence need not take Transportation: Services and Charges I (B.A. 71), Production Management (B.A. 89), and Report Writing (B.A. 100), and may delay one other junior course until the senior year.

JUNIOR YEAR

	Credits
Core group requirements	18
Textiles (H.E.4)	3
Application of Color and Design (H.E. 56-56A)	6
Art History and Appreciation (H.E. 150)	3
Psychology of Advertising (Psy. 56)	3
Advertising (B.A. 88)	3
Practice Course (B.A. 183)	2
	38

SENIOR YEAR

	Credits
Core group requirements	18
Retail Store Management (B.A. 69)	3
Commercial Policies (Econ. 176)	3
Business Cycles (Econ. 149)	3
Drawing (either Art Ed. 7, 8, or Arch. 21)	2
Senior Topics Course: Marketing (B.A. 182C)	3
Practice Course (B.A. 183)	3
	35

RELATED COURSES IN OTHER COLLEGES

I. *Law and Business.*—Students desiring to combine business and legal training may earn the degree of bachelor of business administration by fulfilling the requirements for that degree (usually four years of collegiate work) and becoming candidates for the degree of bachelor of science in law by taking two years of work in the Law School. Students may qualify for the degree of bachelor of laws only by completing three years of work in the Law School. Candidates registered for the degree of bachelor of science in law who desire to earn the degree of bachelor of laws must change their registration from the two-year course prior to the completion of the second year.

II. *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.

III. 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 principles underlying bookkeeping and accounting. Sufficient practice in technical processes will be given to serve as a background for more advanced work. Preparation and analysis of statements. (3 cred.; 3rd qtr. fr., soph.; no prereq.)

Econ.25-26. Principles of Accounting. A course following Econ. 20 presenting the principles underlying the accounting statements, the accounts, principles of valuation, depreciation, and preparation and analysis of statements. (6 cred.; soph., jr., sr.; prereq. Econ. 20.)

Econ.29. Principles of Accounting. Purpose and principles of account classification; capital and revenue; accruals; valuation; depreciation; preparation and interpretation of balance sheets, income accounts, and other statements. Open to Engineering, Architecture, and Chemistry students only. (3 cred.; soph., jr., sr.; no prereq.)

B.A.62. Elementary Accounting: Combined Course. A combination of Econ. 20, Elements of Accounting, and Econ. 25, Principles of Accounting, for School of Business Administration students. (5 cred.; jr., sr.; no prereq.)

B.A.90. Accounting Laboratory for Commercial Teachers. Designed to give teachers of commercial subjects instruction and practice in the working of the type of practice sets usually used in secondary schools and to give secretarial students familiarity with some of the common business papers and routines. Open only to secretarial and commercial education majors. (1 cred.; jr., sr.; prereq. Econ. 25.)

B.A.92. Accounting Practice Laboratory. A laboratory in advanced accounting and cost accounting designed to give practice in certain accounting techniques and tools, methods of calculation, uses of the slide rule, and work sheets, and the handling of detailed cost accounting data. Open only to majors in accounting. (1 cred.; jr., sr.; prereq. B.A. 132 or concurrent.)

B.A.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. (3 cred.; jr., sr., grad.; prereq. Econ. 25-26.)

B.A.132. Cost Accounting. Cost accounting practices and procedures. (5 cred.; jr., sr., grad.; prereq. Econ. 25-26.)

B.A.133. Cost Accounting Methods. Cost accounting as applied to specific industries and the construction of cost systems. (3 cred.; jr., sr., grad.; prereq. B.A. 130 or 132.)

B.A.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. (3 cred.; jr., sr., grad.; prereq. B.A. 138 or 139.)

B.A.135. Auditing and Public Accounting. The principles and technical methods of professional auditing practice. Prevention and detection of fraud and errors in accounting records, auditors' working papers, financial exhibits, certificates, and reports. (3 cred.; jr., sr., grad.; prereq. B.A. 138 or 139.)

B.A.136. Internal Auditing. Accounting systems and methods as related to executive organization of routine procedures and the establishment of financial and budgetary control. (3 cred.; jr., sr., grad.; prereq. B.A. 138 or 139.)

B.A.138. Accounting Practice and Procedure. A course in the practice and technique of accounting for students who intend to specialize in accounting. (5 cred.; jr., sr., grad.; prereq. Econ. 25-26.)

B.A.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. (3 cred.; jr., sr., grad.; prereq. Econ. 25-26.)

B.A.181-182A. 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. (6 cred.; sr.)

ADMINISTRATION

Econ.97, 98, 99. Honors Course in Economics. This course is offered to specially qualified students who are majors in economics and who wish to pursue a course of specialized reading and research. (Cred. ar.; jr., sr.; prereq. consent of major adviser.)

B.A.97, 98, 99. Honors Course in Business Administration. This course is arranged for those students whose scholastic records are of such a character as to warrant encouraging them to carry on independent study in the field of business administration. (Cred. ar.; jr., sr.; prereq. permission of the dean.)

B.A.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. (3 cred.; sr., grad.; prereq. B.A. 101-102.)

B.A.183. Practice Course. Students engaged in outside work on the cooperative 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. (Cred. ar.; jr., sr., grad.; prereq. consent of adviser.)

ADVERTISING

B.A.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. (3 cred.; jr., sr.; prereq. Econ. 2 or B.A. 77, and Psy. 56.)

B.A.194-195-196. Advanced Advertising Procedure. Problem or case work in (1) market research, (2) preparation of copy and layout. (3 cred.; jr., sr., grad.; prereq. B.A. 88.)

BUSINESS LAW

Econ.28. Business Law. Business law arranged for engineers, including the law of contracts, suretyship, agency, partnership, corporations, negotiable instruments, conveyance patents, and riparian rights. Open to Engineering, Architecture, and Chemistry students only. (3 cred.; soph., jr., sr.; prereq. 6 cred. in Economics.)

B.A.51.* Business Law: Contracts. A discussion of the legal principles and laws of contracts. (3 cred.; jr., sr.; prereq. Econ. 4 or 6-7.)

B.A.52.* Business Law: Agency, Partnership, and Corporations. The laws of agency also a consideration of problems of organization in individual businesses, partnerships, and corporations. (3 cred.; jr., sr.; prereq. B.A. 51.)

B.A.53.* Business Law: Negotiable Instruments. A discussion of the legal principles and laws of negotiable instruments. The case method is used in B.A. 51, 52, and 53. (3 cred.; jr., sr.; prereq. B.A. 51.)

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. (3 cred.; jr., sr., grad.; prereq. Econ. 4, 6-7, or 83.)

B.A.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. (3 cred.; jr., sr., grad.; prereq. Econ. 176.)

* No credit will be allowed for B.A. 51, 52, or 53 until all three are completed.

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. (5 cred.; soph.; prereq. Econ. 1, 2, and 3.)

Econ.6-7. Principles of Economics: General Course. A general elementary course in the theory of economics. (10 cred.; soph., jr., sr.; no prereq.)

Econ.8-9. General Economics. Principles of economics with special emphasis upon their application to current problems such as money, banking, conservation, insurance, international commerce, monopolies, transportation, labor, socialism, public ownership, and finance. Open to Engineering, Architecture, and Chemistry students only. (6 cred.; soph., jr., sr.; no prereq.)

Econ.82. Competition and Monopoly in Modern Industry. This course and Econ. 83 are offered for Senior College students who wish a general course in modern economics. The organization of modern industry; the effect of concentration of ownership on economic conditions; the effects of monopoly and monopolistic competition on prices; the general level of prices; inflation and control by the state. (3 cred.; jr., sr.; no prereq.)

Econ.83. The Inequality of Incomes. Theories of inequality; the earnings of land, labor, and capital. The unequal income of economic strata. Government interference for the modification of inequality; taxation; minimum wage laws; bonuses; controlled earnings. (3 cred.; jr., sr.; prereq. Econ. 82.)

Econ.84. Comparative Economic Systems. The modified system of individualism; state socialism; communism and the Russian experiment; fascism. (3 cred.; jr., sr.; prereq. Econ. 4, 6-7, or 83.)

B.A.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. (6 cred.; sr., grad.; prereq. Econ. 4, or 6-7.)

Econ.103-104. Advanced Economics: Competition, Monopoly, and Inequality of Incomes. An advanced course in economic theory, prices, and costs; the value theory. The distribution of wealth; causes and effects of inequality. The distribution of income; inequality; rent, wages, interest, and profits. (6 cred.; jr., sr., grad.; prereq. 20 cred. in soc. sci. including Econ. 4, 6-7, or 83.)

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. (3 cred.; jr., sr., grad.; prereq. B.A. 101-102 or Econ. 103-104 or consent of instructor.)

Econ.106. History of Economic Ideas: The Critics of the Classical Econ omists. 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, and (4) the modern institutionalists. (3 cred.; jr., sr., grad.; prereq. B.A. 101-102 or Econ. 103-104 or consent of instructor.)

B.A.107. Advanced General Economics: Combined Course. A condensed course in which essentially the same subject-matter is treated as in B.A. 101-102. (5 cred.; sr., grad.; prereq. Econ. 4 or 6-7.)

Econ.203-204. Seminar in Economic Theory. (6 cred.; grad.)

Econ.215. Mathematical Economics. (3 cred.; grad.)

FINANCE

Econ.3. The Mechanism of Exchange. An elementary course in money and banking. The basic principles of money and a description of the various types of financial institutions, their functions and relations to the whole economic organization. (5 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.)

B.A.57. Money and Banking. Designed for students in the School of Business Administration who have not had an elementary course in this field. Principles of money and banking. Types and functions of financial institutions. (3 cred.; jr., sr.; no prereq.)

B.A.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 School of Business Administration students. (3 cred.; jr., sr.; prereq. Econ. 4 or 6-7.)

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. (3 cred.; jr., sr., grad.; prereq. Econ. 141 or B.A. 142.)

Econ.125. Comparative Banking: European Systems. (3 cred.; jr., sr., grad.; prereq. Econ. 141 or B.A. 142.)

Econ.127. Comparative Banking: South American Systems. (3 cred.; jr., sr., grad.; prereq. Econ. 141 or B.A. 142.)

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. (3 cred.; jr., sr., grad.; prereq. Econ. 3 and either Econ. 4, 6-7, or 83.)

B.A.142. Money and Banking: Advanced Course. The problems of a central bank and theory of the value of money. Includes control of reserves, providing a scientific currency, regulation of credit, fluctuations of the

general price level, their causes and possible reduction. (3 cred.; jr., sr., grad.; prereq. Econ. 3 and either Econ. 4 or 6-7.)

B.A.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. (3 cred.; jr., sr., grad.; prereq. Econ. 3 and either Econ. 4 or 6-7.)

B.A.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. (3 cred.; jr., sr., grad.; prereq. B.A. 155.)

B.A.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. (3 cred.; jr., sr., grad.; prereq. Econ. 3 and either Econ. 4 or 6-7.)

B.A.148. The Securities Market. A description of the mechanism of the stock exchanges in New York, London, Berlin, and Paris. The technique of speculation and the business of the investment house. (3 cred.; sr., grad.; prereq. B.A. 146 and Econ. 149.)

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. (3 cred.; sr., grad.; prereq. Econ. 141 or B.A. 142.)

B.A.155. Corporation Finance. Incorporation. The various types of corporate securities and their uses. Financial plans for industrial, utility, and other types of corporations. Financial affairs of an established business. General financial problems of the holding company, consolidations, mergers, and reorganizations. (3 cred.; jr., sr., grad.; prereq. Econ. 3 and either Econ. 4 or 6-7.)

B.A.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. (3 cred.; jr., sr., grad.; prereq. B.A. 155.)

Econ.160. The Modern Corporation. A survey of the simpler financial activities and of the social problems of the corporate form of business organization. (3 cred.; jr., sr., grad.; prereq. Econ. 3 and either Econ. 4, 6-7, or 83.)

B.A.181-182B. Senior Topics Course: Business Finance. Individual research and discussion of important current financial developments. (6 cred.; sr.)

Econ.191-192. Public Finance. Public expenditures, revenues, and debts. Special attention is given to tax principles, practices, and burdens. (6 cred.; jr., sr., grad.; prereq. Econ. 4, 6-7, or 83.)

Econ.193. State and Local Taxation. Main problems of state and local finance and proposed solutions therefor. (3 cred.; jr., sr., grad.; prereq. Econ. 191-192 or B.A. 58.)

Econ.243-244. Seminar in Money and Banking. (6 cred.; grad.)

INSURANCE

B.A.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. (3 cred.; jr., sr.; prereq. Econ. 4 or 6-7.)

B.A.60. Fire and Marine 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. (3 cred.; jr., sr.; prereq. Econ. 4 or 6-7).

B.A.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. (3 cred.; jr., sr.; prereq. Econ. 4 or 6-7.)

B.A.182H. Senior Topics Course: Insurance. Reports on selected problems in the field of insurance. (3 cred.; sr.)

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. (3 cred.; jr., sr., grad.; prereq. Econ. 4, 6-7, or 83.)

Econ.162. Labor Movements. An interpretation of leading labor movements in Europe and the United States during the last century. (3 cred.; jr., sr., grad.; prereq. Econ. 161.)

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. (3 cred.; jr., sr., grad.; prereq. Econ. 4, 6-7, or 83.)

Econ.164. Labor Legislation and Social Insurance. A course dealing with the economic aspects of labor legislation, including minimum wage laws; hours legislation; factory acts; accident, health, old age, and employment insurance; mothers' pensions. (3 cred.; jr., sr., grad.; prereq. Econ. 161.)

Econ.166. International Economic Problems. A survey of current problems including monetary stabilization; reparations; international debts; international capital movements; tariff barriers; international wage levels; and programs of international economic co-operation. (3 cred.; jr., sr., grad.; prereq. Econ. 4, 6-7, or 83.)

B.A.167. Personnel Administration. Managerial policy for various types of organization of labor. Special attention to job analysis, employment incentives, and regularization of employment. (3 cred.; jr., sr., grad.; prereq. Econ. 161.)

B.A.168. Advanced Personnel Administration. Special attention to employee training, joint relations, health and safety, and methods of personnel research. (3 cred.; jr., sr., grad.; prereq. B.A. 167.)

B.A.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. (9 cred.; sr.)

Econ.248-249. Seminar in Unemployment and Business Cycles. (6 cred.; grad.)

MARKETING

Econ.2. 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. (5 cred.; fr. only; no prereq.)

B.A.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; selling methods; compensation of salesmen; supervision and control. Method: case studies. (3 cred.; jr., sr.; prereq. Econ. 2 or B.A. 77.)

B.A.69. Retail Store Management. Location, organization, and layout. Buying and sales budgets and sales planning; stock control; sales promotion; interior and window display; store services; credits and collections; store operation, finance, and general policy. Method: lectures and discussions. (3 cred.; jr., sr.; prereq. Econ. 2 or B.A. 77.)

B.A.77. Survey in Marketing. Introductory course for advanced students including description of (1) the marketing processes, (2) produce exchanges and speculation on these exchanges, (3) co-operative marketing institutions, and (4) market areas. The operation of supply and demand in marketing. Detailed reading on the marketing of several of the more important commodities. (3 cred.; jr., sr.; no prereq.)

B.A.78. Marketing of Raw Materials. Fundamentally a course on the principles and techniques of production and price control. Readings, lectures, and discussions on (1) supply and demand conditions of the major raw materials, (2) evaluation of the several techniques of control which have been planned and attempted. Formal planning is considered. International aspect stressed. Reports by students on details of control devices. (3 cred.; jr., sr.; prereq. Econ. 2 or B.A. 77.)

B.A.79. Marketing of Manufactured Goods. The several problems involved in marketing manufactured products studied in detail with special emphasis on costs, mergers, and trade association activities. Method: lec-

tures and discussions. Papers required on individual commodities. (3 cred.; jr., sr.; prereq. Econ. 2 or B.A. 77.)

Econ.85. 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. (3 cred.; jr., sr.; prereq. Econ. 4, 6-7, or 83.)

B.A.180-181C. Senior Topics Course: Marketing. Selected topics in (1) market structure, (2) manufacturer's sales problems, (3) price policies, (4) trade association activities. (6 cred.; sr.)

B.A.182C. Senior Topics Course: Marketing. Selected topics in retail store management, in co-operation with Twin City department store executives. (Open to students who have had B.A. 180-181C and with permission of the instructor to a limited number of other advanced students. (3 cred.; sr.)

Econ.206. Seminar in Market Prices. (3 cred.; grad.)

PRODUCTION

Econ.1. Business Organization: Production. Description of industrial organization. An elementary treatment of the economic principles involved in production. (5 cred.; fr. only; no prereq.)

B.A.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 dispatching of product; scientific management; practical problems in production control. (3 cred.; jr., sr.; no prereq.)

B.A.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. (9 cred.; sr.)

PUBLIC UTILITIES AND TRANSPORTATION

B.A.71. Transportation: Services and Charges I. A survey of the rail, highway, and water transportation facilities, services, and rates, supplemented by lectures on current transportation problems. (3 cred.; jr., sr.; prereq. Econ. 4 or 6-7.)

B.A.72. Transportation: Services and Charges II. The principles, construction, interpretation, and use of rail, highway, and water classifications, 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. (3 cred.; jr., sr.; prereq. B.A. 71.)

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. (3 cred.; jr., sr., grad.; prereq. 20 cred. in soc. sci. incl. Econ. 4, 6-7, or 83.)

B.A.165. Economics of Public Utilities. A general course on the economic aspects of government regulation of the finances, rates, and services of municipal public utilities. Economic characteristics, legal position, regulation, valuation, and government ownership are the principal topics covered. (3 cred.; jr., sr., grad.; prereq. Econ. 3 and either Econ. 4 or 6-7.)

Econ.172. Economics of Transportation. An analysis of the economics of the leading methods of modern transportation: railway, waterway, truck and bus, pipe line, and airway. The relative advantages of each will be stressed and a careful account given of the regulation, taxation, and place of each type. (3 cred.; jr., sr., grad.; prereq. 20 cred. in soc. sci. incl. Econ. 4, 6-7, or 83.)

B.A.181-182I. Senior Topics: Traffic and Transportation. Selected problems in the regulation and management of transportation agencies and in industrial traffic management. (6 cred.; sr.)

REPORT WRITING

B.A.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. (1 cred.; jr., sr.; no prereq.)

SECRETARIAL TRAINING

Econ.32-33-34.‡ Secretarial Training: Typewriting. Keyboard technique, letter writing, secretarial procedure, dictating machine transcription. (3 cred.; 2nd qtr. fr., soph., jr.; prereq. consent of instructor.)

Econ.37-38-39.‡ Secretarial Training: Shorthand. An elementary course in Gregg shorthand. A large vocabulary of high-frequency words is developed with emphasis placed upon dictation and transcription. (9 cred.; soph., jr.; prereq. Econ. 33 or consent of instructor.)

Econ.40-41-42.‡ Secretarial Procedure. A vocabulary of frequent words and technical terms is developed for use in dictation and transcription. Students are trained in the secretarial procedure characteristic of various lines of business. (9 cred.; soph., jr., sr.; prereq. Econ. 34 and 39 or consent of instructor.)

B.A.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. (3 cred.; jr., sr.; prereq. Econ. 4 or 6-7.)

B.A.181-182E. Senior Topics Course: Secretarial Practice. Business correspondence; analysis and criticism of business letters; construction of single letters and series. Filing; organization and management of filing

‡ A laboratory fee of $2.50 will be required of students who register for one or more of the courses in secretarial training.

departments; a study of alphabetic, numeric, geographic, and subject filing, including charge, follow-up, and transfer systems. (6 cred.; sr.)

STATISTICS

Econ.14. Elements of Statistics. Elementary concepts in statistical method; averages, ratios, errors, sampling, index numbers, graphic representation, collection of material. (5 cred.; soph., jr., sr.; prereq. Econ. 4 or 6-7.)

B.A.70. Statistics Survey. The tools and devices which facilitate the use of business data are surveyed in this course. Statistical information is collected by questionnaires, consolidated into tables, summarized in averages, and illustrated by graphic devices. Current index numbers are compared in form and application. The logical interpretation and limitations of statistical data are stressed throughout the course. (4 cred.; jr., sr.; prereq. Econ. 4 or 6-7.)

B.A.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. (3 cred.; jr., sr., grad.; prereq. Econ. 14 or B.A. 70.)

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. (6 cred.; jr., sr., grad.; prereq. Econ. 14.)

B.A.180-181-182F. Senior Topics Course: Statistics. Reports will be prepared by the students 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. (9 cred.; sr.)

COURSES IN OTHER COLLEGES REQUIRED IN CERTAIN SEQUENCES

AGRICULTURAL ECONOMICS

(See bulletin of the College of Agriculture, Forestry, and Home Economics.)

30. Agricultural Prices.
40. Principles of Marketing Organization.
90. Agricultural Statistics.
110-111. Economics of Agricultural Production.
131. Market Prices.
135. Methods of Price Analysis.
141. Marketing Organization: Dairy and Poultry Products.
142. Marketing Organization: Fruits and Vegetables.
150. Advanced Farm Finance.
170. Land Economics.
191. Advanced Agricultural Statistics.

HOME ECONOMICS

(See bulletin of the College of Agriculture, Forestry, and Home Economics.)

4. Textiles.
56-56A. Applications of Color and Design.
150. Art History and Appreciation.

COMPOSITION

(See bulletin of the College of Science, Literature, and the Arts.)

27-28. Advanced Writing.

DRAWING AND DESCRIPTIVE GEOMETRY

(See bulletin of the College of Engineering and Architecture.)

64. The Graphic Arts: Introduction.
65. The Graphic Arts: Printing and Layouts.
66. The Graphic Arts: Processes.

GEOGRAPHY

(See bulletin of the College of Science, Literature, and the Arts.)

41. Geography of Commercial Production.
102. Trade Routes and Trade Centers.

JOURNALISM‡

(See bulletin of the College of Science, Literature, and the Arts.)

13. Introduction to Reporting.
41. Editing for Non-Majors.
55. Advertising and Newspaper Typography.
69. Newspaper and Magazine Articles.

MATHEMATICS

(See bulletin of the College of Science, Literature, and the Arts.)

30. Analytic Geometry.
50. Calculus I.
51. Calculus II.

MATHEMATICS AND MECHANICS

(See bulletin of the College of Engineering and Architecture.)

85. Strength of Materials with Laboratory.

POLITICAL SCIENCE

(See bulletin of the College of Science, Literature, and the Arts.)

181-182. International Law.

PSYCHOLOGY

(See bulletin of the College of Science, Literature, and the Arts.)

56. Psychology of Advertising.
125-126. Psychology of Individual Differences.
130. Vocational Psychology.
160. Psychology in Personnel Work.

‡ A fee of $1 a quarter is charged all students registering for journalism courses with the exception of Journalism 5. In addition a laboratory fee of $1 for Journalism 41 and $1 per credit for Journalism 55 is charged.

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The College of Science, Literature and the Arts

1934-1935

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GENERAL INFORMATION

1. *Admission to the freshman year.*—Students are admitted to this college either by certificate from an accredited secondary school or by examination. For details concerning the requirements in either case consult the bulletin of General Information, pages 24-27.

2. *Adult special students.*—Persons of maturity (at least 24 years of age) who desire to pursue a special and limited course of study may be admitted by the Students' Work Committee as adult special students. The registration of such students will be under the control of the committee.

Application for registration as an adult special student should be made not later than September 15, December 15, or March 15, depending upon the quarter the candidate desires to enter the college.

3. *Admission to advanced standing.*—The following rules govern students entering this college with advanced standing from some other institution.

a. Credits of advanced standing are provisional and are finally adjusted by the Students' Work Committee after the student has completed a year's residence. Credits which have been forfeited may be recovered by special examination.

b. A student entering with advanced standing must earn an average of one honor point per credit for all work in this college counted for graduation or for admission to the Senior College.

c. A student admitted to the Senior College and failing to meet this requirement may be excluded from the Senior College at any time after the first quarter.

4. *Examinations for advanced standing.*—Any student upon first registration at the University may, with the approval of the Students' Work Committee, be allowed without charge to take examinations for advanced standing in subjects in which the student declares himself to be prepared. Such examinations must be taken within the first six weeks of residence.

5. *Examinations for credit.*—Credit for work done outside of class may be obtained by taking special examinations. Application should be made to the assistant dean for students' work.

6. No student may receive by means of such an examination more than 12 credits in one department or more than a total of 18 credits toward graduation.

7. No credit in beginning language courses may be gained by special examination.

8. *Registration.*—Students are required to register on the days announced in the university calendar. Only in very exceptional circumstances will a student be allowed to register thereafter, and no student will be enrolled after the first week of the quarter. (See section 11, Penalty Fees.)

9. No student will receive credit for work for which he is not properly registered.

10. *Fees.*—Tuition fee (per quarter)

Residents of Minnesota	$20.00
Non-residents	30.00

Credit hour tuition fee (unclassed students, auditors, and others carrying less than full work)
- Residents of Minnesota 1.75
- Non-residents 2.50
- Incidental fee (per quarter) 6.00

Matriculation deposit‡ (first quarter only)
- Men 15.00
- Women 5.00

Special fees
- Fees for individual courses are specified in the course announcements.
- Examination for removal of condition 1.00
- Examination for credit (after first 6 weeks in residence) 5.00
- Special examination 5.00

Laboratory deposit (required of students registered for courses in chemistry) 5.00

Graduation fee 7.50

Music fees (in addition to tuition) for those electing music
- Courses 11 to 27
  - 1 individual lesson per week, 2 credits 25.00
  - 2 individual lessons per week, 4 credits 50.00
  - Class lessons in Courses 11, 12, 13, 27 ..... 25.00
- Courses A, B, C and D, E, F
  - 1 individual lesson per week, no credit 25.00

Practice fees
- Organ (per hour) ..... 0.20 to 0.40
- Piano* (per quarter) 5.00
- ($.50 per quarter for each additional hour per week)

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

12. *Auditors.*—Under certain conditions stated below students may be enrolled as auditors and may hear lectures and class discussions regularly without being required to do the work of the course. No regular student may be admitted to classes as an auditor until his senior year.

13. Any mature person not a regular student may be admitted as an auditor to any course under the following regulations:

a. He shall secure the written approval of the dean and of the instructor in charge of the course.

b. He shall present such approval to the registrar and pay the usual fee charged for regular membership in such a course. See section 10.

* Six hours per week.

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

14. Attendance as an auditor does not entitle one to credit or to admission to regular examinations in the course.

15. Any senior whose high scholastic standing enables him to carry a small program may register as an auditor under the same regulations.

16. *Grades.*—Four grades, A, B, C, and D, are given for work of varying degrees of merit. The grade D permits a student to register for continuation or dependent courses; and work completed with this grade is counted toward graduation when combined with work of A or B grade in other courses. The grade C indicates work of a quality acceptable for graduation; the grades B and A are given for work of higher degrees of excellence.

Work of inferior grade is marked E (condition) or F (failure). Work which is of at least D grade but, because of circumstances beyond the student's control, not completed, may be marked I (incomplete).

17. *Credits and honor points* are used for convenience in indicating amount and quality of work.

Amount of work is expressed in *credits.* Each credit demands on the average three hours a week of a student's time; that is, one recitation with two hours of preparation, or three hours of laboratory work.

Quality of work is indicated by *honor points.* Honor points are assigned to the various grades on the assumption that work of a quality acceptable for graduation is graded at least C. (See section 16.) Each credit with the grade of C carries one honor point; each credit with the grade of B, two honor points; each credit with the grade of A, three honor points. The grade of D carries no honor points. The grade of F carries minus one honor point per credit. The penalty cannot be removed by repeating the course with a passing grade.

A student who maintains an average of one honor point per credit is proceeding normally to fulfill the requirements for graduation or for admission to the professional schools. By maintaining an average better than C, a student is able to reduce the amount of work which he is required to complete. (See sections 32 to 34.)

18. *The grade I (incomplete)* cannot be given when the work not completed represents more than one fourth of the quarter's work.

19. An *incomplete* not removed before the end of the first month of the student's next quarter in college becomes a *condition.* The Students' Work Committee may, in special cases, extend this time limit.

20. *The grade E (condition)* is a temporary grade, representing a deficiency which may be removed without repeating the course. A student who has received a condition in a course may register for the continuation or dependent course the following quarter.

21. *Removal of conditions.*—Conditions may be removed by additional work and an examination or, in certain cases, by satisfactory work in the next quarter of the course.

22. In English (courses in composition), Geology, Greek, History, Journalism, Latin, Music, Physical Education for Women, Physics, Scandinavian, Speech, and Zoology, conditions may sometimes be removed by pass-

ing a continuation course with a grade of C or better, in which case the grade of the first quarter will be recorded as D. A student who desires to remove a condition in this way must obtain the approval of the department, and must notify the registrar's office of his intention within the first week of the quarter. No student who has already failed in the condition examination is permitted to remove the condition by this second method.

23. In the following departments, conditions may be removed only by examination: Anthropology, Architecture, Astronomy, Botany, Chemistry, Drawing, Economics, English (courses in literature), Fine Arts, German, Geography, Library Instruction, Mathematics, Orientation, Philosophy, Physical Education for Men, Political Science, Psychology, Romance Languages, and Sociology.

24. The permanent grade resulting from the removal of a condition may in no case be higher than C.

25. Examinations for the removal of conditions incurred during the fall and winter quarters are given during the first thirty days of the succeeding quarter. Examinations for the removal of conditions incurred during the spring quarter are given the week before the opening of the fall quarter.

26. A student who desires to take a condition examination must notify the registrar in writing at least three days before the date scheduled for the examination. Any student failing to give such notice will not be allowed to take the examination.

27. A condition not made up within one quarter of residence becomes a failure subject to the rules governing failures.

28. *The grade F (failure)* represents a deficiency so serious that the student must repeat the course in order to obtain credit therein.

29. A student receiving a failure in any course shall not be allowed to pursue the continuation of that course the following quarter.

30. Any student receiving a failure in a course which is required in his curriculum must repeat the course the next time it is offered.

31. No course for which a student has received credit may be repeated by him to raise his grade except by special permission of the Students' Work Committee.

32. *Quality credit.*—For each five honor points in excess of one honor point per credit, the required number of credits will be diminished by one.

33. This regulation applies only to the total number of credits required. It does not apply to other specific requirements of the student's curriculum. It is in force as regards (a) admission to the Senior College, the College of Education, and the School of Business Administration, (b) graduation from the general course and from the special courses leading to the degrees of bachelor of arts and bachelor of science, and (c) the work done *in this college* in the following combined arts and professional courses: Arts and Medicine and Science and Medicine.

34. This regulation is based on the well-known fact that students of high scholarship have accomplished more than those who have poorer records. Students of higher attainment are thus given the opportunity of completing the work for the B.A. degree in less than four years and entering earlier on their graduate work. Seniors with high scholastic standing are allowed

the privilege of visiting classes* and of reading under direction; and students who are handicapped by outside work or poor health can thus carry less than full work and still make a normal advance toward graduation.

35. *Junior and Senior colleges.*—The Junior College, consisting of the first two years, offers instruction in the fundamental branches which are required in preparation for the courses leading to the degrees B.A. and B.S., and for the professional schools. It is expected also that its courses of study will offer preparation for various vocations or will provide a general education for those who do not complete a longer course.

The Senior College, consisting of the third and fourth years, is concerned primarily with the advanced instruction leading to the Bachelor's degrees.

Each college is under the general direction of an assistant dean.

36. Students who are candidates for a degree are listed as freshmen when they have less than 39 credits; as sophomores when they have 39 credits or more.

37. The college distinguishes between Junior College courses, intended primarily for freshmen and sophomores, and Senior College courses, intended primarily for juniors and seniors.

38. Senior College courses appear in the announcement as open to "juniors and seniors" or to "juniors, seniors, and graduates."

39. Some Senior College courses are regularly open to Junior College students who have an average grade of at least C in the prerequisite courses. They are listed beneath the heading *Senior College Courses* in departmental statements in the Science, Literature, and the Arts section of the Combined Class Schedule bulletin. Other Senior College courses are open to Junior College students only by special permission of the Students' Work Committee. Courses which carry graduate credit may not be taken earlier than the third quarter of the student's sophomore year.

40. *Election of subjects in other colleges or schools.*—In the senior year, any student registered in the College of Science, Literature, and the Arts may elect not to exceed 6 credits per quarter in any other college or school of this University, provided that (1) the courses are indicated by the dean of the college or school in question and approved by the Advisory Committee of this college as suitable for such election; and (2) no duplication of subject occurs. Courses so taken are counted toward the bachelor of arts degree on the same terms as those taken in the College of Science, Literature, and the Arts.

By resolution of the Board of Regents students in any college electing work in any other college must complete the work so elected before they are allowed to come up for the degree for which they are candidates.

Seniors desiring further information regarding courses open should consult the assistant dean for the Senior College.

* See sections 13 and 15.

GENERAL REGULATIONS

NOTE.—*Students are held individually responsible for the information contained in these pages. Failure to read and understand these regulations will not exempt a student from whatever penalties he may incur.*

1. *Number of credit hours.*—Students must elect at least 13 credits of work a quarter. To take less than that number, a student must secure permission from the Students' Work Committee.

2. Students ordinarily may not elect more than 17 credits. After two quarters of residence a student may register for 18 credits provided he has an average of 1½ honor points per credit for the two quarters *previous to the time of registration,* and no condition or failure for the quarter immediately preceding registration. A student carrying 18 credits may be required to revise his program if his work shows a serious decline.

3. *Extension and Correspondence Courses.*—No student enrolled in the college will be allowed to carry work in the Extension Division without permission of the Students' Work Committee. No student may enroll for an extension course if this would increase his credits beyond the maximum allowed.

4. Credits received in university extension courses are counted as credits in this college only after the student has completed one year of work in the college.

5. *Military drill.*—All men are required to register for military drill during their first two years and to complete satisfactorily six quarters of drill.

A student must register for military drill every quarter until the requirement is completed, unless excused by the dean of student affairs. No other office has authority to permit a student to postpone drill.

Students entering with 90 credits of advanced standing are not required to drill. Students with 45 credits, or with more than 45 credits but less than 90 credits, of advanced standing must complete three quarters of drill.

6. *Afternoon work.*—All freshmen and sophomores are expected to elect approximately one third of their work in the afternoon.

7. *Residence.*—To secure any degree from this college a student must earn 45 credits in residence. To secure a degree in a curriculum given entirely within this college, he must spend the last three quarters before graduation in residence in the Senior College and must earn in residence in the Senior College a minimum of 45 credits.

8. *Habitual bad English.*—Any student who either in speaking or in writing, habitually uses bad English shall be reported by his instructor to the dean with all available evidence. If the dean considers this evidence sufficient, he will require the student to take without credit such further work in composition as the chairman of the Department of English may specify.

9. *Changes in registration.*—After classes have begun, no changes in registration other than necessary changes, may be made without permission of the Students' Work Committee.

10. No student may drop out of class without permission of the Students' Work Committee. Students are warned that failure to obey the regulations in this paragraph may result in their exclusion from college.

11. When a student's registration in any subject is cancelled at his own request within the first two weeks of any quarter, no standing is recorded. After that time a record of his work is obtained from his instructor. Work of the grade of D or higher will be cancelled without grade; work below the grade of D will be recorded as "dropped with the grade of F."

12. If a student is in any doubt regarding his registration or desires to make any change in it, he should consult his major adviser, the assistant dean of his college, or the chairman of the Students' Work Committee.

13. *Absences.*—No unexcused absences are to be regarded as legitimate. Both tardiness and absence are dealt with by the individual instructor on the assumption that each student is expected to do the full work of the class.

14. A student absent for any reason whatsoever is expected to do the full work of the course. He must make up work lost through delay in registration as in the case of any other absences.

15. *Delinquent students.*—Continued residence in the college is conditioned upon reasonable success in the student's work. Any student who does not make satisfactory progress in the course in which he is registered may be placed on probation by the Students' Work Committee.

16. No student is considered to have a wholly satisfactory standing who fails to secure in the course of any year the normal advance of one honor point for each credit for which he is registered.

17. *Probation.*—A student in the Junior College will be placed on probation if at the close of any quarter or at the time of the midquarter report he is below passing grade in fifty per cent of his work. A student in the Senior College will be placed on probation if he is below passing grade in forty per cent of his work.

18. A student on probation is in serious danger of being excluded from college if his work does not show immediate and rapid improvement. Subject to the regulations hereinafter stated, the condition and length of the probation are determined by the Students' Work Committee.

19. With the exception of students who refuse to take a serious interest in their work, no student will be excluded from college until he has been on probation at least six weeks.

20. The period of probation continues not more than two quarters. It may be extended if the committee is convinced that failure to show marked improvement is due to causes (other than incapacity) over which the student has no control, and that these causes may reasonably be expected to disappear.

21. Students excluded from this college shall be recorded as (a) transferred, (b) discontinued, (c) dropped.

a. *Transferred.*—Students whose attitude toward their work is satisfactory, but who evidently are pursuing the wrong course, may be transferred to another college at the close of any quarter with the approval of the two colleges concerned and the dean of student affairs.

b. *Discontinued.*—Students who are apparently pursuing the right course, but have been handicapped by conditions over which they have no control (ill health, necessary outside work, etc.) may be required to discontinue their registration until the committee is satisfied that the conditions under which they work are bettered. When such discontinuance takes place, at any time other than the end of the quarter, the courses for which the student is registered are recorded as cancelled without grade.

c. *Dropped.*—Students who have clearly shown by their records that they are irresponsible, and who have failed to meet the terms of their probation, shall be dropped.

22. *Readmission.*—Students excluded from college shall be allowed to return only with the permission of the Students' Work Committee.

a. Students classified as discontinued must present evidence that the conditions which hindered their work have been remedied.

b. Students who have been dropped may be required to remain out of college until the term of the next year corresponding to that in which the delinquency occurred. Such students must present satisfactory evidence that they have been employed in an occupation demanding intelligence and responsibility, or have successfully pursued subjects of an approved character. At the time when the student is dropped the Students' Work Committee will inform him what type of studies will be accepted for readmission.

23. The cancellation of a student's registration, of his own accord, will not affect his status as a delinquent student or the terms of his readmission. When a student leaves college he will be notified by the registrar's office of his status under these regulations.

24. Students who return under the provision of section 22 will be registered on probation. Such students may be dropped at any time that their work is unsatisfactory to the Students' Work Committee.

25. *Eligibility.*—A student who is ineligible to participate in extracurricular activities because of a condition may become eligible by removing the condition.

A student who is ineligible because of failure in a course required for graduation may become eligible (a) by repeating the course with a passing grade, or (b) by earning an average of one honor point per credit on a program of at least fifteen credits during the quarter immediately preceding participation. The two terms of a summer quarter may count as a quarter for this purpose.

A student who is ineligible because of a failure in a course not required for graduation may become eligible by either of the above methods or by completing one full year of work.

26. *Petitions.*—A student who wishes exception made to any rule of the college should present his request in writing to the Students' Work Committee. Petition blanks may be obtained at 219 Administration Building or 106 or 219 Folwell Hall.

Every student who desires to be heard in regard to his petition will be given such an opportunity by the committee.

COURSES OF STUDY

SUMMARY OF COURSES

A student may, while registered in the College of Science, Literature, and the Arts, pursue one of the following courses, described on pages 12 to 31 of this bulletin. These curricula are subject to revision by action of the faculties of the colleges concerned.

Courses given within this college:

1. A course leading to the degree of bachelor of arts.
2. Special courses leading to the degree of bachelor of science.
   a. Course in Library Training.
   b. Course for Medical Technicians.
   c. Course in Pre-Professional Social Work.
3. Courses preparing for admission to the School of Business Administration, School of Dentistry, College of Education, the course in Nursing Education, the course in Interior Architecture in the College of Engineering and Architecture, the Law School, and the College of Pharmacy.
4. A four-year course leading to the degree either of bachelor of arts or of bachelor of science with special training in military science and tactics.

Combined arts and professional courses:

5. A seven-year course leading to the degrees of bachelor of science, bachelor of medicine, and doctor of medicine.
6. A five-year course leading to the degrees of bachelor of arts and bachelor of architecture.
7. A six-year course leading to the degrees of bachelor of arts and bachelor of laws.
8. A six-year course leading to the degrees of bachelor of science in laws and bachelor of laws.
9. A six-year course leading to the degrees of bachelor of arts and doctor of dental surgery.
10. An eight-year course leading to the degrees of bachelor of arts, bachelor of medicine, and doctor of medicine.

NOTE.—A unit of the University known as University College arranges special courses of study for individual students whose intellectual interests or professional aims are not provided for by curricula offered in other colleges of the University. For further information, consult Professor Tate, Room 143, Physics Building.

ADMISSION

It is the intention of the college to admit those students who meet the minimum requirements of admission to the University and give reasonable promise of becoming successful candidates for a degree or of completing satisfactorily one of the courses preparatory to the professional schools. The case of each individual applicant will be decided on the evidence of his previous record either in secondary school or college, of his performance

in such aptitude and placement tests as are found reliable for this purpose, and of comments, advice, or recommendations received from teachers or officials of the institutions previously attended. Especial attention will be given to the transfer of students from the General College of the University on evidence of fitness for the work in this college.

For the student who is not fitted for the requirements of the college course, more suitable educational opportunities are offered in the General College of the University. Students who transfer from other collegiate institutions with records that indicate inability to continue successfully in the work of this college, and students who, after admission to this college, are making unsatisfactory records, will be advised to enter the General College of the University.

REGULATIONS APPLYING TO ALL COURSES

1. *Military Drill.*—During the Junior College years all men must complete six quarters of military drill.

2. *Freshman English.*—Unless freed from the requirement by placement tests all students must complete three quarters of English A-B-C or Composition 4-5-6. On the basis of placement tests in English, students are:

Exempt from any requirement in English,

Permitted to choose between English A-B-C and Composition 4-5-6,

Assigned to Composition 4-5-6,

Required to make up minimum essentials as a preliminary to Composition 4-5-6.

Students who are exempt from Freshman English may register, if they wish, for English A-B-C or Composition 4-5-6, or for any Junior College courses in English, composition, or speech for which English A-B-C is the prerequisite.

3. *Beginning languages.*—A student may not receive credit for beginning courses (two quarters, 10 credits) in more than one of the foreign languages, exclusive of Greek and Italian, except by special permission of the Students' Work Committee.

4. *Studies for beginning freshmen.*—The following subjects of study are offered to beginning freshmen in the fall quarter of the college year:* English literature and composition; Latin and Greek; German, French, Italian, Spanish, Norwegian, and Swedish; botany, chemistry, geology, and zoology; economics (production and marketing), history, and political science; mathematics; music (theoretical and practical); the history of ancient art, architecture and sculpture, and painting; freehand and technical drawing; home economics; orientation (an introduction to civilization). In addition to these subjects which may be studied throughout the year (fall, winter, and spring), the college offers the following short courses which some students may find possible to add to their programs at some time during the year: astronomy; human anatomy; human physiology; how to study; the use of books and libraries; personal hygiene and elementary sanitation.

* For students who enter college in the winter or spring quarter the choice of subjects is more limited.

5. *Residence.*—To secure a degree from this college a student must earn at least 45 credits in residence at this college.

ADVISERS

Every freshman may have a faculty counselor to whom he can go for help in personal matters, in choosing a vocation, or in planning his study program. This counselor will put the student in touch with specialists in fields in which he may be interested and will arrange for special tests or other sources of information. For this service the student should go to Room 112, Psychology Building.

Each freshman student who has not decided on the general plan of his college course before entrance should begin at once to consider whether he will elect a major study or the curriculum in liberal arts (see page 11) or one of the professional courses—social work, journalism, law, medicine, etc. (see pages 17 to 31). He should seek the help of one of the faculty counselors who are appointed to deal with freshman problems. As soon as he has decided on a four-year course in this college, he will be assigned to an adviser who will assist him throughout the four years. In case a student changes his choice of a field of work he will be transferred to an adviser in the new field.

Every student is expected to make the planning of his study program a serious part of his work. The student should plan his program and bring it to his adviser for suggestions and approval. Advisers are available for discussion of student programs at any time during the year.

Freshmen or sophomores who do not have regular counselors should discuss their study programs with the assistant dean for the Junior College, Room 106, Folwell Hall, or with a Senior College adviser in a line of work in which they are interested. Discussion with members of the faculty should be attended to early and not left to the registration period, because after registration begins, there may not be time to secure the information which is desirable or to make the necessary arrangements for courses of study which are important in the student's plan.

In no case should the planning of a program be left to the registration period. The chief responsibility of registration officers should be to check and tally the programs which have been prepared in advance.

I. COURSE LEADING TO THE DEGREE OF BACHELOR OF ARTS

Two general plans of study are offered, one providing for specialization, the other offering opportunity for greater breadth of training. The first plan is the one which has been in effect in recent years, involving the pursuit of major and minor studies in the Senior College. The second is a curriculum in liberal arts intended for those who wish to get a broader view of the fields of knowledge or to draw upon a wider range of studies in preparing themselves for life. Graduation honors are open to candidates for the B.A. degree on either plan.

JUNIOR COLLEGE

1. For admission to the Senior College* the student must have completed the following work in the Junior College or the equivalent in another recognized institution.

NOTE.—Students who entered college as beginning freshmen before September, 1934, may substitute for paragraph (a) the following: "Ten credits† in one of the social studies and ten credits† in one of the natural sciences." These credits together with the required work in English and foreign languages given in paragraphs (b) and (c) below constitute the old group requirements for admission to the Senior College as published in the bulletin of the college for the year 1933-34.

a. Preparation for Senior College courses in five subjects, one to be chosen from each of the Groups A, B, C, and two to be chosen at large from the Groups A, B, C, D.

Group A. *Humanities:* English and foreign languages and literature, speech, music, fine arts.

Group B. *Social Studies:* Anthropology, economics, geography, history, political science, sociology.

Group C. *Natural Sciences:* Astronomy, botany, chemistry, geology (including laboratory), physics, psychology (including laboratory), zoology.

Group D. Philosophy, mathematics.

For the purpose of this requirement the student must offer in each of the five subjects at least 10 credits (or a year course of 9 credits) of Junior College or of Junior and Senior College courses.

b. English A-B-C (15 credits) or Composition 4-5-6 (9 credits) or exemption from the requirement. All students are required to take a placement test before registering for any course in English or composition. See page 11.

c. Foreign language, 0 to 20 credits, according to the following schedule:§

Amount Presented for Entrance	*Amount Required in Junior College*
Four years of one language	None
Three years of one language	5 credits in same language
Two years of one language	10 credits in same language
One year of one language	15 credits in same language
Less than a year of one language	20 credits in one language

The work done in English or a foreign language may be counted toward the subject requirement in Group A.

Students majoring in Journalism may present the Junior College work required by that department as one of the two subjects chosen at large.

The student should read carefully the section headed Advisers on page 12.

* For the requirements for admission to the Senior College in courses leading to the degree of B.S. see p. 17 and following.

† Or nine credits in a year course.

§ Not required in the course in Pre-Professional Social Work.

2. If the student elects to carry a major sequence he must plan to secure the necessary preparation for it in consultation with a major adviser. He should apply at the departmental office and be assigned to a major adviser. If he elects the curriculum in liberal arts he will be assigned to an adviser by the Senior College office (219 Folwell Hall).

These decisions must be made by the student not later than the end of his sophomore year. He is at liberty to consult with Senior College advisers at any time that he desires and will be assigned to an adviser whenever he has chosen his course.

The student must earn a total of 90 credits, with an average of one honor point per credit, or a smaller number of credits determined as follows: For every five honor points in excess of one honor point per credit, the number 90 is diminished by one.

A student entering with advanced standing from some other institution must secure a total of 90 credits, and an average of one honor point per credit for the work done in this college. For every five honor points earned in this college, in excess of one honor point per credit, the number 90 is diminished by one.

SENIOR COLLEGE

The student is expected to devote his time to Senior College studies except in so far as additional elementary studies in the judgment of his Senior College adviser definitely contribute to his intellectual development.

Requirements in the Curriculum for Specialization

1. Each student electing this curriculum must complete a coherent and progressive sequence of Senior College courses, known as a major sequence, as specified by the department which offers it. Such major sequences are offered by the following departments: Anthropology, Architecture, Astronomy, Bacteriology, Botany, Chemistry, Economics, English, Fine Arts, Geography, Geology and Mineralogy, German, Greek, History, Human Physiology, Journalism, Latin, Mathematics, Music, Philosophy, Physics, Political Science, Preventive Medicine and Public Health, Psychology, Romance Languages, Sociology, Speech, Zoology. The courses constituting a major sequence in any department are announced in the program.

Major work will be arranged individually for students whose plans require study in fields of practical or applied art.

A student must maintain an average of one honor point per credit in the work of the major sequence.

2. A minor sequence, 9 credits. A student must secure in some department other than his major department and in addition to his major sequence 9 credits in Senior College courses.

Requirements in the Curriculum in Liberal Arts

The student is expected to submit to his adviser a plan of study in which the subjects and courses chosen are related to one another and to the student's purpose and are intelligently arranged in a working program. The adviser will examine and discuss the plan with the student. The program as approved by the adviser is to be carried out in harmony with the general requirements.

An indefinite variety of study programs may be recognized under this heading. They may serve the purpose of the student who is interested in general culture, in literary or artistic pursuits, in comparative literature, in the integration of fields of study ordinarily separated by departmental organization, in critical interpretation, or in any activity, preparation for which requires the student to draw upon several fields. This curriculum is intended to provide for the making of programs by individuals to suit their own interests or needs. The adviser represents the college in approving the individual's program.

Requirements for Graduation

For graduation a student must earn 180 credits and 180 honor points, or a smaller number of credits determined as follows: for every five honor points in excess of one honor point per credit, the number 180 is diminished by one. He must spend the last three quarters before graduation in residence in the Senior College and must earn in residence in the Senior College a minimum of 45 credits.*

Any student who fails to complete the requirements for graduation within a normal period will, in order to complete the work, be required to continue in the Senior College for one or more university sessions. During this period he will be required to carry at least 13 credit hours of work and to secure an average of one honor point per credit.

A student entering the Senior College with advanced standing from some other institution must secure the same total, and an average of one honor point per credit for the work done in this college. For every five honor points earned in this college in excess of one honor point per credit, the number is diminished by one.

HONORS COURSE PLAN

A student who has met all the requirements for admission to the Senior College may be enrolled for the Honors Course upon the approval of the department in which he wishes to pursue his major study.

Each student enrolled in the Honors Course will be put under the immediate direction of a member of his major department of professorial rank who shall be known as his tutor.

A part of the student's Senior College work will consist of reading or other individual studies done under the direction of his tutor. Work done in this way will be accepted as a substitute for a part or the whole of the major sequence and of the elective work of the usual curriculum.

A student electing this plan will be governed by the announcement of his major department and the direction of his tutor as to number of courses, attendance at classes, and general methods to be pursued.

The requirements for the minor study are not modified by this plan at present.

When the tutors of a department report at the end of any quarter that a student is not making satisfactory progress in the Honors Course, the student will be registered as a candidate in the regular course. In this case

* This regulation does not apply to students in the combined courses.

the tutors will report blanket credits equivalent to the work actually done. The student can then arrange to complete his major sequence either in the same department or in another.

For the year 1934-35 Honors Courses are offered by the Departments of Anthropology, Economics, English, History, Latin, Political Science, Psychology, Romance Languages, Sociology, and Zoology.

GRADUATION HONORS†

The degree B.A. may be awarded *cum laude, magna cum laude,* or *summa cum laude* upon the recommendation of the Committee on Honors.

Honors are awarded only to students who have a scholastic record of two honor points per credit in all work carried. A student who has this record will be awarded the degree B.A. *cum laude.*

Students wishing to become candidates for the higher honors *(magna cum laude, summa cum laude)* must signify their intention not later than the beginning of the third quarter before graduation. Students are admitted as candidates upon the recommendation of the Senior College adviser with the approval of the Committee on Honors. The committee will not admit as a candidate a student who has limited his Senior College work to the minimum requirements in major and minor subjects.

With the approval of the Committee on Honors the candidate may pursue a course of reading in lieu of any or all elective courses. Near the close of the senior year the candidate will take a special examination which may touch upon any part of the field of his college course. In this comprehensive examination the candidate should show (a) an acquaintance with the chief literature and sources of information in the fields studied, and (b) ability to discuss with intelligence and clear reasoning, questions or problems upon which he has had opportunity to secure the necessary information. Such questions may be new to the student. The object is to test the student's ability to bring facts and theories to bear upon problems presented in the examination. The examination should be a test not of memory but of assimilation, of culture, and of power to command or use the knowledge which courses of study have put within the student's reach. Candidates who pass this examination will, upon recommendation of the committee, be awarded the degree B.A. *magna cum laude.*

A candidate whose standing in the comprehensive examination is satisfactory and who in addition presents an acceptable critical paper, a piece of creative work, or a thesis embodying the results of original research will, upon recommendation of the committee, be awarded the degree of B.A. *summa cum laude.* The preparation of the paper should be begun early in the senior year.

The degree B.S. *cum laude* will be awarded to students who have an average of two honor points per credit in all their work.

Students may be accepted as candidates for the higher honors in courses leading to the B.S. degree and in combined arts and professional courses provided they present an equivalent of the work required for graduation honors in the General Course.

† Students who enter with advanced standing are eligible to become candidates for honors if they will have earned 75 credits of work in residence before graduation.

COURSES IN THE GENERAL EXTENSION DIVISION

A student who takes courses in the General Extension Division in classes in St. Paul, Minneapolis, or Duluth and wishes to count them toward a Bachelor's degree given by the College of Science, Literature, and the Arts must meet all curricular requirements of this college as stated in the bulletin. This means that:

a. Before beginning work in the Senior College with a view to graduation, the student shall apply for Senior College standing and be enrolled by the assistant dean for the Senior College.
b. He shall be assigned to a major adviser and shall complete all the Senior College studies under the direction of the adviser.
c. He shall complete any required work, either of major or minor sequences or of any other nature, in this college if it is not offered in the Extension Division.
d. He must observe any specific requirements which may be adopted hereafter, such as comprehensive examinations on either Junior College or Senior College work.

For the adjustment of irregularities in his curriculum the student will get advice from the assistant dean for the Senior College or from the major adviser.

A student who does not conform to these regulations may apply for standing in the Senior College on the same terms as a student transferred from some other institution.

Students who have not taken class work in one of the cities named must meet both curricular and residence requirements.

CREDIT IN THE GRADUATE SCHOOL

A student lacking not more than nine credits toward graduation may, upon petition, receive graduate credit for a limited amount of work taken as an undergraduate. No graduate credit will be given unless the student has made previous arrangements with the Graduate School. Courses taken for graduate credit will not carry credit toward the Bachelor's degree.

With the permission of the assistant dean for the Senior College, undergraduates lacking not more than nine credits toward graduation may be registered also in the Graduate School. Permission will be granted only in exceptional cases.

II. COURSES LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

Students in these courses who complete the work with an average of two honor points per credit will receive the degree B.S. *cum laude*. Candidates for the higher honors may be accepted if they offer an equivalent of the work required for graduation honors in the General Course. See page 16.

A. COURSE IN LIBRARY TRAINING

For a special course in library training, leading to the degree of bachelor of science, a student must first complete satisfactorily three years of academic work. During these three years the student must secure at least 135 credits, and an average of one honor point per credit for all credits

earned. (For each five honor points in excess of one honor point per credit, the required number of credits will be diminished by one.) The student must complete the requirements for admission to the Senior College, and is subject to all the regulations which govern the work of other Arts students. During his third year the student will elect work in this college, subject to the approval of the assistant dean for the Senior College. He must complete his academic requirements before beginning the courses in Library Instruction. During the fourth year a student will elect not less than 45 credits from courses given by the Division of Library Instruction, and must maintain an average of one honor point per credit for all the credits earned. Under present conditions of unemployment, it is a decided advantage to take this course *after* the completion of a full four-year collegiate course leading to the degree of B.A. or B.S. rather than as the fourth year of such a course. For specific information see the bulletin of the Division of Library Instruction obtainable from the registrar.

B. COURSE FOR MEDICAL TECHNICIANS

A four-year course in medical technology is offered by the College of Science, Literature, and the Arts and the Medical School.

With the development of laboratories in clinics, hospitals, and medical schools, medical technology is a fair field for women at the present time. Men, as a rule, are not advised to take the course.

The satisfactory completion of the prescribed course leads to the degree of bachelor of science. During the first two years, the student is registered in this college and must earn 90 credits, with an average of one honor point per credit. (For each five honor points in excess of one honor point per credit, the number 90 is diminished by one.) The required courses are listed below. High school physics is a prerequisite, but General Physics 23, given by the Division of Agricultural Engineering or Course G.C. 12f, The Physics of Sound, Heat, Light, and Motion, given in the General College of the University, may be taken as a substitute after admission.

1. English A-B-C, or Composition 4-5-6, or exemption from the requirement. (See p. 11.)
2. Zoology 1-2-3, 21, 51*
3. Inorganic Chemistry 1-2-3 or 4-5; 11
4. Analytical Chemistry 7
5. Organic Chemistry 1-2
6. A reading knowledge† of French or scientific German
7. Bacteriology 41*
8. Human Physiology 4*

For the work in the Medical School consult the special bulletin obtainable at the office of the registrar.

Practical experience in the various tests required in laboratory work is taken at the University of Minnesota Hospitals or other approved hospitals and covers four or more quarters, 45 to 60 credits.

Further information may be obtained by addressing Dr. W. A. O'Brien at the University of Minnesota Hospitals, Minneapolis, Minnesota.

Students transferring from other colleges without these courses must complete them before entering the Medical School.

* Should be taken during the first two years if possible.

† Courses 1, 2, 3, 4 in French (20 credits) or Courses 1, 2, 3A, 30, 31, 32 in German (24 credits) ordinarily give a student the required reading knowledge.

C. PRE-PROFESSIONAL SOCIAL WORK

Education for Social Work is a five-year course in preparation for professional social work. In order to plan the work wisely, students are advised to consult with the social work advisers in the offices of the Department of Sociology and Social Work as early as the freshman year. The organization of the course aims to give the undergraduate the fundamentals of a broad modern education.

The first two years of work taken in the Junior College consist of the regular academic requirements, with the usual language requirement omitted, and fundamental courses in sociology, economics, psychology, and political science required.

For admission to the Senior College the student must earn 90 credits with an average of one honor point per credit. In the Senior College he must earn 90 credits and 90 honor points in addition to the number required for admission. (For each five honor points in excess of one honor point per credit the required number of credits will be diminished by one.)

In the Senior College students continue background theory courses and begin technical social work courses in class and field work.

A student must spend the last three quarters before graduation in residence in the Senior College and must earn in residence in the Senior College a minimum of 45 credits.

Satisfactory completion of four years' work leads to a degree of bachelor of science but not certification in social work.

The fifth year offers advanced courses in theory and specialized fields of social work including social case work with families and children, medical social work, group work, rural social work, public welfare administration, visiting teacher's work, and work with Indians. All students must meet the general requirements of the Graduate School. Upon completion of the requirements of the Graduate School, which include an approved thesis, the student will receive the degree of master of arts and a certificate of social work. Completion of all the graduate requirements except the thesis entitles the student to a certificate of social work.

A special bulletin is prepared for students in this course and should be consulted for a statement of undergraduate and graduate requirements in preparation for professional social work.

First and Second Years, Junior College

Common basic foundation

REQUIRED

English A-B-C or Composition 4-5-6 or exemption from the requirement. (See p. 11.)

Sociology 1, 6 or 14, 45, 49

Economics 6-7

Political Science 1-2-3

Psychology 1-2

Zoology 1-2-3 or Human Physiology 1 and 2.

Third and Fourth Years, Senior College

Sociology 52, 53, 60, 70, 71, 72, 90, 91, 92,* 119,* 123, 129, 133,† 134 or 127 (an Extension Division course), 136, 137, 152, 156§; Preventive Medicine 53, 57,¶ 61; Sociology 55 or Home Economics 90; six credits from Sociology 100, 101, 102, 103, 114, 120, 160.

Fifth Year, Graduate

For the fifth year, of professional specialization, see the bulletin of the Graduate School and the special bulletin on graduate social work published by the department.

III. COURSES PREPARING FOR ADMISSION TO THE PROFESSIONAL SCHOOLS

A. PRE-BUSINESS COURSE

To be eligible for admission to the School of Business Administration, the student must present 90 credits, earned in a recognized college or university, with one honor point per credit, or a smaller number of earned credits, which together with quality credits will total a minimum of 90. One quality credit is granted for every five honor points in excess of one honor point per credit.

Quality credits earned in the Junior College may be applied only toward the ninety credits required for admission to the School of Business Administration. In other words, a student who has a surplus of honor points above the number required to complete ninety credits may not apply these for credit in the School of Business Administration. Any excess credits, however, other than quality credits, may be applied toward electives in the School of Business Administration.

The credits for admission shall be earned in the following groups:

A. Required Credits:
1. English A-B-C or Composition 4-5-6, or exemption from the requirement. (See page 11.)
2. Nine credits in mathematics or in *one* of the following laboratory sciences: botany, chemistry, physics, zoology, geology.
3. Nine 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 Principles of Economics: General Course (Econ. 6-7) or the equivalent. It is recommended that beginning freshmen take Business Organization: Production (Econ. 1); Business Organization: Marketing (Econ. 2); The Mechanism of Exchange (Econ. 3); and Principles of Economics (Econ. 4).

* For case work students only.
† For medical social work students only.
§ For group work students only.
¶ For medical and rural social work students only.
** Social Statistics (Soc. 45) is not accepted in fulfillment of this requirement.

B. Elective Credits:

Sufficient elective credits to complete the minimum number required for admission (normally 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:

   The Mechanism of Exchange (Econ. 3)
   Elements of Statistics (Econ. 14)†
   Principles of Accounting (Econ. 25-26)§

   Students who do not elect the above courses during the freshman and sophomore years will be required to take Money and Banking (B.A. 57); Elementary Accounting: Combined Course (B.A. 62); and Statistics Survey (B.A. 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. General Psychology (Psy. 1-2). This course is a prerequisite for courses in Advertising, Foreign Trade, Merchandising, Personnel Management, Secretarial Training, and Insurance.
   b. Commerce Algebra (Math. 8) and Mathematics of Investment (Math. 20) are required of students who take the Accounting, Insurance, or Finance sequence.
   c. Commerce Algebra (Math. 8) and Trigonometry (Math. 6) are required of students who take the Statistics sequence.
   d. Students in the Foreign Trade sequence are required to have a reading knowledge of at least one foreign language. Nine credits in political science are prerequisite for International Law (Pol. Sci. 181-182), which is required in this sequence.
   e. Secretarial Training: Typewriting (Econ. 32-33) is required of students who take the Secretarial sequence.

B. TWO-YEAR PRE-DENTAL COURSE*

The two-year pre-dental course required for admission to the School of Dentistry is a part of the five-year course in Dentistry leading to the degree of doctor of dental surgery. During the two years of prescribed work students are registered in this college and subject to its regulations. It is desirable that students should have had chemistry and higher algebra in high school. The required courses are listed below.

1. Inorganic Chemistry 1-2-3 or 4-5
2. Inorganic Chemistry 11 (Qualitative Analysis)
3. Organic Chemistry 1-2
4. English A-B-C or Composition 4-5-6 or exemption from the requirement. (See page 11.)
5. Mathematics 4 or 3-4 or 6
6. Physics 3 and 4 and one of the combinations 23 and 24, 33 and 34, 43 and 44
7. Zoology 1-2-3
8. Drawing, economics, history, Latin or a modern language (high school or college), political science, psychology, sociology, and speech are recommended as electives to make up a total of 90 quarter credits. For each five honor points in excess of one honor point per credit, the number 90 is diminished by one.

NOTE.—Students who have had no chemistry in high school are advised to take Inorganic Chemistry 11 (Qualitative Analysis) in the summer of their first year.

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* For the three-year pre-dental course, which is a part of the six-year course in Arts and Dentistry, see page 30.

† Credit may not be received for both Elements of Statistics (Econ. 14) and Social Statistics (Soc. 45).

§ Students who have had a high school course or experience in bookkeeping will be admitted to Econ. 25 upon passing a placement test. For other students Elements of Accounting (Econ. 20) is prerequisite to Econ. 25.

C. COURSES PRELIMINARY TO THE COLLEGE OF EDUCATION

All students who desire to receive a state teacher's certificate upon graduation from the University of Minnesota must be graduates of the College of Education. In most cases students register in that college at the beginning of their junior year. In certain special four-year curricula, however, they should register in the College of Education at the beginning of their freshman year or as soon thereafter as they have made their curriculum choice. These special four-year curricula are:

Art Education	Physical Education for Women
Industrial Education	Public School Music
Physical Education for Men	School Health Work

In curricula for Agricultural and Home Economics Education the preliminary work is done in the College of Agriculture, Forestry, and Home Economics. (See the bulletin of that college or the bulletin of the College of Education.)

For all other general and special curricula the prescribed work of the first two years* is done in the College of Science, Literature, and the Arts.

The following general requirements apply to all students entering the College of Education at the beginning of their junior year:

1. A minimum of 93 credits for men and 95 credits for women, carried with an average of one honor point per credit. (For each five honor points in excess of one honor point per credit, the number 93 or 95 is diminished by one.) For men 3 of these credits and for women 5 credits shall be in physical education. (No credit is granted for physical education courses by the College of Science, Literature, and the Arts; but upon transfer to the College of Education, the student will receive the credits and honor points earned in those courses.)

2. The student must have completed 6 credits in general psychology.

3. At the time of entrance to the College of Education a student must present a certificate from the Students' Health Service indicating that he is free from physical defects that would prevent the successful pursuit of educational work.

4. At the time of entrance to the College of Education each student will be given a general examination designed to show his capacities to pursue professional curricula in education.

Curricula Which Include Preliminary Work in the College of Science, Literature, and the Arts

I. A General Course Preliminary to the College of Education with Majors and Minors in Academic Subjects

Students preparing to teach academic subjects in senior high schools and to qualify for the state high school standard certificate must have one major and one or more minors in subjects taught in high schools. The College of Education offers majors and minors in the following fields: English, speech, journalism; German, Latin, French, Scandinavian; geog-

* Five quarters in the curriculum in Nursing Education and Public Health Nursing. See page 24.

raphy, history, political science, sociology; botany, chemistry, physics, zoology; mathematics. Special combinations of majors and minors are provided in the natural sciences and social studies curricula.

Students looking forward to high school teaching should enroll as pre-education students as early in their course as possible. They should select majors and minors early and with regard to the demands of high schools. Before entering the College of Education the student must meet certain specific requirements in addition to those listed above:

1. The credits presented for entrance, exclusive of credits in physical education, must be earned in the following groups of college courses:

Group A	English
Group B	Foreign languages: German, Greek, Latin, Romance Languages, Scandinavian
Group C	Social sciences: Anthropology, Economics, Geography, History, Political Science, Sociology
Group D	Natural sciences: Astronomy, Botany, Chemistry, Geology and Mineralogy, Human Physiology, Physics, Psychology, Zoology
Group E	Mathematics
Group F	Journalism, Fine Arts, Orientation, Speech, or such other courses in other colleges or departments of the University as are approved by the College of Education

2. Within the general requirements listed above the student during his high school and Junior College years must have completed the required work indicated under A, B, C, and D below. At least 20 credits in Groups B, C, and D must be completed in college.

When Taken	In High School	In College
A. English	3 years	and 9 credits in composition
B. Language	3 years in one language	or 20 credits in one language
	or	
	2 years in one language	and 10 credits in same language
	or	
	1 year in one language	and 15 credits in same language
C. Social sciences	2 years	or 10 credits in one department
D. Natural sciences	2 years	or 10 credits in one department

NOTE.—In lieu of the specific course requirements indicated in the language group a student may take a comprehensive examination in an elected language to be conducted by a committee appointed by the dean of the College of Education.

3. Within the total credits stipulated under section 1 a student must meet, in fields of study which are represented in prevailing high school curricula, the following requirement: at least 15 credits in a major field and at least 10 credits in each of two minor fields. The purpose of this requirement is to prepare the student for the study of the advanced courses necessary to the completion of satisfactory teaching majors and minors.

II. Courses Preliminary to the Four- and Five-Year Specialized Curricula in the College of Education

The College of Education provides training for many different kinds of educational work: for positions as superintendents of schools, high school and elementary school principals, elementary school supervisors, teachers in normal schools and teachers colleges, educational counselors, school psychologists; teachers of special subjects and of special classes; school libra-

rians, visiting teachers; positions in junior high schools, elementary schools, kindergartens, nursery schools, public health nursing, nursing education, and school health work. In all cases except the special four-year curricula previously mentioned the preliminary work is done in the College of Science, Literature, and the Arts. The Junior College work, however, is selected to meet the professional needs, and specific courses are required. The student should consult the bulletin of the College of Education for the requirements of his curriculum and should confer with the adviser for that curriculum early in his course.

The specialized curricula offered by the College of Education based upon two years' work in the College of Science, Literature, and the Arts are:

Commercial Education
Library Methods
Natural Sciences
Social Studies
Junior High School Education
Elementary Education
Kindergarten and Nursery School Education
Speech Pathology
Teachers of Subnormal Children
Visiting Teachers
Educational Administration or Supervision
Educational Psychology
Professional Education of Teachers

Credits earned in required courses in Art Education and Physical Education will be granted upon transfer to the College of Education.

III. Course Preliminary to Nursing Education and Public Health Nursing in the College of Education

For the first five quarters of the five-year course in Nursing Education, the student is registered in the Junior College. She must complete the requirements listed below, and must earn an average of one honor point per credit.

English A-B-C or Composition 4-5-6 or exemption from the requirement. (See page 11.)
Zoology, 10 credits
History, 9 or 10 credits
Human Physiology 1 and 2
Psychology 1-2
Home Economics 70 or 72
Sociology 1
Chemistry or Botany, 8 or 10 credits
Electives to make a total of 75 credits exclusive of physical education.* (For each five honor points in excess of one honor point per credit, the number 75 is diminished by one.)
Physical Education, six quarters. One quarter of this requirement may be completed after registering in the School of Nursing. No credit is granted for physical education courses in the College of Science, Literature, and the Arts; but upon transfer to the College of Education, the student will receive the credits and honor points earned in those courses.

Upon completion of the above requirement the student registers in the School of Nursing for two and a half years, followed by three quarters in the College of Education, with a major in Nursing Education or Public Health Nursing.

* Students are advised to include Sociology 49 when possible.

D. COURSES PRELIMINARY TO TRAINING IN INTERIOR ARCHITECTURE IN THE COLLEGE OF ENGINEERING AND ARCHITECTURE

This course offers to students of the College of Science, Literature, and the Arts the opportunity to prepare themselves for certain lines of work such as domestic architecture and interior architecture and decoration without taking the full technical course in Architecture.

During the first two years, the student is registered in this college. He must complete the requirements stated below and must earn 90 credits and 90 honor points. At the beginning of his course, he should consult the School of Architecture regarding electives.

During the third and fourth years, the student registers in the College of Engineering and Architecture and upon the satisfactory completion of the prescribed work, amounting to 102 additional credits, receives the degree of bachelor of interior architecture. (See bulletin of the College of Engineering and Architecture.)

Course Required in the First Two Years	Credits
English A-B-C or Composition 4-5-6 or exemption from the requirement. (See page 11)	0 to 15
Mathematics 4 or 6 (with prerequisite)	4 to 10
French (see Junior College Requirements, page 13)	0 to 20
History 11-12-13	9
Physics or Inorganic Chemistry	8
Architecture 11-12-13	3
Architecture 21-22-23	6
Architecture 24-25-26	6
Architecture 31-32-33	9
Architecture 61, 62, 63	6

E. GENERAL COURSE PRELIMINARY TO THE LAW SCHOOL

Students in the University preparing to enter the Law School register in this college. Ninety quarter credits of academic work are required for admission to the four-year course in the Law School, and 135 credits for admission to the three-year law course. The faculty of the Law School recommends the "two-four" course. An average of one honor point for each credit earned up to the time of admission is also required. Excess honor points do not reduce the number of credits required.

No specific subjects are required for admission to the Law School as a candidate for the degree of bachelor of laws, but a student seeking the degree of bachelor of arts in the combined course must satisfy the requirements of the College of Science, Literature, and the Arts for that degree. Likewise, a student seeking the degree of bachelor of science in law in the combined course must satisfy the specific requirements for that degree. (See statements of combined courses in Arts and Law, pages 29 and 30.)

The following course is recommended by the faculty of the Law School. It satisfies the requirements for admission to the Law School, the academic requirements for the degree of bachelor of science in law, and the Junior College requirements for the degree of bachelor of arts.

1. Latin, 20 credits, minus 5 credits for each year of Latin in high school.
2. English A-B-C or Composition 4-5-6 or exemption from requirement. (Page 11.)
3. Natural science, 10 credits
4. Political Science 1-2-3
5. Philosophy 2 and 1, 3 or 50, 51, 52
6. Psychology 1-2
7. History, 9 or 10 credits, and 70-71-72
8. Economics 6-7
9. Sociology 1

Additional courses should be elected in Economics, History, Philosophy, Political Science, Sociology, and Speech.

F. PRE-PHARMACY COURSE

For recommendations for one year's work preliminary to the College of Pharmacy, consult the bulletin of that college.

IV. MILITARY SCIENCE AND TACTICS

Credit for advanced military science.—Students who have completed the Basic Course, R.O.T.C., and are selected for advanced work by the professor of military science and tactics, and who sign an agreement with the government to continue this work for the remainder of their college course (not to exceed two years) and to attend one summer training camp, are eligible for the Advanced Course, R.O.T.C., prescribed in War Department regulations.

For admission to the Senior College, a student must complete 90 credits, with an average of one honor point per credit. The faculty will recommend for graduation, in any course of study (given entirely in this college), leading to the degree of bachelor of arts or bachelor of science, any student who has completed in addition to this requirement 84 credits, 84 honor points, and the work of the Advanced Course of the R.O.T.C.

A student must spend the last three quarters before graduation in residence in the Senior College and must earn in residence in the Senior College a minimum of 45 credits.

Students enrolled in the Advanced Course, R.O.T.C., are furnished with a special uniform and receive from the government a fixed allowance per day while enrolled in this course, except during the period in which they are actually at a training camp, when they are paid at the rate prescribed for the seventh grade in the army.

All students who complete the Advanced Course, R.O.T.C., will, if recommended by the professor of military science and tactics and the president of the University, be commissioned in the Officers' Reserve Corps of the United States Army.

Special course for students of military science.—The degree of bachelor of science will be given to students who complete the following course:

JUNIOR COLLEGE

1. A total of 90 credits, with an average of one honor point per credit.
   a. English A-B-C or Composition 4-5-6 or exemption from the requirement. (See page 11.)
   b. History 1-2.
   c. Zoology 1-2-3, Psychology 1-2, Chemistry (10 credits).
2. Preparation for a major sequence in history, political science, or mathematics.

SENIOR COLLEGE

1. For the completion of the Advanced R.O.T.C. Course as now given, a total of ..... 12 credits
2. Bacteriology 41 ..... 5 credits
3. Preventive Medicine 40, 53 ..... 6 credits
4. One of the following (in Senior College courses)
   a. History, including 59-60-61 and 93-94-95 ..... 18 credits
   b. Political Science, including 101-102-103, 181-182 ..... 21 credits
   c. Mathematics, including 50, 51, 52 ..... 21 credits
   d. Electives to make a total of 90 credits and 90 honor points, in addition to the requirement for admission.

The quality credit rule applies to this course in so far as the number of elective credits is concerned.

V. SEVEN-YEAR COURSE IN SCIENCE AND MEDICINE, LEADING TO THE DEGREES OF BACHELOR OF SCIENCE, BACHELOR OF MEDICINE, AND DOCTOR OF MEDICINE*

During the first two years the student is registered in the College of Science, Literature, and the Arts. He is expected to complete the courses listed below or their equivalent, as approved by the Students' Work Committee of the Medical School, and must secure 90 credits, with an average of one honor point per credit. (For each five honor points in excess of one honor point per credit, the required number of credits will be diminished by one.)

Composition 4-5-6, English A-B-C, or exemption from requirement. (See page 11.)
Zoology 1-2-3.
Inorganic Chemistry 11, Analytical Chemistry 7, and Organic Chemistry 1-2, with the elementary courses prerequisite to them.
Physics† 3 (with prerequisite mathematics), 13, 23, 33, and 43.
German sufficient to secure a reading knowledge. Students may meet this requirement by passing German 31-32, or by taking a special examination after completing two college years of German. This examination is conducted by the German Department.

The following subjects are recommended as electives: advanced zoology (such as comparative anatomy), physics, chemistry, freehand drawing, Latin, French, higher mathematics and statistics, psychology, sociology, and cultural subjects generally. General Bacteriology, a Medical School subject, may not be presented for admission to the Medical School. With the approval of the Students' Work Committee of the Medical School and the assistant dean for students' work in the College of Science, Literature, and the Arts, a pre-medical student may take one subject in the Medical School in any quarter.

* For the eight-year course in Arts and Medicine, which involves three years of pre-medical work, see page 31.

† The bulletin of the Medical School gives the requirement in physics as "twelve credits covering mechanics, sound, heat, light, electricity, and magnetism." At the University of Minnesota, however, the courses covering those branches of physics amount to 15 credits.

For admission to the Medical School, a candidate's record must show a number of honor points equal to the total number of credits in the required subjects of zoology, chemistry, physics, and composition; also a number of honor points equal to the total number of credits in all subjects; and the student must be accepted by the Medical School under the limited registration regulation of that school. He must take a medical student's aptitude test and the general sophomore test given by the College of Science, Literature, and the Arts. The scores of those tests are considered by the Students' Work Committee in advising students and determining admission. A student applying for admission for the fall quarter must have satisfied all requirements before July 1.

PROGRAM FOR THOSE WHO ENTER IN THE FALL WITHOUT LANGUAGE AND WITHOUT HIGHER ALGEBRA

First Year

Inorganic Chemistry 1-2-3 or 4-5, and 11
German 1-2-3A
Mathematics 3 and 4, and Physics 3
Zoology 1-2-3

Second Year

Inorganic Chemistry 11, if not already completed
Analytical Chemistry 7
Organic Chemistry 1-2
German 30-31-32
Physics 13, 23, 33, and 43
Composition 4-5-6 or English A-B-C, or an elective for those exempted from the requirement

NOTE.—Students who have had no chemistry in high school are advised to take Inorganic Chemistry 11 in the summer of their first year.

PROGRAM FOR THOSE WHO ENTER IN THE FALL WITH TWO YEARS OF GERMAN

First Year

Inorganic Chemistry 1-2-3 or 4-5, and 11
German 3A, 30-31
Mathematics 3 and 4, and Physics 3
or
Mathematics 4 and Physics, one or more of 3, 13, 23, 33, 43
Zoology 1-2-3

Second Year

Inorganic Chemistry 11, if not already completed
Analytical Chemistry 7
German 32
Organic Chemistry 1-2
Physics to complete the requirement. (See page 27.)
Composition 4-5-6 or English A-B-C, or an elective for those exempted from the requirement
Electives to make a total of 90 credits

The work during the third and fourth years is taken in the Medical School and is credited toward the degree of bachelor of science. To secure this degree, a student, in addition to the requirements for admission, must

have completed the first two years of the medical course in accordance with the standards of the Medical School and have passed, with a "C" average, the comprehensive examinations in these years.

Students who have completed elsewhere two or more years of collegiate or university work which includes the required subjects specified above and which is in other respects the full equivalent of the two years of academic work required in this seven-year combined course, will be awarded the degree of bachelor of science on recommendation of the faculty of the Medical School, provided they meet the scholarship requirements stated above.

The foregoing regulations governing the quality and amount of premedical training required for admission to the Medical School will be enforced for those who present the minimum amount of work. In cases of mature and superior students, especially such as have taken degrees and have made special progress along some line (even tho it may not have been closely related to medicine), concessions may be made. Cases under this paragraph will be considered individually and upon petition to the dean of the Medical School.

It should be borne in mind that no student can pursue the medical course to advantage without knowledge of biology, chemistry, and physics.

VI. FIVE-YEAR COURSE IN ARTS AND ARCHITECTURE*

This course is designed to combine with the full technical course in Architecture the broad cultural training recognized as most desirable in preparation for the practice of this profession. The courses leads to the degrees of bachelor of arts at the end of four years and bachelor of architecture at the end of five years. The degree of master of architecture may be taken at the end of six years.

Students wishing to elect this course should consult the School of Architecture. For the first two years the requirements are the same as those laid down in the course in Interior Architecture, page 25 of this bulletin, except that the student will register in Mathematics 11, 12, and 13 (College of Engineering and Architecture) and complete these courses by the end of his sophomore year.

During the first four years of this course the student is registered in the College of Science, Literature, and the Arts. He must complete the requirements for admission to the Senior College, and is subject to the regulations governing other students in this college.

VII. COMBINED COURSE IN ARTS AND LAW, LEADING TO THE DEGREES OF BACHELOR OF ARTS AND BACHELOR OF LAWS*

The work of the first three years of this course is done in the College of Science, Literature, and the Arts, or not exceeding two years in some other accredited college, and the third year in this college. The student must complete the requirements for admission to the Senior College, and is subject

* Only students who have completed the required work in the College of Science, Literature, and the Arts before entering the professional school will be permitted to avail themselves of the privilege of securing the B.A. degree in a combined course.

to all the regulations which govern the work of other Arts students. During these three years the student must secure at least 135 credits, *exclusive of quality credits,* and an average of one honor point per credit for all credits earned. For a student who has 135 earned credits, when he enters the Law School, the course for the degree of bachelor of laws is three years; for a student who has less than 135 earned credits, when he enters the Law School, the course for the degree of bachelor of laws is four years.

During his third year the student will elect work in this college subject to the approval of the assistant dean for the Senior College. The first year of the course in the Law School, when completed with the standing required by that college for graduation, counts as the equivalent of the fourth year (45 credits) of the Arts course.

VIII. COMBINED COURSE IN ARTS AND LAW, LEADING TO THE DEGREES OF BACHELOR OF SCIENCE IN LAW AND BACHELOR OF LAWS

The work of the first two years of this course is done in the College of Science, Literature, and the Arts, or in some other accredited college. During these two years the student must secure at least 90 credits, *exclusive of quality credits,* and an average of one honor point per credit for all credits earned. The course must include English A-B-C or Composition 4-5-6 (unless exempted), Political Science 1-2-3 (American Government and Politics), Philosophy 2 (Logic), Psychology 1-2 (General Psychology), History 70-71-72 (English Constitutional History), and Economics 6-7 (Principles of Economics). Reasonable substitutions will be allowed. No foreign language is required. The degree of bachelor of science in law will be conferred upon completion of two years work in the Law School. This work may be selected to suit the needs of the student, and may be restricted to commercial law for students desiring a preparation for business. The degree of bachelor of laws is conferred upon completion of two additional years of work in the Law School. This course of two years academic work and four years in the Law School is recommended by the faculty of the Law School as the best available for students preparing for the profession of law.

IX. SIX-YEAR COURSE IN ARTS AND DENTISTRY, LEADING TO THE DEGREES OF BACHELOR OF ARTS AND DOCTOR OF DENTAL SURGERY*

During the first three years of this course, the student does his work in the College of Science, Literature, and the Arts, subject to the regulations of the college, and must secure at least 135 credits, with an average of one honor point per credit for all credits earned. (For each five honor points in excess of one honor point per credit, the required number of credits will be diminished by one.) He must complete the requirements for admission to

* Only students who have completed the required work in the College of Science, Literature, and the Arts before entering the professional school will be permitted to avail themselves of the privilege of securing the B.A. degree in a combined course.

the Senior College and also the work in zoology, chemistry, mathematics, and physics prescribed for admission to the School of Dentistry (see page 21).

During his third year, the student elects work in this college subject to the approval of the assistant dean for the Senior College. The work of the pre-junior and junior years in the School of Dentistry, exclusive of technical and practical work, when completed according to the standards required by that school, counts as the equivalent of the fourth year (45 credits) of the Arts course.

X. EIGHT-YEAR COURSE IN ARTS AND MEDICINE, LEADING TO THE DEGREES OF BACHELOR OF ARTS, BACHELOR OF MEDICINE, AND DOCTOR OF MEDICINE*

During the first three years of this course, the student is registered in the College of Science, Literature, and the Arts, subject to the regulations of the college, and must secure at least 135 credits, with an average of one honor point per credit for all credits earned. (For each five honor points in excess of one honor point per credit, the required number of credits will be diminished by one.) He must complete the requirements for admission to the Senior College and also the work in zoology, chemistry, mathematics, physics, and foreign language prescribed for the seven-year course in Science and Medicine (page 27).†

During his third year, the student elects work in this college subject to the approval of the assistant dean for the Senior College. The first year of the course in the Medical School, when completed with the standards required by that school, counts as the equivalent of the fourth year (45 credits) of the Arts course.

For admission to the Medical School, a student's record must show a number of honor points equal to the number of credits in the required subjects of English or composition, chemistry, physics, and zoology; and also a number of honor points equal to the total number of credits. The student must have a reading knowledge of German and must be accepted by the Medical School under the limited registration regulations of that school.

PROGRAM

For program of courses see the Combined Class Schedule bulletin for 1934-35, pages 11-89.

* Only students who have completed the required work in the College of Science, Literature, and the Arts before entering the professional school will be permitted to avail themselves of the privilege of securing the B.A. degree in a combined course.

† For recommended electives and the restrictions governing them, see page 27.

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Part I

Announcement of Courses for the Years 1932-1934

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Lucy Will, M.A., Instructor in University High School

UNIVERSITY HIGH SCHOOL

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MEMBERS OF OTHER FACULTIES GIVING INSTRUCTION IN THE COLLEGE OF EDUCATION

For a complete list of members of others faculties giving instruction in the College of Education, see the following bulletins:

Bulletin of the College of Science, Literature, and the Arts, Part I

Bulletin of the College of Agriculture, Forestry, and Home Economics, Part I

Bulletin of the Medical School

Bulletin of the School of Chemistry, Part I

Bulletin of the College of Engineering and Architecture, Part I

Bulletin of the School of Business Administration, Part I

Bulletin of the Division of Library Instruction

Bulletin of the Institute of Child Welfare

GENERAL INFORMATION

The College of Education is organized to offer professional courses in the field of education, to promote research in the problems of education, and to provide educational guidance for prospective teachers and other educational workers in the schools. The completion of satisfactory curricula in this college entitles graduates to receive certificates for school work from the Minnesota State Department of Education. Such certificates are issued only to those graduating from this college.

Among the important curricula offered by the college are those relating to teaching in the following fields: academic subjects in elementary and high schools, agriculture, art, business subjects, home economics, industrial arts, natural science, physical education, and public school music.

Work is also offered in the fields of educational administration and supervision, clinical psychology, educational psychology, library service, school health work, sociology, teaching of subnormal children, professional education of teachers, work of the visiting teacher, educational and vocational guidance, nursery school and kindergarten education, nursing education, and public health education.

ADMISSION

Admission as regular students.—Admission to regular standing in the College of Education may be effected in one of the following ways:

a. Completion of the requirements for admission to the College of Education as outlined below, or to the junior year of the College of Agriculture, Forestry, and Home Economics. This preparation involves the earning of 90 credits and 90 honor points exclusive of physical education and represents two years work in a junior college.

b. Graduation from the advanced graduate course of the Minnesota state teachers colleges or of other fully accredited state teachers colleges. The College of Education grants 90 credits to such graduates.

c. Registration in one of the following four- or five-year specialized curricula in the freshman year, provided the requirements for admission to the University have been completed:

Art Education
Industrial Education
Nursery School and Kindergarten Education
Physical Education for Men
Physical Education for Women
Public School Music
School Health Work

In all other cases of four- or five-year curricula as outlined in this bulletin, the prescribed work of the first two years is to be taken prior to the student's entrance to the College of Education.

ENTRANCE REQUIREMENTS

All students who desire to prepare for teaching must register in the College of Education beginning with the junior year. They should enroll as pre-education students in the Lower Division as early in their course as

possible. Advisers for pre-education students will be members of the faculty of the College of Education. Entrance to the college will be conditioned upon a student's meeting the general and specific requirements outlined below:

1. Ninety quarter credits, exclusive of credit for physical education, carried with an average grade of C. The ninety credits thus indicated must be earned in the following groups of college courses:

Group A English
Group B Foreign languages: German, Greek, Latin, Romance Languages, Scandinavian
Group C Social sciences: Anthropology, Economics, Geography, History, Political Science, Sociology
Group D Natural sciences: Astronomy, Botany, Chemistry, Geology and Mineralogy, Human Physiology, Physics, Psychology, Zoology
Group E Mathematics
Group F Journalism, Philosophy, Speech, Fine Arts, or such courses in other colleges or departments of the University as are approved by the College of Education

2. Within the general requirements listed above the student during his high school and Lower Division years must have completed the required work indicated under A, B, C, and D below, and at least 20 credits in groups B, C, and D must be completed in college.

When Taken	In High School	In College
A. English	3 years	and 9 credits in composition
B. Language	3 years in one language	or 20 credits in one language
	or	
	2 years in one language	and 10 credits in same language
	or	
	1 year in one language	and 15 credits in same language
C. Social sciences	2 years	or 10 credits in one department
D. Natural sciences	2 years	or 10 credits in one department

NOTE.—In lieu of the specific course requirements indicated in the language group a student may elect a comprehensive examination in an elected language to be conducted by a committee appointed by the dean of the College of Education.

3. Within the total credits stipulated under No. 1 a student must meet, in fields of study which are represented in prevailing high school curricula, the following requirement: at least 15 credits in a major field and at least 10 credits in each of two minor fields. The purpose of this requirement is to prepare the student for the study of the advanced courses necessary to the completion of satisfactory teaching majors and minors.

4. The student must have completed six credits in general psychology.

5. In the cases of certain specialized curricula described in this bulletin the above requirements may be modified in details. All courses of a special curriculum should be completed, altho it may not always be possible to complete them in the order listed.

6. Students with two years of college training who are short certain entrance requirements will make up all deficiencies after enrolling in the College of Education.

7. At the time of entrance a student must present a certificate from the Students' Health Service indicating that he is free from physical de-

fects which would prevent him from the successful pursuit of educational work.

8. At the time of entrance to the College of Education the student will be given a general examination designed to show his capacity to pursue professional curricula in education.

9. In the freshman and sophomore years, men must complete three quarters of physical education and six quarters of military drill; women must complete six quarters of physical education. Five credits, to be counted toward graduation from the College of Education, will be granted for the completion of the requirement in physical education. The total number of credits required for graduation will be 185.

Admission on probation.—Students with advanced standing who wish to enter the College of Education are admitted on probation if the average of the grades presented for admission is below that of the average mark required for graduation in the college from which they enter.

Students in Home Economics.—Students expecting to receive certificates to teach upon graduation shall be registrants in the College of Education beginning with the junior year. Students in the College of Agriculture, Forestry, and Home Economics desiring a teacher's certificate in home economics shall in addition to their registration in that college register also in the College of Education. No formal application for transfer is necessary if such transfer is made at the beginning of the junior year. At least 90 credits, and honor points equal to the number of credits are required for admission to the junior class.

Admission as unclassed students.—Graduates of a five-year normal course, if individually recommended by the normal school president, are allowed sixty-three quarter credits and are admitted as unclassed students pending the completion of twenty-seven additional credits.

Teachers of experience who are unable to meet the regular requirements for admission are admitted to the College of Education as unclassed students.

Admission with advanced standing.—Graduates of the three-year course in the state teachers colleges of Minnesota may receive not more than one hundred thirteen quarter credits; credits earned in such three-year normal course shall be applied, in case they are deemed of equivalent merit, in the College of Education, to courses for supervisors in elementary grades, principals in state graded schools, teachers in junior high schools, or in normal school departments in high schools; students coming from such three-year course shall not receive certificates in high school subjects from the University without completing the prescribed courses of the University for such certificates.

Applicants for transfer from the third or fourth year of the degree course offered in Minnesota teachers colleges may receive credit for any part of their work in so far as such work is equivalent in subject-matter to courses offered in the College of Education.

Graduates of state teachers colleges will not be permitted to take for credit, Psychology 1 and 2, General Psychology.

QUALIFYING EXAMINATIONS—REQUIREMENTS FOR REGISTRATION FOR THE SENIOR YEAR

Registration for the work of the senior year in the College of Education is provisional pending satisfactory performance upon the qualifying examinations as outlined below.

The qualifying examinations consist of four sections:

1. a. Teaching major:—materials usually taught in secondary schools.
   b. Additional phases of the major field taught in college courses.
2. Fundamentals of educational psychology, secondary education, and methods or techniques of instruction.
3. English form and composition.

Students not preparing to work in secondary schools will be permitted to take an alternative form of the examination in education which deals with elementary education and methods of teaching in elementary schools.

No registration for student teaching or other work of the senior year will be regarded as completed until these examinations have been taken.

Statements of the scope of these examinations are on file at the reserve desk of the University Library. Booklets giving the scope of these examinations may be obtained at the office of the dean of the College of Education.

These examinations will be given twice annually, once in May for all students completing the work of the junior year in the College of Education at the close of the spring quarter. They will also be given during Freshman Week in September for the following groups: entering seniors, seniors not in residence the previous spring quarter, and seniors who complete the work of the junior year by attendance at one or both of the summer quarters just preceding.

GRADUATION—DEGREES—HONORS COURSE

The degree of bachelor of science.—Students graduating from the College of Education will receive the degree of bachelor of science. A total of 185 credits and 185 honor points are required for graduation. Candidates for this degree must (a) have met the requirements in a major and in a minor field and in professional subjects, or (b) they must have completed one of the specialized curricula. In addition they must have met the special scholarship requirements as stated on p. 14. Candidates may major in any department listed on p. 16.

Graduation with high distinction.—All graduates of this college who have attained *special excellence* in scholarship as is evidenced by an honor point ratio[1] of 2.5 or more are candidates for the degree of bachelor of science *with high distinction.* This award is conditional upon favorable recommendation of the faculty and is conferred by faculty action only.

Graduation with distinction.—All graduates of this college who have attained *excellence* in scholarship to the extent of having earned an average honor point ratio[1] of 2.0 or more are candidates for the degree of bachelor

[1] The honor point ratio is calculated by dividing the total number of honor points earned by the total number of credits earned. See p. 15.

of science *with distinction.* The award is conditional upon favorable recommendation of the faculty and is conferred by faculty action only.

INDEPENDENT STUDY COURSE

An Independent Study Course[1] will be offered during the year 1932-33.

1. The purpose of this course will be to offer students of ability the opportunity to direct their own training to a greater degree than is now afforded by the prevailing methods of class instruction.

2. The course will be open by choice to those students who by tests of general ability and previous scholastic achievement give evidence of the capacity for self-direction. Continuance in the course will be conditioned by continued evidence of worthiness of such enrolment.

3. This course will be in lieu of the former requirements of Educational Psychology, 3 credits (Ed. Psy. 55); The High School, 3 credits (Ed. Ad. 65); Technique of High School Instruction, 3 credits (Ed. T. 15) and is equivalent to Ed. 51-52-53. The field of work to be covered will be approximately that now embraced in the three courses. Students who satisfactorily complete this Independent Study Course and the final examination covering all units, will be given nine credits and will be relieved of the special course requirements named above.

4. Students electing the Independent Study Course will be relieved from certain formal requirements but not from the mastery of a minimum content.

GRADUATE WORK IN EDUCATION

Graduate work in education leading to the degree of master of arts or doctor of philosophy may be pursued in the Graduate School. Students who desire to undertake graduate work with education as a major must have had at least 6 credits in psychology, and in addition to this, a total of not less than 18 credits in education which shall include Ed. Psy. 55 and Ed. Psy. 60 or the equivalent. Students who desire to undertake graduate work with education as a minor must have at least 6 credits in psychology, and, in addition to this, a total of not less than 18 credits in education.

All courses bearing numbers of 100 and above are open for credit to graduate students. Before attempting to make out their programs, graduate students in education should consult the dean of the College of Education and the dean of the Graduate School.

Graduate courses may be pursued during summer quarter. The work for the Master's degree may ordinarily be completed in four summer quarters. For full statement of regulations, consult Graduate School bulletin.

MAJORS AND MINORS

Major and minor work for advanced degrees may be arranged from courses listed below under the following groupings:

[1] Previously designated as Limited Honors Course, College of Education bulletin, 1930-32.

Doctor's Degree

Major.—Majors may be designated as follows:

1. Educational administration and supervision
2. Educational psychology
3. Education (Under this designation the student, with the approval of his adviser, may select a group of courses from among those listed below, excluding the field of his minor, centering about his special interest in education. The following are typical centers of interest: agricultural education, comparative education, elementary education, history of education, home economics education, industrial education, techniques of instruction, secondary education, higher education.)

Minor.—Minors may be designated as follows:

1. Educational administration and supervision
2. Educational psychology
3. Education (Under this designation the student, with the approval of his adviser, may select a group of courses from among those listed below, excluding the field of his major, centering about his special interest in education. Typical centers of interest are listed above under Major.)
4. Any other field of study offered in the University of Minnesota in which satisfactory courses of graduate character are available, and which is obviously related to the major field.
5. Students majoring in fields other than education may choose education or any of its subdivisions enumerated above as a minor when it appears that such a minor is appropriately related to the major field.

Master's Degree

Majors and minors may be arranged under advisement in accordance with the groupings listed above.

BUREAUS OF RECOMMENDATIONS AND RESEARCH

Bureau of Recommendations.—Graduates of the College of Education who have met the requirements for a state teacher's certificate will be recommended for positions for which they are qualified. Students on the Minneapolis campus should register with the Bureau of Recommendations, 208 Burton Hall.

Bureau of Educational Research.—The College of Education conducts a Bureau of Educational Research for the purpose of promoting investigations by faculty and students in problems of education. The bureau is under the direction of the dean of the college and the members of the faculty co-operate as their several interests dictate. Through the bureau opportunity is given for co-operation with public schools in studies bearing

upon problems of school administration, classroom instruction, and related matters. The bureau is responsible for the publication of a series of studies under the general title of Educational Monographs.

SPECIAL FEES

All special methods and practice teaching courses carry a fee of $1 per credit hour. Certain courses in the various departments require the payment of special fees. Such fees are indicated in connection with the course descriptions in this bulletin and with the schedules of courses as listed in Part II. For a statement of tuition and other fees see the general information bulletin.

GENERAL REQUIREMENTS

Residence requirements.—The minimum term of residence in the College of Education is two years beginning as soon as the entrance requirements have been fulfilled.

Students may shorten the two years of residence only by meeting such additional requirements in quality and quantity of professional work as will make the training of such students equal to that of students regularly registered for two full years.

AMOUNT AND QUALITY OF WORK

a. Upon entering the College of Education the student should, under advisement, plan his program (a) to secure one academic major and one or more academic minors and the required professional courses;[1] or (b) he should plan his program in accordance with one of the specialized curricula.

b. During his entire course the student must earn (1) 185 credits including the required courses in drill, gymnasium, and physical education, or a smaller number of credits determined as follows: For every 5 honor points in excess of one honor point per credit the number 185 is diminished by one, but no student will be recommended for graduation who has not completed all of the courses required in his particular curriculum and who has not satisfied all the requirements of his curriculum; (2) 1½ honor points per credit in his major subject; and (3) an average of 1 honor point per credit in all other courses pursued during the junior and senior years.

c. Fifteen credits are regarded as the usual load. Students who wish to register for more than 17 hours must show a record of 1½ honor points per credit for the previous quarter. Students may not carry less than 13 hours without petition.

d. A maximum of 27 credits is elective from courses in agriculture and home economics except in the special curricula in those fields.

e. Continued residence in the college is conditioned upon reasonable success in the student's work. Any student who does not make satisfactory progress in the course in which he is registered may be placed on probation by the Students' Work Committee. No student is considered to have a wholly satisfactory standing who fails to secure in the course of any year the normal advance of one honor point for each credit for which he is registered. A student who is found to be below passing in 50 per cent of his work either at the middle or at the end of the quarter will be placed on probation.

f. All students registered in the College of Education shall maintain satisfactory standards of oral and written English. A Committee on Standards of English in Education will recommend ways of remedying deficiencies and will determine when satisfactory standards have been attained.

[1] For requirements in Education see p. 17.

g. Students registered as freshmen and sophomores in the College of Education will be guided by the faculty regulations of the College of Science, Literature, and the Arts, but will be amenable to the Students' Work Committee of this college.

h. Honor points are computed on the basis of one and one-half times the number of credits required in the major subject, e.g., in case a major recommendation requires 36 credits, the number of honor points will be 54. From among the courses carried in a department the student may select those which he will present as meeting this requirement except that he must include all courses which are specified in the departmental announcement as required for the recommendation for the certificate.

Credits and honor points.—The Senate regulations governing the system of marks is as follows:

1. That there shall be four grades, A, B, C, and D, representing varying degrees of achievement, which shall be acceptable for the completion of a single course; but this definition shall not be construed as preventing any college or school from setting special standards of performance as a condition of registration in particular courses of study, of admission to the college or school, of promotion, of counting work toward a degree, or of continued residence in the college or school. Work merely acceptable for the completion of all his single courses of study does not constitute a satisfactory record for a student when his college specifies higher requirements for any purpose.

2. There shall be two grades indicating work of distinctly unsatisfactory quality. These grades shall be known as 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 removed only by a repetition of the work in the course, or, in exceptional cases, by examination by permission of the faculty concerned.

3. There shall be a Grade I (incomplete), which shall indicate that a student, for reasons satisfactory to the instructor in charge, shall have been unable to complete the work of the course. This grade shall be given only when the work already done has been of a quality acceptable for the completion of the course. Any student receiving this grade shall be given an opportunity to complete the said course within the first thirty days of his next quarter in residence.

4. There shall be a symbol, T (transferred), indicating the transfer of credit from another institution or from one college to another of the University of Minnesota. This symbol shall be provisional and subject to final evaluation by the faculty of the college or school to which the student is transferred.

The amount of work pursued by a student is estimated in credit hours; the quality or grade of his work, in honor points.

A credit hour is one hour per week of recitation or lecture work extending throughout one quarter, or three hours per week of laboratory work through one quarter. It is assumed that each credit hour will demand on the average three hours a week of the student's time for recitation or lecture, one hour in class and two hours of preparation; for laboratory courses, three hours in the laboratory.

Honor points are computed as follows: each credit hour with the grade of A entitles the recipient to 3 honor points; each credit hour with the grade of B entitles the recipient to 2 honor points; each credit hour with the grade of C to 1 honor point; each credit hour with the grade of D to no honor points. Illustration: A student completing a one-quarter 3-credit course and receiving the grade of A would be entitled to 9 honor points;

if receiving the grade of B, to 6 honor points; if receiving the grade of C, to 3 honor points; if receiving the grade of D, to no honor points.

Professional lectures.—From time to time during the year lectures of general interest to students of education will be given by members of the faculty and invited speakers. All students in the College of Education are expected to attend these lectures. Special announcements will appear in the *Official Daily Bulletin.*

CERTIFICATION OF TEACHERS

Employment in a professional capacity in the schools of Minnesota is conditioned upon the proper licensing of the person to be employed. By a recently enacted law (1929) all authority for such certification is conferred upon the State Department of Education. Certification by institutions and the university teacher's certificate have been discontinued. Within the scope of this law the University operates its program for those students who desire certification for teaching in the public schools.

The law provides that certification is automatic for the graduates of the College of Education who have completed specifically named curricula in this college. No provision is made for the certification of any other university graduates. Certificates may be issued only to those persons who are "physically competent and morally fit to teach." The various curricula in the College of Education provide the training necessary for any type of state certificate which is based upon four or five years of training beyond the high school.

Courses which provide the training necessary for holding positions in the public schools of Minnesota are offered in the following subjects:

Agriculture
Art Education
Botany
Chemistry
Clinical Psychology
Commercial Education
Educational and Vocational Guidance
Educational Psychology
Elementary Education
Elementary School Supervision
English
French
Geography
German
History
Home Economics
Industrial Education
Junior High School Education
Latin
Library Methods
Mathematics
Natural Science
Nursery School and Kindergarten Education
Nursing Education
Physical Education for Men
Physical Education for Women
Physics
Political Science
Professional Education of Teachers
Public Health Nursing
Public School Administration
Public School Music
Scandinavian
School Health Work
Social Studies
Sociology
Spanish
Speech
Teaching Subnormal Children
Zoology

Students who desire certification upon graduation shall be registrants in the College of Education beginning with their junior year. Students in home economics and agriculture shall also be registrants in the College of Agriculture, Forestry, and Home Economics. They shall have satisfied the prescribed requirements for a major and a minor in secondary school subjects or the specific requirements of a specialized curriculum as outlined in this bulletin. Such students will also be required to complete the two years' work leading to the degree of bachelor of science. No certificate is granted without a degree from the University of Minnesota.

By a proper selection of courses students qualifying for the degree of bachelor of science may qualify for teaching in more than one field. This is desirable since most beginning teachers in public schools are required to teach more than one subject.

PRESCRIBED COURSE OF STUDY FOR TEACHERS OF SECONDARY SCHOOL SUBJECTS

In order to receive the Bachelor's degree and to qualify for the state general high school certificate in secondary school subjects, students not completing a specialized curriculum as set forth in this bulletin will be required to pursue in addition to one academic major and one academic minor[1] the following professional courses, totaling 26 credits.

A. *Required courses—General.*

Course No.	Title	Credits	Prerequisite Courses
Ed. 51-52-53	Introduction to Secondary School Teaching...	9	Psy. 1-2
	or		
Ed.Psy. 55	Educational Psychology		Psy. 1-2
Ed.Ad. 65	The High School	 9	Ed.Psy. 55
Ed.T. 15	Technique of High School Instruction		Ed.Psy. 55, Ed.Ad. 65

B. *Methods and practice teaching.*—In addition the student must complete a *Special Methods and Practice Teaching Course* (9 credits, prerequisite Ed.T. 15) in his major field and a course in Special Methods in his minor field (3 credits, prerequisite, Ed.T. 15).

C. *Education electives.*—To complete the professional requirement of 26 quarter credits required for this degree and the teacher's certificate the candidate will elect additional credits, under faculty advisement, from among the following subjects:

[1] In certain cases two academic minors are required. See departmental statements.

Course No.	Title	Credits	Prerequisite Courses
H.Ed. 1	Brief Course in History of Education..	5	Psy. 1-2
H.Ed. 3	Educational Sociology	3	Psy. 1-2
H.Ed. 5	Public Education in the U. S.	3	Psy. 1-2
H.Ed. 101	Historical Foundations of Modern Education	3	Psy. 1-2
H.Ed. 102	History of Modern Secondary and Higher Education	3	Psy. 1-2
H.Ed. 103	History of Modern Elementary Education	3	Psy. 1-2
H.Ed. 131	Comparative School Systems	3	9 hrs. in ed.
Ed.Ad. 75	The Elementary School.....	3	Ed.Psy. 55
Ed.Ad. 113	The High School Curriculum.....	3	10 hrs. in ed.
Ed.Ad. 121	Educational Advising of Women and Girls	3	15 hrs. in ed. and psy.
Ed.Ad. 124	Public School Administration.....	3	10 hrs. in ed.
Ed.Ad. 133-134	Guidance in Secondary Schools.....	4	10 hrs. in ed.
Ed.Ad. 167-168	The Junior High School.....	4	10 hrs. in ed.
Ed.Ad. 169	Extra-curricular Activities	2	10 hrs. in ed.
ArtEd. 189	Application of Esthetic Theory to Art Education	3	See departmental statement
Ind. 105	Industrial Education	3	See departmental statement
Ind. 110	Guidance in the Schools.....	2	Ed.Psy. 55
H.E.Ed. 143	Home Economics Curricula.....	2	H.E. 42
Ed.T. 110	Educational Diagnosis in Secondary Education	2	Ed.Psy. 55
Ed.T. 122	Literature for Adolescents.....	3	See departmental statement
Ed.T. 193	Foundations of Secondary School Methods	3	Ed.T. 15
Ed.Psy. 134	Mental Tests	2	Ed.Psy. 55 and 60
Ed.Psy. 146-147	Child Guidance	4	15 hrs. in psy. and ed.
Ed.Psy. 157	Psychology of Child Development.....	2	6 hrs. in psy.
Ed.Psy. 158	Psychology of Adolescence.....	3	Ed.Psy. 55 or equiv.
Ed.Psy. 159	Psychology of Personality.....	3	Ed.Psy. 55 and 60 or 134 or equiv.
Ed.Psy. 183	Psychology of Gifted Children.....	2	Ed.Psy. 55 or equiv.
P.M.&P.H. 80	Health Supervision of the School Child	3	P.M.&P.H. 50 or 52 or 53

PRACTICE TEACHING[1]

Special methods and practice teaching are normally combined into a one-year course extending throughout the senior year. Failure to register for such course for the fall quarter of the senior year may result in delay in graduation. All courses prerequisite to special methods and practice teaching, including the final examination in Ed. 51-52-53, should have been completed by the beginning of the senior year. In addition to the special methods and practice teaching course in the subject which the student wishes to teach he must satisfy the requirements for a major or minor in that subject according to his curriculum. By the beginning of his senior year he should have completed courses in his academic field which will enable him to do practice teaching satisfactorily.

[1] See departmental statement.

Arrangements for practice teaching should be made at the close of the junior year and before the student registers for other courses. In the academic subjects arrangements should be made through Mr. Charles W. Boardman, director of student teaching, and in the special subjects through the major advisers, as follows:

Agricultural Education	A. V. Storm
Art Education	Ruth Raymond
Commercial Education	Consult College of Education office
Home Economics	Ella J. Rose
Industrial Education	Homer J. Smith
Nursery School and Kindergarten Education	John E. Anderson
Physical Education for Men	L. F. Keller
Physical Education for Women	J. Anna Norris
Public School Music	Carlyle Scott, A. N. Jones
Teaching of Subnormal Children	John G. Rockwell

The teachers' courses in methods of teaching and in practice teaching are combined into a one-year course in the following subjects:

English	German
Mathematics	Latin
Secondary school science	Romance languages (French and Spanish)
History and social science	Commercial subjects

SPECIALIZED CURRICULA AND MAJOR SEQUENCES

SPECIALIZED CURRICULA IN ADMINISTRATION OR SUPERVISION

The following specialized curricula are prescribed for prospective superintendents of schools, elementary school principals or supervisors, and high school principals. These curricula require five years for completion, two years in the Lower Division, two years in one of the three special curricula in the College of Education, and one year in the Graduate School. The satisfactory completion of four years of work entitles the student to the degree of bachelor of science and to the state high school or elementary school teacher's certificate. The satisfactory completion of the fifth year's work entitles the student to the Master's degree and provides the training for the university certificate in administration or supervision.

1. *Students from other institutions.*—Students entering from other institutions may qualify for the certificate in administration or in supervision, either by meeting the requirements set forth below or by making such substitutions or modifications as their previous education and training shall warrant. All substitutions or modifications of these requirements must meet with the approval of the student's major adviser and the faculty.

2. *Extra-curricular activities.*—The student who is anticipating the field of public school administration as his life work should avail himself of the opportunities which the University offers for the development of leadership and those personal qualities essential to success in the administrative field. Under guidance, he should select for active participation those extra-curricular activities which offer the best training and experience suitable to his individual needs.

3. *Teaching minors.*—Students anticipating the state high school certificate must complete two teaching minors during the four years of undergraduate work, and a course in special methods and practice teaching in one of these minors. A third teaching minor is desirable. Students should have these requirements in mind when planning their work in the Lower Division. The teaching minors[1] may be selected from any two of the following fields: English, foreign language, history and social science, mathematics, science. Other teaching minors may be selected on the approval of the major adviser and the faculty.

[1] See departmental course outlined for minor requirements.

CURRICULA IN ADMINISTRATION OR SUPERVISION

A. LOWER DIVISION—COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

For All Students Anticipating a Four- or Five-Year Specialized Curriculum in Administration or Supervision

Freshman and Sophomore Years

Course No.	Title	Credits
Eng. A-B-C	Freshman English	15
	or	
Comp. 4-5-6	Freshman Composition (or exemption)	9
Hist. 1-2	Modern World	10
Pol.Sci. 1-2	American Government	10
	Natural Science	10
	French or German[1]	5-20
Psy. 1-2	General Psychology	6
Soc. 1	Introduction to Sociology	5
Econ. 8-9	Principles of Economics[2]	6
	Electives[3]	8-28
	Physical Education	5
	Military Science	

B. COLLEGE OF EDUCATION—SPECIALIZED CURRICULA IN ADMINISTRATION OR SUPERVISION

I. Three-Year Curriculum for Superintendents of Schools and Elementary School Principals

Major Adviser: Fred Engelhardt

Junior Year

Course No.	Title	Credits
Ed. 51-52-53	Introduction to Secondary School Teaching	9
Ed.Psy. 60	Statistical Methods	2
Ed.Ad. 75	The Elementary School	3
	Electives[3,4]	31

Senior Year

Course No.	Title	Credits
Ed.T.	Special Methods and Practice Teaching	9
Ed.Ad. 124	Public School Administration	3
Ed.Ad. 125	Techniques in Administration	3
Ed.Ad. 150	Supervision and Improvement of Instruction	2
Ed.Ad. 156	Practice Supervision	3
Ed.Ad. 123	Supervision of High School Instruction	3
Ed.Psy. 134	Mental Tests	2
	Electives[1,3,4]	20

[1] Twenty credits must be secured in either French or German in the University if no work in these languages was presented for entrance. (See General Information, p. 8.)

[2] See College of Engineering bulletin.

[3] The electives should be selected in view of the teaching minor requirements.

[4] Selection under guidance from the following additional courses is recommended: Ind. Ed. 105, Industrial Education; Public Health, 53, Elements of Preventive Medicine; Speech and Journalism; Phys. Ed. 97, Organization and Administration of Physical Education; Agricultural Administration 151; Ed.Ad. 158, Organization for Supervision; H.Ed. 3, Educational Sociology; H.Ed. 103, History of Education.

II. Three-Year Curriculum for High School Principals

Major Adviser: Harl R. Douglass

Junior Year

Course No.	Title	Credits
Ed. 51-52-53	Introduction to Secondary School Teaching	9
Ed.Psy. 60	Introduction to Statistical Methods	2
H.Ed. 102	History of Modern Secondary and Higher Education	3
Ed.Ad. 75	The Elementary School	3
	Electives[1,2]	28

Senior Year

Course No.	Title	Credits
Ed.T.	Special Methods and Practice Teaching	9
Ed.Ad. 124	Public School Administration	3
Ed.Ad. 150	Supervision and Improvement of Instruction	2
Ed.Ad. 133-134	Guidance in Secondary Schools	4
Ed.Ad. 113	High School Curriculum	3
Ed.Ad. 123	Supervision of High School Instruction	3
Ed.Psy. 134	Mental Tests	2
Ind. 105	Industrial Education	3
	Electives[2]	13

III. Three-Year Curriculum for Elementary School Supervisors

The completion of the first two years of this curriculum entitles one to the advanced elementary school certificate for teaching in the elementary and not in the high school.

Major Adviser: Leo J. Brueckner

Junior and Senior Years

Required Courses

Course No.	Title	Credits
Ed. 61-62-63	Introduction to Elementary School Teaching	9
Ed.Psy. 60	Introduction to Statistical Methods	2
Ed.Psy. 111	Educational Measurements in the Elementary School	3
Ed.Psy. 134	Mental Tests	2
Ed.Ad. 119	Elementary School Curriculum	3
Ed.Ad. 124	Public School Administration	3
Ed.Ad. 125	Techniques in Administration	3
Ed.Ad. 150	Supervision and Improvement of Instruction	2
Ed.Ad. 151	Uses of Tests in Improving Instruction	2
Ed.Ad. 156	Practice Supervision	3
	Elective in Supervision	2
	Total	34

[1] Selection under guidance from the following additional courses is recommended: Ind. Ed. 105, Industrial Education; Public Health, 53, Elements of Preventive Medicine; Speech and Journalism; Phys. Ed. 97, Organization and Administration of Physical Education: Agricultural Administration 151; Ed.Ad. 158, Organization for Supervision; H.Ed. 3, Educational Sociology; H.Ed. 103, History of Education.

[2] The electives should be selected in view of the teaching minor requirements.

Ten hours of electives for courses listed below

Course No.	Title	Credits
H.Ed. 3	Educational Sociology	3
H.Ed. 103	History of Modern Elementary Education	3
Ed.T. 23	Teachers' Course in Geography	3
Ed.T. 45	Teaching of Geography and History in the Elementary School	2
Ed.T. 143-144	Teaching of Reading in Elementary School	3
Ed.T. 148-149	Teaching of Arithmetic	4
Ed.Ad. 152	Supervision—Adjustment of Schools to Individual Differences	2
Ed.Ad. 153	The Supervision of English	2
Ed.Ad. 154	The Supervision of Social Studies	2
Ed.Ad. 155	The Supervision of Arithmetic	2
Ed.Ad. 157	Practice in Supervision	3
Ed.Ad. 158	Organization for Supervision	2
Ed.Ad. 159	Supervision of Reading	2
Ed.Ad. 160	Supervision of Elementary Subjects	2
Ed.Ad. 167-168	The Junior High School	4
	Special methods courses in elementary and junior high school teaching.	
	Total required credits	44
	18 credits in each of two of the following fields or such others as may be approved: English literature, history, languages, political science, natural science, social science, mathematics, geography, art, music, or physical education	36
	General electives	10
	Total credits required	90

C. GRADUATE SCHOOL CURRICULUM

Fifth Year

For Students Anticipating a Certificate in Administration or Supervision

The candidate for the certificate of administration or supervision in any one of the following fields (superintendent of schools, elementary principal, elementary supervisor, and secondary school principal) must satisfactorily complete the requirements for the Master's degree (see Graduate School bulletin). The language requirement may be waived in all cases where a language is not essential in the thesis or the work to be pursued.

The work of the student shall constitute a major in educational administration and supervision and a minor in educational psychology.

AGRICULTURAL EDUCATION

Major Adviser: A. M. Field

Students who have completed the required work of the freshman and sophomore years of the College of Agriculture, or equivalent, may prepare to teach agriculture in the public schools by completing the junior and senior years in a combined curriculum of the College of Education and the College of Agriculture.

The agriculture requirements can be fulfilled by the major, minor, and elective plan (Method I) as shown below, or by completing the suggested curriculum under Method II shown later.

The education requirements can be fulfilled by completing satisfactorily 24 quarter credits in Agricultural Education courses some of which are required courses. The courses now required are Agr. Ed. 11, 42, 181, 182, 183.

FRESHMAN AND SOPHOMORE COURSES

The courses during the freshman and sophomore years are the same as are required of all agriculture students in the College of Agriculture. Every student should, if possible, complete these subject courses before the end of the sophomore year. Any subjects that cannot be taken in the freshman or sophomore years must take precedence the following year. Care should be taken in registration to give precedence to courses offered only one quarter. See bulletin, College of Agriculture, Forestry, and Home Economics.

JUNIOR AND SENIOR YEARS

METHOD I. ELECTIVE CURRICULA

Under this method the student, with the approval of his adviser, may select any curriculum which complies with the following requirements:

a. A major of from 24 to 36 credits.
b. A minor of 18 credits.
c. Limited electives 18 credits, which must be selected outside of the groups from which the major and minor have been chosen.
d. Free electives, sufficient to meet the number of credit hours required for graduation chosen from any of the courses offered in the University.

The major and minor must be selected from different elective groups.

Elective Groups

A. Groups from which major, minor, or electives may be chosen

1. Agricultural Economics and Farm Management
2. Agricultural Education
3. Animal Industry, including
   - Animal Husbandry
   - Dairy Husbandry
   - Poultry Husbandry
   - Veterinary Medicine
4. Agricultural Sciences and Plant Industry, including
   - Agricultural Biochemistry
   - Agronomy and Plant Genetics
   - Entomology and Economic Zoology
   - Horticulture
   - Plant Pathology and Botany
   - Soils
5. Agricultural Engineering

B. Groups from which electives only may be chosen

1. Bee Culture
2. Forestry
3. Home Economics
4. Military Science and Tactics
5. Physical Education
6. Rural Publications and Journalism
7. Courses in departments of other schools and colleges of the University

Method II. Suggested Curriculum

The following suggested curriculum may serve as a guide to students desiring a well-balanced preparation for teaching agriculture and the sciences, for serving as county agent, or for practical farming, and will facilitate making a program that will avoid conflicts.

Junior Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Agron. 121	Grain Crops	3	..	..	Agron. 1, Bot. 9 cred.
An.Husb. 2-3	Types and Breeds of Livestock	3	3	..	An. Husb. 10-11
Dy.Husb. 101	Milk Production	5	..	..	Dy. Husb. 1
Hort. 6	Fruit Growing	3	..	..	
Ent. 3	Economic Entomology	..	3	..	Zool. 16
Agron. 131	Principles of Genetics	..	3	..	Bot. or Zool. 9 cred.
Vet. 9-10	Veterinary Studies	..	3	3	
Agr.Eng. 40	Mechanical Training I.	..	..	3	
Agron. 123	Forage Crops	..	..	3	Agron. 1, Bot. 9 cred.
An.Husb. 8	Fundamentals of Feeding and Management	..	..	5	
Agr.Ed. 11	Educational Psychology	..	3	..	
	Electives	3	2	3	
		17	17	17	

Senior Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Agr.Econ. 40	Principles of Marketing Organization	3	..	..	Agr. Econ. 2
Agr.Ed. 102	Farm Management Organization	3	..	..	Agron. 1, Agr. Econ. 2, Soils 4
Agr.Ed. 42	Supervised Teaching Experience	..	..	3	Agr. Ed. 182
Dy.Husb. 6	Judging Dairy Cattle	1	..	..	An. Husb. 10-11
Pl.Path. 1	Plant Pathology	5	..	..	Bot. 9 cred.
Agr.Ed. 103	Farm Management Operation.	..	3	..	Agr. Ed. 102
Soc. 14	Rural Sociology	..	3	..	Senior classification
Agr.Ed. 181-182-183	Teaching Agriculture	5	5	5	Agr. Ed. 11
	Electives	..	6	9	
		17	17	17	

It is recommended that electives be chosen from the courses in Agricultural Education or from such of the subject-matter courses as will best complete a well-balanced and well-distributed preparation. In addition to those found in the suggested curriculum above may be mentioned Agricultural Engineering 12; Agronomy 124, 132; Forestry 27; Plant Pathology 9;

Poultry 1; Publications and Rural Journalism 19. Recommended electives in education: Agr. Ed. 135, 154, 161; Ed. Ad. 65, 133, 167-168.

Graduates of the University of Minnesota completing these agriculture and education requirements will be eligible for the Minnesota "high school standard special" certificate for teaching agriculture and the sciences in high schools or elementary schools of this state.

Students desiring to obtain the teacher's certificate should consult the head of the Division of Agricultural Education, preferably during the freshman year, to avoid difficulties that may arise in program making.

ART EDUCATION

Major Advisers: Ruth Raymond, R. V. Hilpert

The following special curriculum leads to the degree B.S. and provides the training necessary for the Minnesota "high school standard special" certificate for teaching art in elementary and high schools. Teachers with experience in other subjects and with talent and taste for art are especially recommended to qualify for art supervision. A minor is provided with especial reference to graduates of state teachers colleges who have taste in art and some teaching experience, that they may meet the state's need for teachers of art in combination with other elementary or high school subjects. For the statement of requirements in this art minor see below.

Students preparing for the university degree and a teacher's certificate in art may register in the Department of Art Education at the beginning of their freshman year.

FOUR-YEAR CURRICULUM IN ART EDUCATION

1. In Art, the following is the minimal requirement for the art major:
   - 18 credits in design
   - 18 credits in drawing
   - 12 credits in handicrafts[1]
   - 5 credits in art history and appreciation[2]
   - 3 credits in theory of art teaching
   - 9 credits in practice teaching and special methods in art
2. In professional education courses:
   - 3 credits in Educational Psychology, Ed. 51 or 61
   - 3 credits in Technique of High School Instruction, Ed. 53
   - 12 credits selected from the list of options on page 18
3. A minor group: a minimum of 18 credits, chosen, in accordance with the individual student's interest and ability, from any one of the departments offering courses through the College of Education bulletin.[3]
4. Required supporting courses: a minimum of
   - 19 credits in English composition and literature
   - 10 credits in history, if a minor of high school history has not been presented for entrance
   - 6 to 10 credits in a natural science, if a minor of a laboratory science has not been presented for entrance
   - 6 credits in general psychology
   - 5 credits in sociology
   - 3 credits in textiles

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[1] Course 11 in Industrial Education may be chosen as a handicraft.

[2] Art.Ed. 55, 56, 57, 70, 153, and 154, and the various courses offered in English by the Greek Department may fulfill this requirement as well as those courses specifically designated Art History or Art Appreciation.

[3] Freshman English cannot be included in this minor group. The requirement is waived for graduates from state teachers colleges.

5. Electives. Recommended electives: continuation of a language begun in high school (French especially recommended); speech arts, for use in teaching, and to lead to the play production courses; courses in philosophy, history, sociology, and psychology; courses for the appreciation of music, literary classics, and the stage, (attendance upon concerts, exhibitions, and plays is urged as part of an art education). A large number of the 40 electives may be spent profitably for art courses beyond the minimal requirement listed above.

Requirements for a Minor in Art

9 credits in design
9 credits in drawing
6 credits in handicrafts
3 credits in art history and appreciation
3 credits in special methods and practice teaching

BOTANY

Major Adviser: C. O. Rosendahl

	Credits
Botany as a major subject:	
Bot. 1 General Botany	4
Bot. 2 Elementary General Morphology of Plants	3
Bot. 7 Taxonomy of Flowering Plants	3
Bot. 21 Elementary Ecology	3
Bot. 22 Elementary Plant Physiology	3
Bot. 12 Morphology of Algae and Bot. 13 Morphology of Fungi	6
or Bot. 23 Bryophytes and Pteridophytes and Bot. 63 Gymnosperms and Angiosperms	6
Additional courses	9
Bot. 51 Histological Methods, advised	
Total credits	31
Botany as a minor subject:	
Bot. 1, 2, 7, 21 or 22. Bot. 51 advised (see above)	
Total credits	20

For specialized curriculum in natural science, see p. 44.

CHEMISTRY

Major Adviser: S. E. T. Lund

		Credits
Chemistry as a major subject:		
Inorg.Chem. 9-10	General Inorganic Chemistry	10
Inorg.Chem. 12-13	Qualitative Chemical Analysis	10
Anal.Chem. 1-2	Quantitative Analysis	10
Org.Chem. 51-52	Organic Chemistry	10
	Total credits	40
Chemistry as a minor subject:		
Inorg.Chem. 9-10, 12-13; Anal.Chem. 1-2 or 7 and six additional credits in chemistry		
	Total credits	30

Students without entrance credits in chemistry must take Inorg.Chem. 6-7-8 (15 credits) instead of Inorg.Chem. 9-10 (10 credits).

For specialized curriculum in natural science, see p. 44.

COMMERCIAL EDUCATION

The curriculum in commercial education is designed to prepare teachers of commercial subjects in secondary schools. It is purposely made much broader in its scope than the present program of the typical high school commercial department, with the idea of paving the way for meeting more effectively than at present the needs of high school students who enter business. Completion of this curriculum leads to the bachelor of science degree and provides the training necessary for the Minnesota "high school standard special" certificate for teaching commercial subjects.

The first two years' work, taken in the Lower Division, College of Science, Literature, and the Arts, consists of the regular academic requirements of that college, with the foreign language requirement omitted and foundation courses in psychology, economics, statistics, and accounting added.

Students who enter the College of Education from other institutions must substitute for some of their electives such of the Lower Division requirements as they have not fulfilled. Graduates from the two-year course in state teachers colleges may find it necessary to attend an extra summer quarter in order to meet all requirements.

FOUR-YEAR CURRICULUM IN COMMERCIAL EDUCATION

LOWER DIVISION, COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS[1]

Course No.	Title	Credits
Comp. 4-5-6	Freshman Composition (or Eng. A-B-C or exemption)	9
	Natural Science	10
	Social Science, other than economics	10
Econ. 3	Mechanism of Exchange	5
Econ. 6-7	Principles of Economics	10
Psy. 1-2	General Psychology	6
Econ. 20	Elements of Accounting[2]	3
Econ. 25-26	Principles of Accounting	6
Econ. 14	Elements of Statistics	5
Econ. 32	Secretarial Training[3]	1
Econ. 37-38-39	Secretarial Training[4]	9
	Electives, for which the following are especially recommended: continuation of a language begun in high school, speech, philosophy, additional social science.	

COLLEGE OF EDUCATION

Junior Year

Econ. 51-52-53	Business Law	9
Econ. 40-41-42	Secretarial Training	9
Econ. 33-34	Secretarial Training[3]	2
B.A. 139	Advanced General Accounting	3
Ed. 51-52-53	Introduction to Secondary School Teaching	9
	Electives[5]	

[1] During the freshman and sophomore years students must secure the required credits in physical education. Men must also register for military science.

[2] 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.

[3] Students who have had one year of high school typewriting are admitted to Econ. 33; those who have had two years of high school typewriting are admitted to Econ. 34.

[4] Students who have had two years of high school shorthand are admitted to Econ. 40 and are exempt from Econ. 37-38-39.

[5] Electives must include the 8 credits in education courses as listed on page 18.

Senior Year

Course No.	Title	Credits
Ed.T. 80-81-82	Special Methods and Practice Teaching	9
Econ. 85	Economics of Marketing	3
Econ. 141	Monetary and Banking Policy	3
Econ. 161	Labor Problems	3
B.A. '86	Office Management	3
Geog. 41	Geography of Commercial Production	5
Geog. 102	Trade Routes and Trade Centers	3
	Electives[1]	

Recommended Electives

Title	Credits
History of Education (H.Ed. 1)	5
Educational Sociology (H.Ed. 3)	3
Advertising (Psychology 56 and B.A. 88)	6
Introduction to Economic History (History 80-81)	6
Personnel Management (B.A. 167)	3
Additional English Composition	6
The Modern Corporation (Economics 160)	3
Survey of Cost Accounting (B.A. 130)	3
Economics of Transportation (Economics 172)	3

EDUCATIONAL PSYCHOLOGY

UNDERGRADUATE CURRICULA IN EDUCATIONAL PSYCHOLOGY, CLINICAL PSYCHOLOGY, AND EDUCATIONAL AND VOCATIONAL GUIDANCE

Students who are planning on assuming certain specialized duties in connection with their high school teaching or who are interested in securing a basis for graduate work may elect an undergraduate major or minor in the above fields.

These curricula are intended particularly for students who may perform the duties of counselor, dean, clinical psychologist, or specialist in tests and measurements in connection with teaching duties in the high school. It is not their purpose to produce a person with highly specialized training in those fields, but to supply a basis for later professional growth as well as some immediate background for handling the problems involved in the several positions indicated. Students with a real interest in these fields are advised to procure training on the graduate level.

Three general programs have been set up. The first constitutes a major or minor in general educational psychology; the second is a major in clinical educational psychology; and the third is a major or minor in educational and vocational guidance. Students who secure a major in one of these curricula will also secure a teaching major or two teaching minors in academic subjects in meeting the requirements for the state teacher's certificate. If the curricula are elected as minors, the student will secure a major in an academic subject in order to meet the requirements for the certificate.

Permission of the adviser must be secured to elect one of these curricula.

[1] Electives must include the 8 credits in education courses as listed on page 18.

I. Undergraduate Curriculum in Educational Psychology

Major Advisers: W. S. Miller, A. C. Eurich

For a Major

Course No.	Title	Credits
Psy. 1-2[1]	General Psychology	6
Psy. 4-5	Introductory Laboratory Psychology	4
Ed. 51	Educational Psychology	3
Ed.Psy. 60	Introduction to Statistical Methods	2
Ed.Psy. 134	Mental Tests	2
Ed.Psy. 157	Psychology of Child Development	
	or	
Ed.Psy. 158	Psychology of Adolescence	3
	Electives in Educational Psychology	10
	Total	30

For a Minor

Course No.	Title	Credits
Psy. 1-2[1]	General Psychology	6
Psy. 4-5	Introductory Laboratory Psychology	4
Ed. 55	Educational Psychology	3
Ed.Psy. 60	Introduction to Statistical Methods	3
Ed.Psy. 134	Mental Tests	2
Ed.Psy. 157	Psychology of Child Development	
	or	
Ed.Psy. 158	Psychology of Adolescence	3
	Total	21

In addition to the above major or minor requirements students will take the two remaining quarters of Ed. 51-52-53, Introduction to Secondary School Teaching, 6 additional credits, and special methods and practice teaching, 9 credits.

II. Clinical Psychology

Major Adviser: J. G. Rockwell

The following courses are considered basic for the training of the clinical psychologist. The student should plan on pursuing training for an advanced degree. He may secure an undergraduate major by electing a total of 45 credits from the courses listed below.

Course No.	Title	Credits
Psy. 1-2[1]	General Psychology	6
Psy. 4-5	Introductory Laboratory Psychology	4
Psy. 144-145	Abnormal Psychology	6
Soc. 1	Introduction to Sociology	5
Soc. 49	Occurrence of the Socially Inadequate	3
Soc. 52	Elementary Case Work	3
Soc. 53	Elements of Criminology	3
Soc. 60	Social Protection of the Child	3
Soc. 90-91-92	Elementary Field Training	6

[1] To be taken during the sophomore year. Graduates of normal schools are not permitted to take Psy. 1 or 2 for credit.

Course No.	Title	Credits
Ed. 51	Educational Psychology	3
Ed.Psy. 60 or 116-117	Statistical Methods	2 or 4
Ed.Psy. 134	Mental Tests	2
Ed. Psy. 143-144	Individual Mental Examination	4
Ed.Psy. 146-147	Child Guidance	4
Ed.Psy. 149-150-151	Psycho-Educational Clinic	6
Ed.Psy. 184	Mental Deficiency	2

In addition to the above, major students will take the two remaining quarters of Ed. 51-52-53, Introduction to Secondary School Teaching, 6 additional credits, and practice teaching and special methods, 9 credits.

III. Educational and Vocational Guidance

Major Advisers: M. E. Haggerty, Ruth A. Merrill

For a Major

Course No.	Title	Credits
Psy. 1-2[1]	General Psychology	6
Psy. 4-5	Introductory Laboratory Psychology	4
Ed. 51	Educational Psychology	3
Ed.Psy. 60	Introduction to Statistical Methods	3
Ed.Psy. 134	Mental Tests	2
Ed.Psy. 187	Practice in Personnel Work	2
Ed. 52	The High School	3
Ed.Ad. 169	Extra-curricular Activities	2
Soc. 1	Introduction to Sociology	5
Soc. 49	Occurrence of the Socially Inadequate	3
Soc. 52	Elementary Case Work	3
Soc. 90	Elementary Field Training in Case Work	2
Ed.Ad. 133 Ind.Ed. 110 Ed.Ad. 121	Guidance in Secondary Schools, or Guidance in the Schoo's, or Educational Advising of Women and Girls	2 or 3
	Electives	5
	Total	45 or 46

For a Minor

Course No.	Title	Credits
Psy. 1-2[1]	General Psychology	6
Psy. 4-5	Introductory Laboratory Psychology	4
Ed. 51	Educational Psychology	3
Ed.Psy. 60	Introduction to Statistical Methods	3
Ed.Psy. 134	Mental Tests	2
Soc. 1	Introduction to Sociology	5
Soc. 49	Occurrence of the Socially Inadequate	3
Ed. 52	The High School	3
Ed.Ad. 133 Ind.Ed. 110 Ed.Ad. 121	Guidance in Secondary Schools, or Guidance in the Schoo's, or Educational Advising of Women and Girls	2 or 3
	Total	31 or 32

In addition to the above major or minor requirements students will complete the course Ed. 51-52-53 and will take practice teaching and special methods, 9 credits.

[1] To be taken during the sophomore year. Graduates of normal schools are not permitted to take Psy. 1 or 2 for credit.

ELEMENTARY EDUCATION

PRESCRIBED CURRICULUM FOR THE ADVANCED CERTIFICATE FOR ELEMENTARY SCHOOL TEACHERS

Major Advisers: L. J. Brueckner, W. E. Peik

Students who have been graduated from a two-year teachers college or normal school course or its equivalent and who wish to work for the Bachelor's degree in education and the Minnesota "elementary school advanced" certificate for teaching in elementary schools should enroll in this curriculum. By substituting certain courses in the junior high school field the certificate can be made legal for junior high schools. The courses listed below as required presuppose a full two-year normal training course.

Course No.	Title	Credits
Ed.Psy. 60	Introduction to Statistical Methods	2
Ed. 61-62-63	Introduction to Elementary School Teaching	9
Ed.Psy. 111	Educational Measurements in the Elementary School	3
Ed.Ad. 119	Elementary School Curriculum	4
Ed.Ad. 124	Educational Administration	3
Ed.Ad. 150	Supervision and Improvement of Instruction	3
Ed.T. 143	The Teaching of Reading in the Elementary School	2

Ten hours to be elected from courses listed below

Ed.Ad. 151	Use of Tests in Improvement of Instruction	2
Ed.Ad. 152	Supervision—The Adjustment of Schools to Individual Differences	2
Ed.Ad. 153	Supervision of English in the Elementary Schools	2
Ed.Ad. 155	Supervision of Arithmetic in the Elementary Schools	3
Ed.Ad. 159	The Supervision of Reading	2
Ed.Ad. 160	Supervision of Elementary Subjects	2
Ed.Ad. 167-168	The Junior High School	4
Ed.Soc. 3	Educational Sociology	3
H.Ed. 103	History of Modern Elementary Education	3
Ed.T. 23	The Teaching of Geography	3
Ed.T. 44	Children's Literature	3
Ed.T. 45	Teaching of History and Geography	2
Ed.T. 148-149	The Teaching of Arithmetic	4
Ed Psy. 134	Mental Tests	2
Ed.Psy. 159	Psychology of Personality	3
	Special methods courses in elementary and junior high school subjects	
	Total required credits	36
	18 credits in each of two of the following fields or such others as may be approved: English, history, social studies, languages, political science, science, mathematics, geography, art, music, physical education, library methods	36
	General electives	18
	Total credits required for certificate	90

ENGLISH

Major Advisers: C. W. Nichols, Dora V. Smith

English as a major subject:

		Credits
Eng. 22-23	Introduction to Literature	10
Eng. 55-56	Shakespeare	6
Eng. 73-74	American Literature	6
Comp. 11-12 or 18-19		6
Speech		6
Additional credits, all of which must be secured in courses numbered 100 or above		6
Total credits		40

English as a minor subject:

Eng. 22-23	Introduction to Literature	10
Eng. 55-56	Shakespeare	6
Eng. 73-74	American Literature	6
Comp. 11-12 or 18-19		6
Total credits		28

GEOGRAPHY

Major Adviser: D. H. Davis

Geography as a major subject:

Twenty-eight credits from the following courses:

		Credits
Geog. 11	Human Geography	5
Geog. 41	Geography of Commercial Production	5
Geog. 43	Political Geography	5
Geog. 53	Historical Geography of the U.S.	3
Geog. 71	Geography of North America	3
Geog. 101	Geography of Europe	3
Geog. 102	Trade Routes and Trade Centers	3
Geog. 110	Geography of South America	3
Geog. 111	Cartography	3
Geog. 120	Geography of Asia	3
Geog. 133	Climatology	3
Geog. 235	Geography of Minnesota	3
Geog. 241	Field Course	3
Geog. 251-252-253	Seminar in Geography	3

Five additional credits from the following courses in geology:

Geol. 1-2	General Geology (Dynamic and Historical)	10
Geol. 1-3	General Geology (Dynamic and Economic)	10
Geol. 8	Introductory Geology	5
Geol. 29	General Physiography	5
Total credits		33

Geography as a minor subject:

Eighteen credits selected from the following courses:
Geog. 11, 41, 71, 101, 102, 110, 120

Total credits 18

GERMAN

Major Adviser: S. Kroesch

German as a major subject:

		Credits
Ger. 50-51-52	Composition[1]	6
Ger. 53-54-55	Conversation	3
Ger. 56-57	Essay Writing	6
Ger. 68	Survey of German Literature	3
Ger. 108	Phonetics	3
Additional credits in courses numbered above 50		15
Total credits		36

German as a minor subject:

Ger. 50-51-52	Composition	6
Ger. 108	Phonetics	3
Additional credits in courses numbered above 50		8
Total credits		17

HISTORY

Major Adviser: E. S. Osgood

History as a major subject:

	Credits
Total number of credits	45

At least 18 credits must be in Upper Division courses. In the senior year students, if they have maintained to the end of the junior year an honor point average of 1.5 in all work and an average of 2.0 in courses in history taken after the freshman year, will take at least one course numbered above 150; all other majors will take an additional survey course in the senior year, but will not take a course numbered above 150.

History as a minor subject:

A minimum of 18 credits of which no fewer than 9 are in Upper Division courses.

No major recommendation to teach history will be given unless the student has taken at least the general course in American History, Hist. 7-8-9.

HOME ECONOMICS EDUCATION

Major Adviser: Wylle B. McNeal

For the junior and senior years the following courses have been approved by the College of Agriculture, Forestry, and Home Economics, and by the College of Education. All students who are candidates for the degree of bachelor of science and for the Minnesota "high school standard special" certificate for teaching home economics in elementary or high schools are required to pursue one of the following curricula.

Such students become registrants in both colleges during the junior and senior years but register for their freshman and sophomore work in the College of Agriculture, Forestry, and Home Economics. Every stu-

[1] Prerequisite, Ger. 4 or four years preparatory German.

dent who expects to teach home economics and to obtain the state certificate must meet the following requirements: (a) a minimum of 22 credits in professional work, (b) the special scholarship requirement, (c) home practice in foods and cookery, and (d) completion of all of the subjects listed under any one of the five lines of specialization described below. When a student has acquired 90 credits and honor points equal to the number of credits and indicates her specialization as the teachers' or the extension course she becomes also a registrant in the College of Education.

REQUIREMENTS OF TEACHERS' CURRICULA IN HOME ECONOMICS

Students in the Home Economics Course desiring to qualify as teachers must comply with the following requirements:

A. Completion of 22 credits of professional work, including

Course No.	Title	Credits F.	W.	S.	Prerequisite Courses
Ed. 51	Educational Psychology	3	3	3	Psy. 1-2
or					
Agr.Ed. 11	Educational Psychology	3	3	3	Psy. 1-2
H.E.Ed. 40	Child Training	3	3	3	Psy. 1-2
H.E.Ed. 42	Special Methods and Observation	5	5	5	H.E. 13, 83; Agr. Ed. 11 or Ed.Psy. 55
H.E.Ed. 49	Supervised Teaching	6	6	6	H.E.Ed. 42 and qualifying exam.
H.E.Ed. 49a	Observation and Supervised Teaching	8	8	8	H.E.Ed. 42su, 3 cred. and qualifying exam.
H.E.Ed. 143	Home Economics Curricula.....	..	2	2	H.E.Ed. 42 or parallel

One of the following courses is required:

Hist.Ed. 1	History of Education.....	5	5	5	Psy. 1-2
Hist.Ed. 5	Public Education in U. S.	..	..	3	Psy. 1-2
Hist.Ed. 101	Foundations of Modern Education	3	..	..	Psy. 1-2
Ed. 52	The High School.....	3	3	3	Ed. 51

B. Satisfaction of special scholarship requirement. Prior to registration for Supervised Teaching the student must have a grade of C or higher in each of the following home economics courses: H.E. 3, 11, 13, 50, 51, 53, 80 or 81, and 83, and must have completed a qualifying examination.

C. Home experience in foods and cookery is required following H.E. 83 as a prerequisite to Supervised Teaching. Arrangements should be made with a foods instructor for satisfactory completion including an examination.

D. Completion of one of the following special curricula.

GROUP I. GENERAL REQUIREMENTS

Junior Year

1. *General courses.*—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and prerequisites must be observed.

Course No.	Title	Credits F.	W.	S.	Prerequisite Courses
Ag.Econ. 3	Principles of Economics.....	5	5	5	None
H.E. 83	Food Management	3	3	3	H.E. 70, 80, or 81, 85 or parallel
H.E. 85	Food Marketing	2	2	2	None
H.E. 131	House Planning and Equipment	5	5	5	H.E. 53
Physiol. 4	Human Physiology	4	4	4	Inorg. Chem. 4 cred., Zool. 3 cred.
H.E.Ed. 40	Child Training	3	3	3	Psy. 1-2
Prev.Med. 52	Health Care of the Family.....	3	3	3	Physiol. 4, Bact. 41
Rhet. 11 or	Argumentation	3	3	3	Rhet. 3, 22 advised
Rhet. 31	Survey of Eng. Lit. I.....	5	5	5	Rhet. 3

2. *Additional courses* are prescribed depending upon the specialization selected.

3. *Electives* should be selected to make from 15 to 17 credit hours each quarter. Full work for the year consists of 48 credit hours.

Senior Year

1. *General courses.*—The following courses may be taken any quarter that they are offered except that the proper sequence of continuation courses and prerequisites must be observed.

Course No.	Title	Credits F.	W.	S.	Prerequisite Courses
H.E. 34	Home Management Lectures....	3	3	..	H.E. 83, H.E.Ed. 40 or parallel
H.E. 35	Home Management Laboratory..	6	6	6	H.E. 34 or parallel, 83, H.E.Ed. 40, Prev. Med. 52, home experience in foods
H.E. 170	Nutrition of the Family.....	3	3	3	Ag. Biochem. 4, H.E. 70, 80 or 81, Physiol. 4
H.E. 171	Child Nutrition	3	3	3	H.E. 170, H.E.Ed. 40

2. *Additional* courses are prescribed depending upon the specialization selected.

3. *Electives* should be selected to make from 15 to 17 credit hours each quarter. Full work for the year consists of 48 credit hours.

GROUP II. SPECIAL REQUIREMENTS IN THE DIFFERENT LINES OF SPECIALIZATION

1. Teachers' Curriculum in General Home Economics

To those courses listed under *Requirements of Teachers' Curricula in Home Economics* and *General Requirements* add the following:

a. *Required courses.*

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Ag. Econ. 126	Economics of Consumption.....	..	..	3	Ag Econ 1 or 3
H.E. 11	Clothing Planning and Construction A	3	3	3	None
H.E. 13	Clothing Planning and Construction B	3	3	3	H.E. 3, 11, 50, home practice in garment making
H.E. 16	Remodeling Garments and Construction of Children's Clothing	3	..	3	H.E. 13, 53
or					
H.E. 17	Advanced Clothing	..	3	3	H.E. 13, 53
H.E. 150	Art History and Appreciation..	3	3	3	H.E. 51
H.E.Ed. 142a	Educational Measurement in Home Economics	2	2	..	H.E.Ed. 42

b. *Elective courses.*—Ten credits must be elected from Group A. Additional electives may be chosen in conference with adviser to meet graduation requirements.

Group A. Electives.—Anthrop. 41, 114; Child Welfare 60, 80, 90, 120, 130, 170; Eng. 31-32, 33, 73-74; Fr. 1-2, 3-4; Geog. 11, 41; Ger. 1, 2, 3, 4; Hist. 1-2, 3, 7-8-9; Jour. 13, 14-15, 41, 65, 69, 73-74, 82; Phil. 1, 3, 10; Pol. Sci. 1-2, 25; Rhet. 28, 29, 32, 33, 34; Soc. 14, 55, 93, 110, 114, 119, 120.

2. Teachers' Curriculum in Home Economics Extension

To those courses listed under *Requirements of Teachers' Curricula in Home Economics* and *General Requirements* add the following:

a. *Required courses.*

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Ag.Econ. 126	Economics of Consumption.....	..	..	3	Ag.Econ. 1 or 3
H.E. 11	Clothing Planning and Construction A	3	3	3	None
H.E. 13	Clothing Planning and Construction B	3	3	3	H.E. 3, 11, 50, home practice in garment making
H.E. 16 or	Remodeling Garments, Children's Clothing	3	..	3	H.E. 13, 53
H.E. 17	Advanced Clothing	..	3	3	H.E. 13, 53
H.E. 44	Home Economics Extension Work	..	3	..	H.E. 49 or parallel
H. E. 150	Art History and Appreciation..	3	3	3	H.E. 51

b. *Elective courses.*—As listed under Teachers' Curriculum in General Home Economics.

3. Teachers' Curriculum in Foods and Nutrition

To those courses listed under *Requirements of Teachers' Curricula in Home Economics* and *General Requirements* add the following:

a. *Required courses.*

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Ag.Econ. 126	Economics of Consumption	..	..	3	Ag.Econ. 1 or 3
H.E. 73	Nutrition I	4	..	4	Ag.Biochem. 4, Physiol. 4
H.E. 173	Nutrition in Disease	..	..	3	H.E. 170, 175
or					
H.E. 175	Nutrition II	4	4	..	H.E. 73
or					
H.E. 75	Dietetics Laboratory	2	..	..	H.E. 182
and					
H.E. 179	Readings in Nutrition	..	2	2	H.E. 170
H.E. 182	Experimental Cookery	3	3	3	H.E. 80
H.E. 186	Special Food Problems	3	..	3	H.E. 182
or					
H.E. 187	Special Food Problems	5	..	5	H.E. 182 Ag.Biochem. 2
H.E.Ed. 142a	Educational Measurement in Home Economics	2	2	..	H.E.Ed. 42

b. *Elective courses.*—See College of Agriculture bulletin, Part I (Teachers' Curriculum in Foods and Nutrition).

4. Teachers' Curriculum in Textiles and Clothing

To those courses listed under *Requirements of Teachers' Curricula in Home Economics* and *General Requirements* add the following:

a. *Required courses.*

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Ag.Econ. 126	Economics of Consumption	..	..	3	Ag.Econ. 1 or 3
H.E. 11	Clothing Planning and Construction A	3	3	3	None
H.E. 13	Clothing Planning and Construction B	3	3	3	H.E. 3, 11, 50, home practice in garment making
H.E. 16	Remodeling Garments, Children's Clothing	3	..	3	H.E. 13, 53
or					
H.E. 17	Advanced Clothing	..	3	3	H.E. 13, 53
H.E. 102	Advanced Textiles	3	..	3	Ag.Econ. 3 or parallel; Ag.Biochem. 3-4, H.E. 3
H.E. 115	Clothing Economics	2	2	..	H.E. 13, Ag.Econ. 3
H.E. 150	Art History and Appreciation	3	3	3	H.E. 51
H.E.Ed. 142a	Educational Measurement in Home Economics	2	2	..	H.E.Ed. 42

b. *Elective courses.*—Nine additional credits must be added from the following courses:

Agr. Biochem. 2; Bot. 1; H.E. 16 or 17, 55, 57, 107, 154, 195.

5. Teachers' Curriculum in Related Art

To those courses listed under *Requirements of Teachers' Curricula in Home Economics* and *General Requirements* add the following:

a. *Required courses.*

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
H.E.Ed. 147[1]	Organization and Methods for Related Art Teaching	..	3	..	H.E.Ed. 42 or parallel, H.E. 53, 131 or parallel
ArtEd. 4-5-6	Still Life	3 cr. all			None
ArtEd. 7,8,9	Sketch	3 cr. all			None
ArtEd. 29-30-31	Sketch, Course II	3 cr. all			ArtEd. 7, 8, 9
H.E. 11	Clothing Planning and Construction A	3	3	3	None
H.E. 13	Clothing Planning and Construction B	3	3	3	H.E. 3, 11, 50, home practice in garment making
H.E. 55	Decorative Needlework	3	..	..	H.E. 53 or parallel
H.E. 57	Batik and Other Crafts	..	..	3	H.E. 3, 53 or parallel
H.E. 150	Art History and Appreciation	3	3	3	H.E. 51
H.E. 152	Advanced Interior Design	..	3	..	H.E. 53, 131, 150
H.E. 154	Advanced Costume Design	..	..	3	H.E. 13, 53, 55 recommended

b. *Elective courses.*—Electives should be chosen following consultation with adviser.

INDUSTRIAL EDUCATION

Major Adviser: Homer J. Smith

The following curriculum has been designed for young men who desire to prepare for teaching and administrative positions in the fields of the industrial arts and trade education. The satisfactory completion of the four years of work here specified entitles a student to the bachelor of science degree and provides the training necessary for the Minnesota "high school standard special" certificate.

Minnesota Standards for Graded Elementary and High Schools, p. 35 contains the following provision:

> From and after July 1, 1929, a certificate to teach general industrial education may be issued only upon a Bachelor's degree in industrial education from an institution accredited for the training of teachers of industrial arts, but the status of industrial teachers holding certificates prior to that date shall not be affected.

Certain courses of the curriculum are acceptable for Smith-Hughes certification, for service in trade schools and classes—day, evening, and

[1] Students taking this may omit H.E.Ed. 143 as listed under Requirements of Teachers' Curricula.

part-time. These should be enrolled for only upon recommendation of the departmental adviser or the state supervisor of trade and industrial education.

A bulletin descriptive of the plan and work of this special department will be furnished upon request. Those interested in credit transfer, graduate work, etc., should confer with the major adviser. A degree candidate is privileged to complete his work under the curriculum form which was current when he entered.

FOUR-YEAR CURRICULUM IN INDUSTRIAL EDUCATION[1]

Freshman Year[2]

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Comp. 4-5-6	Freshman Composition[3]	3	3	3	None
Ind. 1-2	General Shopwork	2	2	..	None
Ind. 5	Wood Finishing	..	..	2	None
Ind. 20	Industrial History	..	2	..	None
Ind. 25	Literature of Industrial Education	..	..	2	None
	Mathematics *or* Natural Science	5	5	5	
	Drawing	2	..	..	None
	Electives	3	3	3	
		15	15	15	

Sophomore Year[2]

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Econ. 6-7	Principles of Economics	5	5	..	None
Soc. 1	Introduction to Sociology	..	..	5	None
Psy. 1-2	General Psychology	3	3	..	None
Ind. 60	Philosophy of Vocational Education	2	..	..	None
Ind. 61	Practices in Vocational Education	..	2	..	Ind. 60
Ind. 40	Analysis	..	..	2	None
	Shopwork	3	3	3	
	Drawing	..	2	2	
	Electives	2	..	3	
		15	15	15	

[1] Part II of the College of Education bulletin lists some courses of this department which are not a part of this curriculum. Examples, Ind. 11, Ind. 65, Ind. 105, and Ind. 150-151-152. These are described in pages that follow.

[2] During the freshman and sophomore years students must secure the required credits in physical education. Men must also register for military science.

[3] Or Eng. A-B-C or xemption from the requirement.

Junior Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Ed. 51-52-53	Introduction to Secondary School Teaching	3	3	3	Psy. 1-2
H.Ed. 3	Educational Sociology	..	3	..	Psy. 1-2
Ed.Psy. 134	Mental Tests	2	..	..	Ed. 51
Ind. 70	Methods in Shop Subjects	2	..	..	Ind. 40-42
Ind. 44	Equipment and Management	..	2	..	Ind. 40-42
Ind. 101	Tests in Industrial Subjects	..	2	..	Ed. 51
Ind. 30	Graphic Presentation	..	..	2	None
Ind. 42	Course Organization	..	..	2	Ind. 40
Ind. 66	Methods in Related Subjects	..	..	2	Ind. 40-42
Ind. 14	Methods in Drawing	..	..	2	10 cr. in drawing
	Mathematics *or* Physical Science	..	..	5	
	Shopwork	3	2	..	
	Drawing	2	2	..	
	Electives	3	1	..	
		15	15	16	

Senior Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Ind. 50-51-52	Practice Teaching	2	2	2	Ind. 80; either Ind. 14, 66 or 70 and consent of inst.
Ed.Ad. 124	Public School Administration	3	..	..	10 hrs. in ed.
Ind. 80	General Industrial Training	2	..	..	None
Ind. 170-171-172	Administration of Industrial Education (Day, Evening, Part-time)	2	2	2	
Ind. 110	Guidance in the Schools	..	2	..	Ed. Psy. 55
Psy. 130	Vocational Psychology	..	..	2	10 hrs. in psy. and educ.
	Electives	6	9	8	
		15	15	14	

Requirements above are classified as follows: 52 academic, 17 education, 40 industrial education, 30 shopwork and drawing, 41 elective. Total 180 quarter credits required for the bachelor of science degree, exclusive of physical education.

The 20 credits in shopwork and 10 credits in drawing (30 total) may be increased by election to a maximum of 45 credits. Such additional courses should be elected under advice and may be either extensive or intensive in resultant preparation for teaching.

The 20 credits in mathematics and physical science may be earned in any selected courses within these two fields and in any ratio. Students are hereby presented opportunity to attain certification in an academic subject in addition to the major field, at the same time pursuing subject-matter extremely useful in the major.

Art, physical education, and athletic coaching are appropriate elective fields.

Several of the required courses and numerous others acceptable as electives may be carried in extension or by correspondence. All courses are brought into the summer quarters by rotation.

See College of Education bulletin, Part II, for days, hours, rooms, lectures, prerequisites, etc.

LATIN

Major Adviser: J. B. Pike

Latin as a major subject:

Course No.	Title	Credits
Latin 73	Advanced Grammar and Composition	3
Any two of the following:		
Latin 51	Pliny's *Letters*[1]	3
Latin 52	Horace's *Satires* and *Epistles*	3
Latin 53	Suetonius, *Selected Lives*	3
Latin 62	Horace's *Odes* and *Epodes*	3
Latin 63	Apuleius	3
Latin 71	Cicero's *De Amicitia* and *De Senectute*	3
Three courses in the hundred sequence		9
	Total credits (Upper Division courses)	18

Latin as a minor subject:

Course No.	Title	Credits
Latin 73	Advanced Grammar and Composition	3
Any two of the following:		
Latin 51, 52, 53, 62, 63, 71 (see above)		6
	Total credits (Upper Division courses)	9

Students entering the University with one year of Latin will take 3, or 2 and 3. Students entering with two years of Latin will take 11 and 12 in their first year and any two of 21, 22, 23 in their second year. Students entering with three years of Latin will take any two of 21, 22, 23. Students entering with no Latin will take 1-2 and 3 in their first year; 11 and 12 in their second year; and any two of 21, 22, and 23 in their third year.

LIBRARY METHODS

Major Adviser: F. K. Walter

The following curriculum has been arranged in co-operation with the Division of Library Instruction. It is designed to offer professional library training to prospective teachers who desire such work.

The successful completion of this four-year curriculum will entitle the student to the degree of bachelor of science. Students will also qualify for the Minnesota high school general certificate for teaching academic subjects in junior and senior high schools by completing requirements for a teaching major or for two teaching minors in subjects commonly taught in Minnesota high schools. It will usually be wisest to choose majors and minors in the fields of English and history.

Minor.—Students who complete 18 credits connected with Courses 102, 104, 107, 108, 112, 114, and 122 will satisfy the requirements for a minor in library training.

[1] Prerequisite any two of courses 21, 22, 23 or equivalent.

FOUR-YEAR CURRICULUM FOR SCHOOL LIBRARIAN[1]

LOWER DIVISION, COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman Year[2]

Course No.	Title	Credits
Eng. A-B-C	Freshman English	15
or		
Comp. 4-5-6	Freshman Composition or exemption from the requirement	9
Hist. 1-2	Modern World	10
	History	5
	Language	15
	Total	45

Sophomore Year[2]

Course No.	Title	Credits
Psy. 1-2	General Psychology	6
	Natural Science	10
	Language	5
	Electives[3]	24
	Total	45

COLLEGE OF EDUCATION

Junior Year

Course No.	Title	Credits
Lib.Meth. 102	Cataloging	3
Lib.Meth. 104	Classification	3
Lib.Meth. 112	Reference	3
Lib.Meth. 107	School Library Administration } Any two	6
Lib.Meth. 108	Public Library Administration } Any two	6
Lib.Meth. 114	Selection of Books for Adolescents } Any two	6
Lib.Meth. 121	Library Work with Children	3
Ed.51-52-53	Introduction to Secondary School Teaching	9
	Continuation of required academic courses[4]	13
	Total	45

Senior Year

Title	Credits
Special Methods and Practice Teaching	9
Library Methods	27
Electives[4]	9

[1] Prospective students who are interested in the curriculum should obtain the special bulletin issued by the Division of Library Instruction.

The tuition fees for full time students who are enrolled in this specialized curriculum are $40 per quarter for residents of Minnesota and $45 per quarter for non-residents. Unclassed students, auditors, and others carrying less than full work in library instruction (15 credits per quarter) pay a tuition fee of $3 per credit hour for all courses under the supervision of the Division of Library Instruction, irrespective of their registration in courses in other subjects.

[2] During the freshman and sophomore years students must secure the required credits in physical education. Men must also register for military science.

[3] Electives should be selected to meet the requirements of one teaching major or two teaching minors.

[4] Electives should be selected to meet tthe requirement of one teaching major or two teaching minors. Electives should also include two credits selected from the list of professional courses on p. 18.

MATHEMATICS

Major Adviser: A. L. Underhill

Mathematics as a major subject:

Prerequisite courses: Solid Geometry (entrance credit or its equivalent);[1] Higher Algebra taken either in high school or college; Trigonometry; College Algebra; Analytic Geometry.

Upper Division courses:

Course No.	Title	Credits
Math. 50	Calculus I	5
Math. 51	Calculus II	5
Additional credits in courses numbered above 49		8
Total credits, Upper Division courses		18

A comprehensive examination is also required at the completion of Calculus I. See departmental statement in Part II of this bulletin.

Mathematics as a minor subject:

Prerequisite courses: Solid Geometry (entrance credit or its equivalent);[1] Higher Algebra taken either in high school or college.

Course No.	Title	Credits
Math. 6	Trigonometry	5
Math. 7	College Algebra	5
Math. 30	Analytic Geometry	6
Math. 50	Calculus I	5
Additional credits in courses numbered above 49		3
Total credits		24

A comprehensive examination is also required at the completion of Calculus I. See departmental statement in Part II of this bulletin.

NATURAL SCIENCE

Advisers: H. A. Erikson, Palmer O. Johnson, S. E. T. Lund

Students preparing to teach science in Minnesota high schools should qualify to give instruction in two or more sciences, since almost all positions open to graduates require teaching in at least two fields. As a matter of fact most Minnesota schools now require instruction in general science for which the teacher should be trained in both biological and physical sciences. While it is possible to meet the major or minor sequences in one or more of the sciences as in other academic subjects, the following special curriculum in natural science is recommended for those persons desiring to secure the best preparation for the teaching of high school science. It requires:

1. Completion of 30 hours of work in one of the four natural sciences: chemistry, botany, zoology, physics. (On account of mathematics re-

[1] Those who did not present solid geometry for entrance may meet this requirement in one of the following ways: (1) By taking the subject in the summer school or in the General Extension Division by correspondence; (2) By passing a college entrance examination or a special examination given by the Department of Mathematics.

quirements, students majoring in physics may satisfy the requirement by offering but 25 hours.) In the statement below the word *major* means any one of these four subjects.

2. Completion of 15 hours in one of the five natural sciences: chemistry, physics, botany, geology, zoology. This subject is designated a *minor*.
3. Completion of introductory courses in two of three of the subjects named under (2) not major or minor.
4. Completion of ten hours in chemistry.

The above curriculum should be elected at the beginning of the freshman year. In general it permits a student to meet the requirements for admission to the College of Education except in the case of students majoring in physics. Such students should take Mathematics 6, 7, and 30 during the first four quarters of their course, 10 hours of natural science (instead of 15), begin foreign language during the third quarter, and postpone work in social science until after entering the College of Education at the beginning of the junior year. Students are advised to continue work in their major science through the senior year. Students finding it necessary to modify their programs to meet this schedule will be relieved from meeting other admission requirements of the College of Education by the beginning of the junior year. The following sample curricula are offered to show the distribution of courses:

FOUR-YEAR CURRICULUM FOR THOSE MAJORING IN NATURAL SCIENCE ASIDE FROM PHYSICS

Lower Division, College of Science, Literature, and the Arts

Freshman Year

Title	Credits
Freshman English or Composition	15 or 9
Foreign Language[1]	15
Natural Science	15
Physical Education[2]	

Sophomore Year

Title	Credits
Foreign Language[1]	5
Social Science	10
Psychology	6
Major	15
Natural Science	5
Physical Education[2]	

College of Education

Junior Year

	Title	Credits
	Major	10
	Natural Science	10
Ed. 51-52-53	Introduction to Secondary School Teaching	9
	Electives[3]	16

[1] See foreign language requirements, p. 8.

[2] In addition men must register for the required military science.

[3] Electives should include the 8 credits of required education electives as listed on p. 18.

Senior Year

Course No.	Title	Credits
	Natural Science	10
Ed.T. 62-63-64	Special Methods and Practice Teaching	9
	Electives[1]	26

NATURAL SCIENCE WITH A MAJOR IN PHYSICS

LOWER DIVISION, COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman Year

Course No.	Title	Credits
Eng. A-B-C	Freshman English	15
or		
Comp. 4-5-6	Freshman Composition (or exemption)	9
Math. 6	Trigonometry	5
Math. 7	College Algebra	5
Math. 30	Analytic Geometry	6
	Natural Science	10
	Foreign Language[3]	5
	Physical Education[2]	

Sophomore Year

Course No.	Title	Credits
Phys. 3,4	Elements of Mechanics	4
Phys. 23,24	Heat	4
Phys. 43,44	Electricity	4
Math. 50-51-52	Calculus	15
Psy. 1-2	General Psychology	6
	Foreign Language[3]	15
	Electives	
	Physical Education[2]	

COLLEGE OF EDUCATION

Junior Year

Course No.	Title	Credits
Phys. 33,34	Optics	4
Phys. 124	Pyrometry and Heat	3
Phys. 134	Experimental Optics	3
Ed. 51-52-53	Introduction to Secondary School Teaching	9
	Natural Science	15
	Electives[1]	

Senior Year

Course No.	Title	Credits
Phys. 144	Electricity Measurements	3
Ed.T. 62-63-64	Special Methods and Practice Teaching	9
	Natural Science	10
	Electives[1]	

[1] Electives should include the 8 credits of required education electives as listed on p. 18.

[2] In addition men must register for the required military science.

[3] See foreign language requirements, p. 8.

FIVE-YEAR COURSES LEADING TO THE DEGREE OF MASTER OF ARTS

Graduate School

Many students will find it difficult to secure all of the training they desire within the limits of a four-year period. For those who find it possible to continue their training for an additional year, it is recommended that they pursue work in either of two majors—(1) they may continue their natural science major in the Graduate School and minor in education or (2) they may major in education and carry natural science as a minor. Programs should be made out in consultation with a major adviser.

NURSERY SCHOOL AND KINDERGARTEN EDUCATION

Major Advisers: J. E. Anderson, Josephine C. Foster

The following curriculum is arranged for persons who are preparing to teach or direct nursery schools and for persons who wish to enter the field of kindergarten teaching. Followed by a year of graduate work, it also offers excellent basic preparation for those wishing to enter the field of parental education. Students taking this curriculum should be able to play simple piano music.

This curriculum is offered in co-operation with the Institute of Child Welfare, an organization established in the University for the scientific study of the development of the child. Co-operating with the institute are a number of university departments: Anatomy, Education, Home Economics, Nervous and Mental Diseases, Pediatrics, Psychology, Public Health, and Sociology.

The institute maintains a nursery school and an experimental kindergarten for the observation and study of young children which will, in conjunction with the public schools, be used for observation and practice for students undertaking this curriculum.

FOUR-YEAR NURSERY SCHOOL AND KINDERGARTEN CURRICULUM

Freshman Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Zool. 1-2-3	General Zoology	3	3	3	None
Comp. 4-5-6	Freshman Composition	3	3	3	None
Hist. 1-2	Modern World	5	5	..	None
Pol. Sci. 1-2	American Government	..	5	5	None
or					
Geog. 11	Introduc. to Human Geography	..	..	5	None
Phys.Ed. 1-2-3	Elem. Phys. Training	1	1	1	None
	Electives	4	(4)	4	
		16	16-17	16	

Sophomore Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Psy. 1-2	General Psychology	3	3	..	None
Psy. 4-5	Introductory Lab. Psy.	..	..	4	Psy. 1-2
Soc. 1	Introduction to Sociology	5	..	..	None
Soc. 49	Occurrence of the Socially Inadequate	..	..	3	Soc. 1
ArtEd. 1-2-3[1]	Fundamental Principles of Design	3	3	3	None
ArtEd. 7-8-9[2]	Sketch	1	1	1	None
Ind.Ed. 11	Special Class Woodwork	..	2	..	None
Speech 41-42	Fundamentals of Speech	3	3	..	Comp. 4-5-6
Phys. Ed. 43	Elementary Games and Folk Dancing	..	½	..	None
Phys.Ed.	Three Quarters in Physical Education	⅔	⅔	⅔	
	Electives	0	2	4	
		15⅔	15⅙	15⅔	

Junior Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Ed. 61-62-63	Introduction to Elementary School Teaching	3	3	3	Psy. 1-2
Phys.Ed. 80	Principles of Play	3	..	..	Phys.Ed. 43, Pys. 1-2
P.M.&P.H. 50	Public and Personal Health	3	..	..	Zool. 1-2-3, Psy. 1-2
Soc. 52	Elementary Case Work	..	3	..	Soc. 49
Soc. 90	Elementary Field Training in Case Work	..	3	..	Soc. 49 and 52
Ed.T. 30	Principles of Kindergarten and Nursery School Education	3	..	..	6 cred. psy.
Ed.T. 31	Permanent Play Materials	..	2	..	6 cred. psy.
Ed.T. 32	Plastic Materials	..	..	3	with Ed.T. 30
Ed.T. 33	Rhythms, Games, and Music for the Young Child	..	..	2	Ed.T. 30
Ed.T. 34	Story Telling for Young Children	..	2	..	Ed.T. 30
Ed.T. 85-86-87	Methods and Observation	1	1	1	6 cred. in psy.
C.W. 80	Child Psychology	3	..	..	6 cred. in psy.
Ed.Psy. 60	Introduction to Statistical Methods	..	..	2	6 cred. in psy.
	Electives	..	..	4	
		16	14	15	

[1] For ArtEd. 1-2-3, H.E. 50-51 may be substituted.

[2] For ArtEd. 7-8-9, 3 hours selected from Courses 4-5-6, 32, 35, 37, 38, or 41 may be substituted.

Senior Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Ed.Ad. 119	Elementary School Curriculum..	3	..	..	Ed.Psy. 55 or equiv.
Ed.Psy. 134	Mental Tests	2	..	..	Ed.Psy. 55 or equiv.
Ed.Psy. 146-147	Child Guidance	..	2	2	15 cred. psy. and ed.
C.W. 90	Physical Development of the Child	..	2	..	Zool. 1-2-3, Psy. 1-2
C.W. 120	Health Care of Young Child...	..	..	2	C.W. 90
H.E. 70	Nutrition Survey	3	..	..	10 cred. lab. science
Ed.T. 88-89-90	Practice Teaching in Kindergarten or Nursery School.....	3	3	3	Ed.T. 30-34, 85-87
Ed.T. 143-144	The Teaching of Reading.....	2	2	..	9 cred. ed.
	Electives	2	6	8	
		15	15	15	

NURSING EDUCATION AND PUBLIC HEALTH NURSING

Major Adviser, Nursing Education: Katharine J. Densford

Major Adviser, Public Health Nursing: Eula B. Butzerin

The following courses are arranged so as to indicate the minimum requirements for students wishing to secure a bachelor of science degree with a major in nursing, earning at the same time certain other certificates. They are planned to prepare the student for such public health nursing positions as visiting nursing, school nursing, health teaching, infant welfare, rural and industrial nursing; for administrative, supervising, and teaching positions in schools of nursing and hospitals; and for combined positions in secondary schools involving both nursing and teaching. In the case of those who choose proper subjects in the College of Education it entitles the graduates to receive a high school teacher's certificate. In the case of those electing public health nursing, it also leads to a certificate of public health nursing.

FIVE-YEAR COURSE LEADING TO THE DEGREE OF BACHELOR OF SCIENCE AND GRADUATE IN NURSING

I. Open to high school graduates who meet the entrance requirements of the College of Science, Literature, and the Arts.

Part A. During the first five quarters of the course the student is registered in the College of Science, Literature, and the Arts, during which time she must complete required subjects.

Course	Credits
English A-B-C or 4-5-6 or exemption from requirement....	9-15
Zoology 1-2-3	10
History	10
Physiology 1 and 2[1].....	8
Psychology 1-2	6
Education 51[2]	3
Home Economics 40.....	2
Sociology 1	5
Botany	10
Physical Education	5
Electives	15-9

[1] If 10 credits chemistry is offered as elective, Physiology 1 should be omitted and Physiology 4 may be substituted for Physiology 2 if desired.

[2] For public health nursing.

Part B. During the next ten quarters the student is registered in the School of Nursing, taking required subjects and nursing practice as listed in the School of Nursing bulletin, including Educational Psychology, Ed. 51, 3 credits. Sixty credits are granted for the work taken in the University of Minnesota School of Nursing.

Part C. During the last three quarters, the student is registered in the College of Education, majoring either in nursing education or in public health nursing.

1. The Public Health Nursing curriculum is as follows:

Course No.	Title	Credits
P.M.&P.H. 53	Elements of Preventive Medicine	3
P.M.&P.H. 58	Maternal and Child Hygiene	2
P.M.&P.H. 60	Tuberculosis and Its Control	2
P.M.&P.H. 61	Mental Hygiene	3
P.M.&P.H. 62	Principles of Public Health Nursing	3
P.M.&P.H. 63	Special Fields in Public Health Nursing	3
P.M.&P.H. 64	Field Practice, Infant Welfare	
P.M.&P.H. 65	Field Practice, School Nursing	
P.M.&P.H. 66	Field Practice, County Nursing } Minimum	13
P.M.&P.H. 68	Field Practice, Visiting Nursing	
Soc. 49	The Socially Inadequate	3
Soc. 52	Elementary Case Work	3
Soc. 91[1]	Elementary Field Training in Case Work	4
Soc. 60	Social Protection of the Child	
or		3
H.E. 40	Child Training	
Ed. 53	Technique of High School Instruction	3
		45

2. The Nursing Education curriculum for the last three quarters is as follows:

Course No.	Title	Credits
Ed. 52-53	Introduction to Secondary School Teaching	6
Ed.T.[2]	Special Methods and Practice Teaching	12
Nurs. 60	Ward Administration	2
Nurs. 61	A Survey of Hospital Organization	2
	Electives[3]	23
		45

II. Curriculum for graduate nurses wishing to earn the bachelor of science degree. Open to those who meet the entrance requirements for specialized curricula of the College of Education. (See general information bulletin.)

In the case of graduate nurses from accredited nursing schools whose

[1] In cases where indicated because of lack of experience, students may be advised to take Soc. 90 as prerequisite in addition to above.

[2] Students desiring the teacher's certificate carry practice teaching in secondary school science, Ed.T. 62-63-64. Students wishing practice teaching in nursing subjects carry Ed.T. 12-13.

[3] Electives must be chosen so as to complete the professional requirement of 26 quarter credits for the teacher's certificate.

records are such as to warrant special consideration, the following arrangements can be made for earning the B.S. degree. Candidates must have their nursing school credits evaluated by the nursing committee, and must complete any necessary additional hospital services required in accordance with the decision of the committee before credit is granted. Forty-five credits represent approximately the average advanced standing given for a satisfactory three-year nursing school education.

For additional studies for the bachelor of science degree candidates pursuing this curriculum will register in the College of Education.

The amount and type of college work to be required of each candidate is to be decided by her major adviser after consideration of candidate's general education and experience. Any Lower Division courses specified as essential for a particular student may be taken either previous to, or combined with, the work in nursing education or public health nursing.

The Upper Division courses of these students will correspond in general with Part C—1 for those specializing in health nursing, or Part C—2 for those desiring nursing education, with such additional requirements or electives in either case as may be needed to fulfill the total credit and honor point requirement.

III. Curriculum for graduate nurses wishing to take the public health nursing course leading to the certificate in public health nursing. Open to those who meet the entrance requirements for specialized curricula of the College of Education. (See general information bulletin.)

Such students will complete the 45 credits outlined in Part C—1. Beginning with the fall quarter, 1932, all applicants for this course must complete in addition the following subjects, either before or while registered in the course:

Course	Credits
Psychology 1 and 2	6
Sociology 1	5
Ed. 51, Educational Psychology	3

Also all applicants for the certificate who have not had adequate experience in tuberculosis nursing during their nursing course must take P.M.&P.H. 67, Field Practice in Tuberculosis Sanatorium (2 cred.) in addition to the regular field work.

Students must maintain a C[1] average in both theory and field work.

General Regulations

Electives in the Nursing Education sequence and those in the Public Health sequence whether of regular or irregular students are to be chosen with the approval of the respective advisers in these courses. All programs must also be approved by the Students' Work Committee and dean of the College of Education.

[1] Students wishing to apply these credits toward a bachelor of science degree must conform to the general requirements of the College of Education in regard to honor points (see page 14).

Candidates for the B.S. degree in the curriculum for either regular or irregular students must conform to the College of Education regulation relative to total credits and honor points and are entitled to the privileges of the quality credit rule. Candidates must also meet the physical education requirement.

The lists of studies here printed have been selected as suitable for a majority of the students working in the fields of nursing education and public health nursing, respectively. Advisers may deviate from these recommendations when the objective of particular students would be favored by substituting other courses. Such substitutions are to be made on petition, duplicate copies of which shall be filed with the registrar.

Required and Recommended Subjects

a. Students in either group wishing to secure the high school teacher's certificate for secondary schools must complete the following, and 10 credits in botany or accepted sciences in addition to the special requirements of their respective groups.

Course No.	Title	Credits
Ed. 51-52-53	Introduction to Secondary School Teaching	9
	Special Methods and Practice Teaching Course in Major Field	9
	Education electives[1]	

b. Students preparing for general community health work must complete the following or accepted substitutes or exemptions.

Course No.	Title	Credits
P.M.&P.H. 70	Methods and Materials in Teaching Home Nursing and Child Care	3
P.M.&P.H. 71	Supervision of Public Health Nursing	3
P.M.&P.H. 107	Sanitary Surveys	2

and select 9 credits from the following group:

Soc. 119	The Family	3
Soc. 123	Methods of Social Investigation	3
Bot. 101	Elementary Biometry	3
Psy. 130	Vocational Psychology	2
C.W. 80	Child Psychology	3
C.W. 130	Development of Young Child	3
C.W. 170	Parental Education	3
H.E. 33	Home Management Problems for Social Workers	3
H.E. 171	Child Nutrition	3

c. Further suggested public health electives:

Course No.	Title	Credits
P.M.&P.H. 59	Social Hygiene	1
P.M.&P.H. 69	School Nursing Procedures	3
P.M.&P.H. 73	Occupational Hygiene and Disease	2
P.M.&P.H. 74	Health Instruction Methods and Materials	3
P.M.&P.H. 75	Practice Teaching in Health Subjects	Ar
P.M.&P.H. 80	Health Supervision of the School Child	3

[1] Electives must be chosen so as to complete the professional requirement of 26 quarter credits for the teacher's certificate. See p. 18.

GRADUATE WORK LEADING TO THE DEGREE OF MASTER OF ARTS

Graduate work may be carried and a Master's degree earned by students who meet the requirements of the Graduate School. Programs should be made out in consultation with a major adviser in the department.

PHYSICAL EDUCATION FOR MEN

A physical examination is required of all new matriculants, and of all others using the department privileges, at the beginning of the year, and as often during their college course as their physical condition may indicate. Students taking the required work in physical education are examined at the close of the year.

Courses 1-2-3 and 4 are prescribed for all freshmen and must be taken in the first year of residence. Those students, taking the required course in physical education, who cannot swim must make a reasonable effort, as determined by the department to pass the swimming and life-saving requirements and will be assigned special hours for instruction.

The following curriculum has been outlined for a special four-year professional course in physical education and athletic coaching. Satisfactory completion of this curriculum entitles the graduate to the bachelor of science degree and provides the training necessary for the Minnesota "high school standard special" certificate for teaching physical education in elementary and high schools.

CURRICULUM FOR MEN MAJORING IN PHYSICAL EDUCATION

Major Adviser: L. F. Keller

Freshman Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Comp. A-B-C	Freshman English	5	5	5	None
or					
Comp. 4-5-6	Freshman Composition or exemption from requirement.....	3	3	3	
Chem. 14, 15	General Inorganic Chemistry ..	5	5	..	None
Soc. 1	Introduction to Sociology	..	..	5	None
P.M.&P.H. 3	Personal Hygiene and Elementary Sanitation	..	..	2	
Mil.Sci. 1,2,3	First Year Basic Course	..	..	..	None
Phys.Ed.A,B,C	Elementary Physical Education	1	1	1	None
	Approved electives	5	5	3	
		16	16	16	

Sophomore Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Zool. 1-2-3	General Zoology	3	3	3	None
Psy. 1-2	General Psychology	3	3	..	None
Anat. 5	Human Anatomy	..	..	4	Zool. 1-2-3
Phys.Ed. 10-11-12	Minor Sports	2	2	2	Phys.Ed. 1,2,3 or A,B,C
Phys.Ed. 7-8-9	Advanced Leaders	1	1	1	Phys.Ed. 1,2,3 or A,B,C
Mil.Sci. 4-5-6	Second Year Basic Course	..	..	..	Mil.Sci. 1,2,3
	General electives	6	6	5	
		15	15	15	

Junior Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Physiol. 57,4,60	Human Physiology	4	4	4	Zool. 1 qtr., chem. 1 qtr.
Phys.Ed. 19-20-21	Gymnastics	1	1	1	Phys.Ed. A,B,C
Phys.Ed. 22-23	Kinesiology	2	2	..	Anat. 5
Phys.Ed. 24-25	Methods in Physical Education	..	2	2	Phys.Ed. 22-23, A,B,C
Phys.Ed. 30	Athletic Training and First Aid	..	..	2	None
P.M.&P.H. 53	Elements of Preventive Medicine	3	..	..	Psy. 1-2, Bact. 51
or					
P.M.&P.H. 50	Public and Personal Health	3	..	..	Zool. 1-2 3, Psy. 1-2
Ed. 51-52-53	Introduction to Secondary School Teaching	3	3	3	Psy. 1-2
	General electives[1]	..	3	3	
		16	15	15	

Senior Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
P.M.&P.H. 80	Health Supervision of the School Child	..	3	..	Prev. Med. 50 or 52 or 53
Phys.Ed. 28	Physical Examination and Normal Diagnosis	2	..	..	Physiol. 57,4,60
Phys.Ed. 29	Adaptation of Activities in Orthopedic Procedures	..	2	..	Phys. Ed. 22-23-24-25
Phys.Ed. 31	History of Physical Education	2	..	..	
Phys.Ed. 32	Principles of Physical Education	..	3	..	Phys.Ed. 10-11-12, 23-24-25
Phys.Ed. 33	Organization and Administration of Physical Education	..	..	3	Phys.Ed. 32
Phys.Ed. 37	Football Coaching	..	..	3	None
Phys.Ed. 38	Basket-Ball	..	2	..	None
Phys.Ed. 39	Track Athletics	..	..	2	None
Phys.Ed. 42	Baseball	2	..	..	None
Phys.Ed. 43-44-45	Practice Teaching	2	2	2	Phys.Ed. 19,20.21, 24, 25, Ed. 51-52
	General electives[1]	7	3	5	
		15	15	15	

[1] At least 8 credits of elective work in the junior and senior years must be selected from the education courses listed on p. 18.

COURSES FOR MEN MINORING IN ATHLETIC COACHING

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Phys.Ed. A,B,C	Elementary Physical Education	1	1	1	
Phys.Ed. 10-11-12	Minor Sports	2	2	2	
Phys.Ed. 19-20-21	Gymnastics	1	1	1	Phys.Ed. A,B,C
Phys.Ed. 24-25	Methods in Physical Education	..	..	2	Phys.Ed. A,B,C
Phys.Ed. 30	Athletic Training	..	..	2	
Phys.Ed. 33	Organization and Administration of Physical Education	..	..	3	
Phys.Ed. 37	Football Coaching	3	..	..	
Phys.Ed. 38	Basket-Ball	..	2	..	
Phys.Ed. 39	Track Athletics	..	..	2	
Phys.Ed. 42	Baseball	..	..	2	

NOTE.—All candidates for teacher's certificate with minor recommendation in athletic coaching must take Physical Education 19, 20, 21, 24, 30, and 33. The balance of nineteen credit hours may be secured from any of the courses listed above.

PHYSICAL EDUCATION FOR WOMEN

This department aims to promote the physical efficiency of the women students. It gives physical examinations and advice to all on entrance, plans systematically to keep in close touch with them during their first two years of residence; conducts yearly consultations with, and examines when necessary, all upper class students; gives courses in hygiene; organizes neuromuscular activity leading toward organic strength, nervous stability, conscious motor control, correct body mechanics, skill in handling the body and in physical recreation, and the development of that valuable social quality known as good sportsmanship; co-operates closely with the Women's Athletic Association in encouraging and organizing athletic sports; holds regular office hours for the purpose of consultation with all students who desire its advice.

Work in this department must be taken for six consecutive quarters in the Lower Division. Every student must complete Courses 1, 2, and 3. All sophomore students are allowed as free a choice as their physical condition permits (see Courses 7 to 31); except that students who cannot swim must register for Course 22-23 during the sophomore year. Physical examinations or consultations are required annually of all students. Additional six credits toward graduation can be gained by taking the following courses: 43, 44, 52-53, 61-62-63; 71-72-73; 80.

REQUIREMENTS FOR TEACHING PHYSICAL EDUCATION

The special four-year professional course described below is designed to prepare graduates for the responsible direction of physical education activities and provides the training necessary for the Minnesota "high school standard special" certificate for teaching physical education in elementary and high schools. Students desiring to enter the course should consult with the head of this department. They should be without organic diseases or serious functional disorder, should have a keen sense of rhythm, and should possess qualities of personality which will win the co-operation

of others. They should have a voice adapted to speaking in public. They should have training in the sciences and should have had a unit of physics in high school. Students are required to provide themselves with suits and other equipment in accordance with uniform standards of the department.

FOUR-YEAR CURRICULUM IN THE COLLEGE OF EDUCATION FOR WOMEN STUDENTS MAJORING IN PHYSICAL EDUCATION

Major Adviser: J. Anna Norris

Freshman Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Eng. A-B-C	Freshman English[1]	5	5	5	None
or					
Comp. 4-5-6 (or exemption)	Freshman English[1]	3	3	3	None
P.M.&P.H. 3	Personal Hygiene and Elementary Sanitation[1]	..	..	2	None
Soc. 1	Introduction to Sociology[1]	..	..	5	None
	Social Science[1,2]	5	5	..	None
Zool. 1-2-3	General Zoology[1]	3	3	3	None
Phys.Ed. 36,37,38	Freshman Team Sports	½	½	½	None
Phys.Ed. 39	First Aid	..	..	1	Zool. 1-2-3
Phys.Ed. 40,41,42	Individual Sports and Fundamentals of Movement	1	1	1	None
	Electives	4	4	..	
		16½	16½	15½	

Students should be able to pass the swimming test by the end of the freshman year.

Students who do not present a unit of physics at entrance must complete this requirement before being permitted to register for Kinesiology, Phys.Ed. 66.

Sophomore Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Chem. 14-15	General Inorganic Chemistry[3]	5	5	..	None
Psy. 1-2	General Psychology[1]	3	3	..	None
Ed. 51	Educational Psychology	..	..	3	Psy. 1-2
Speech 41-42	Fundamentals of Speech[1]	3	3	..	Eng. A-B-C or Comp. 4-5-6
Phys.Ed. 43,44	Elementary Games and Folk Dancing	..	½	½	None
Phys.Ed. 46,47,48	Sophomore Team Sports	½	½	½	Phys.Ed. 36,37,38
Phys.Ed. 49	Human Anatomy	..	..	6	Zool. 1-2-3
Phys.Ed. 50-51	Sophomore Individual Sports	½	..	½	Phys.Ed. 40,41,42
Phys.Ed. 54-55	Danish Gymnastics	½	½	..	None
Phys.Ed. 59-60	Swimming for Majors	½	½	..	Elem. Swim. Test
Phys.Ed. 61-62-63	Elementary Inter. Dancing	½	½	½	None
	Electives	3	2½	3	
		16½	16	14	

[1] For description of course see bulletin of the College of Science, Literature, and the Arts, Part I.

[2] Choice of History 1-2, Orientation 1-2, Geography 1-2.

[3] For description of course see bulletin of School of Chemistry.

Junior Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Ed. 52-53	Introduction to Secondary School Teaching	3	3	..	Ed. 51
H.E. 72	Nutrition[3]	..	3	..	Zool. 1-2-3, Phys.Ed. 49
Physiol. 57	Physiological Chemistry[4]	3	..	..	Zool. 1-2-3; Chem. 14-15
Physiol. 4	Human Physiology	..	4	..	Physiol. 57
Physiol. 60	Physiology of Exercise	..	..	4	Physiol. 4
P.M.&P.H. 53	Elements of Preventive Medicine	..	..	3	Psy. 1-2
C.W. 80 or Ed.Psy. 158	Child or Adolescent Psychology[6]	3	..	..	
Phys.Ed. 56-57-58	Technique of Teaching Sports	1	1	1	Phys.Ed. 46,47,48; 50-51
Phys.Ed. 64-65	Modified Swedish Gymnastics	½	½	..	Phys.Ed. 40,41,42; 54-55
Phys.Ed. 66	Kinesiology	3	..	..	Phys.Ed. 49
Phys.Ed. 67	Physical Examination	..	2	..	Phys.Ed. 49; 66
Phys.Ed. 69-70	Technique of Teaching Swimming	1	1	..	Phys.Ed. 59-60
Phys.Ed. 71-72-73	Intermediate Inter. Dancing	½	½	½	Phys.Ed. 61-62-63
Phys.Ed. 74-75	Technique of Teaching Gymnastics	..	1	3	Phys.Ed. 49; 64-65; 66
PhysEd. 76	Orthopedic and Remedial Gymnastics	..	..	3	Phys.Ed. 67
Phys.Ed. 77	Advanced Folk Dancing	1	..	..	Phys.Ed. 43,44
Phys.Ed. 78	Technique of Teaching Folk Dancing	..	1	..	Phys.Ed. 77
	Electives[5]	..	..	1	
		16	17	15½	

[3] For description of course see bulletin of College of Agriculture, Forestry, and Home Economics.

[4] For description of course see bulletin of Medical School.

[5] Eight credits must be elected from educational subjects listed on page 18 of this bulletin.

[6] Child Psychology: prereq., Psy. 1-2; Adolescent Psychology; prereq., Ed. 51.

Senior Year

Course No.	Title	Credits F.	Credits W.	Credits S.	Prerequisite Courses
Ed.T. 110	Measurement in Secondary Education	..	..	2	Ed. 51
Phys.Ed. 80	Principles of Play	3	..	..	Phys.Ed. 43,44; Psy. 1-2
Phys.Ed. 81	Advanced Interpretive Dancing	½	..	..	Phys.Ed. 71-72-73
Phys.Ed. 82	Technique of Teaching Rhythm	1	..	..	Phys.Ed. 71-72-73
Phys.Ed. 83	Principles of Dancing	2	..	..	Phys.Ed. 71-72-73
Phys.Ed. 84-85	Advanced Fundamentals of Movement	½	½	..	Phys.Ed. 74-75
Phys.Ed. 87	Trends of Physical Education	2	..	..	Phys.Ed.64-65,74-75
Phys.Ed. 88	Principles of Physical Edution	2	..	..	See Phys.Ed. 87
Phys.Ed. 89	Health Education in Elementary and Secondary Schools	3	..	..	P.M.&P.H. 53; H.E. 72; Phys.Ed. 74-75
Phys.Ed. 90	Problems in Physical Education	..	2	..	Phys.Ed. 88
Phys.Ed. 92-93-94	Practice Teaching	2	3	2	Phys.Ed. 56-57-58; 69-70; 74; 82; 83
Phys.Ed. 97	Administration of Physical Education	..	3	..	Phys.Ed. 80; 87; 88
	Electives	..	5	8	
		16	13½	12	

Some electives which are permitted by program hours:

Anthropology, 41 (Introduction)
Art Education, 1 (Appreciation)
Art Education, 37, Basketry
Art Education, 38, Elementary Weaving and Allied Crafts
Astronomy, 11 (Description)
Bacteriology, 41
College of Engineering and Architecture, 18f,w,s, General Woodcrait
Ed. Psy. 157, Psychology of Child Development
English, 55-56 (Shakespeare)
Greek, 42 (Sculpture), 44 (Literature and Life), 45 (Mythology)
Home Economics, 70, Nutrition Survey (Freshman or Sophomore)
Home Economics, 170, Nutrition of the Family
Home Economics, 171, Child Nutrition
Human Anatomy, 135, (Physical Development of Childhood)
Philosophy, 1 (Problems), 2 (Logic), 3 (Ethics)
Political Science, 1-2 (American Government)
Preventive Medicine and Public Health, 59 (Social Hygiene), 61, (Mental Hygiene)
Sociology, 6 (Social Interaction), 14, (Rural Sociology)

REQUIREMENTS FOR WOMEN STUDENTS MINORING IN PHYSICAL EDUCATION

Course No.	Title	Credits	Prerequisite Courses
Phys.Ed. 40-41-42	Individual Sports and Fundamentals of Movement[1]	3	None
Phys.Ed. 37,38	Freshman Major Team Sports	1	Phys.Ed. 40-41-42
Phys.Ed. 22-23	Elementary Swimming	1½	None
Phys.Ed. 43-44	Elementary Games and Folk Dancing	1	Phys.Ed., 6 qtrs.
Phys.Ed. 49	Human Anatomy	6	Zool. 1-2-3
Phys.Ed. 54-55	Danish Gymnastics	1	None
Phys.Ed. 56	Technique of Teaching Sports[2]	1	Phys.Ed. 37-38; 48-49-50
Phys.Ed. 64-65	Modified Swedish Gymnastics	1	Phys.Ed. 48-49; 54-55
Phys.Ed. 66	Kinesiology	3	Phys.Ed. 49
Phys.Ed. 74-75	Technique of Teaching Gymnastics	4	Phys.Ed. 49; 64-65; 66
Phys.Ed. 80	Principles of Play	3	Phys.Ed. 43-44; Psy. 1-2
Phys.Ed. 97	Administration of Physical Education	3	Phys.Ed. 80
P.M.&P.H. 3 or	Personal Hygiene and Elem. Sanitation	2	None
P.M.&P.H. 50	Public and Personal Health	3	Zool. 1-2-3; Psy. 1-2
Physiol. 4 or	Physiology	4	None
Zool. 1-2-3	General Zoology	10	None

PHYSICS

Major Adviser: H. A. Erikson

Physics as a major subject:

Course No.	Title	Credits
Phys. 3,4	Elements of Mechanics	4
Phys. 23,24	Heat	4
Phys. 33,34	Optics	4
Phys. 43,44	Electricity	4
Phys. 9	Acoustics	3
Phys. 52	Laboratory Arts	3

Six credits to be elected from the following:

Phys. 104	Precision Mechanics	3
Phys. 124	Pyrometry and Heat	3
Phys. 134	Experimental Optics	3
Phys. 136	Spectrum Analysis	3
Phys. 144	Electricity Measurements	3
Phys. 148	Radioactivity	3
Phys. 150	Conduction through Gases	3
Phys. 152	X-Rays	3
	Total credits	28

Physics as a minor subject:

Twenty-two credits consisting of the following courses: 3 and 4, 23 and 24, 33 and 34, 43 and 44, 9, 52.

For specialized curriculum in natural science see p. 44.

[1] Phys.Ed. 1f may be substituted for Phys.Ed. 48 if tennis has been taken.

[2] In order to adequately prepare for Phys.Ed. 56, courses in the sophomore year must be selected from Phys.Ed. 9, 16-17, 19, 20, 21, 25, 27, 28.

POLITICAL SCIENCE

Major Adviser: O. P. Field

Political Science as a major subject:

Thirty-six credits including:

Course No.	Title	Credits
Pol.Sci. 1-2	American Government and Politics	10

Additional courses in Political Science to the extent of 26 credits, of which 12 must be in Upper Division courses exclusive of Course 51-52-53.

Political Science as a minor subject:

Eighteen credits including:

Course No.	Title	Credits
Pol.Sci. 1-2	American Government and Politics	10

Additional courses in Political Science to the extent of 8 credits, of which at least 3 credits must be in Upper Division courses, exclusive of Course 51-52-53.

PROFESSIONAL EDUCATION OF TEACHERS

Major Adviser: W. E. Peik

This special curriculum is planned for persons who expect to enter the field of teacher training in elementary education. The demand at the present time comes from normal schools, teachers colleges, and high school or county normal departments for directors, supervisors, and critic teachers. The Master's degree is usually but not always required for normal school and teachers college positions. Rural teaching experience and the Bachelor's degree are required in Minnesota to qualify for positions in high school normal departments.

The curriculum listed below presupposes two years of teachers college or junior college work. The completion of two additional years entitles students to the degree of bachelor of science and to the teacher's certificate in elementary education in Minnesota. The satisfactory completion of a third year in the Graduate School entitles the student to the Master's degree and to a university certificate in teacher training.

Adjustments in the prescribed courses to meet the requirements of state departments or the specific needs of a student may be made with the approval of the major adviser and the faculty.

A. REQUIRED COURSES IN EDUCATION

Course No.	Title	Credits
Ed. 61-62-63	Introduction to Elementary School Teaching	9
Ed.Psy. 60	Introduction to Statistical Methods	2
Ed.Psy. 134	Mental Tests	2
Ed.Ad. 124	Public School Administration	3
Ed.Ad. 119	The Elementary School Curriculum	3
Ed.Ad. 150	Supervision and Improvement of Instruction	2
Ed.Ad. 151	Supervision: Uses of Educational Tests in Improving Instruction	2
Ed.Ad. 156	Practice Supervision (Field Work and Observation)	3
Ed.Ad. 172	Elementary Curriculum and Course of Study Construction	2
Ed.Ad. 185	The Professional Education of Teachers	2

In addition 15 hours to be elected from the courses below

Course No.	Title	Credits
Ed.T. 45	The Teaching of Geography and History in the Elem. School	2
Ed.T. 143-144	The Teaching of Reading	3-4
Ed.T. 148-149	The Teaching of Arithmetic	4
Ed.Ad. 152	Adjustment of Schools to Individual Differences	2
Ed.Ad. 153	The Supervision of English	2
Ed.Ad. 154	The Supervision of Social Studies	2
Ed.Ad. 155	The Supervision of Arithmetic	2
Ed.Ad. 157	Practice in Supervision	3
Ed.Ad. 159	The Supervision of Reading	2
Pub.Sch.Mus.	Courses in Music Education (with approval only)	2-5
ArtEd.	Courses in Art Education (with approval only)	2-5
Phys.Ed.	Courses in Physical Education (with approval only)	2-5
Ed.Psy. 113-114-115	Psychology of Elementary School Subjects	6
Ed.Psy. 157	Psychology of Child Development	3
Ed.Ad. 184	Supervision of Practice Teaching	2
Ed.Ad. 186	Special Problems in Teacher Training	2
	Other courses on approval	
	Total credits in education	45

B. REQUIRED COURSES IN ACADEMIC SUBJECTS

Nine or ten credits in each of four of the following academic fields including English and social studies, or eighteen credits in each of two of the following fields or such others as may be approved:

English, English literature, history, geography, political science, social studies, languages, mathematics	36	
General electives (recommended to be in academic subjects)	9	
Total		45

Total credits required for the teacher's certificate and the bachelor of science degree 90

ADDITIONAL YEAR IN THE GRADUATE SCHOOL

For the work of the fifth year, the candidate for the Master's degree and for the university certificate in teacher training must satisfy the requirements of the Graduate School (see Graduate School bulletin). The language requirement may be waived in all cases where a language is not necessary in the thesis or the special work to be pursued.

PUBLIC SCHOOL MUSIC

Major Advisers: Carlyle Scott, Archie N. Jones

The Public School Music Course is a four-year course leading to the degree of bachelor of science, in which the theoretical, practical, and methods courses in music are combined with the study of English composition, psychology, and such subjects as the College of Education demands as a definite requirement. The object is to provide a well-rounded course for candidates for the bachelor of science degree in public school music.

For graduation, students must earn 185 credits and 185 honor points for women and 186 credits and 186 honor points for men and a C+ average in their major instrument with a C average in the rest of the work. They must earn 24 credits in Practical Music, 18 of which shall be the minimum requirement for their major subject and six of which must be in a second field other than the major. Either the major or minor must be in voice. (Students not majoring in piano shall be required to take one year of Piano A, B, C, 2 credits per quarter, exemption dependent upon entrance examination.)

A teaching minor in one academic secondary school subject is required for graduation of all public school music students. English, history or languages are suggested. For advice concerning minors, see departmental advisers.

Pending the development of a specialized curriculum in instrumental music, elective credits to the extent of 7, may be used.

In addition to the practical and theoretical studies in music this course includes such cultural subjects as English, psychology, and history, and the professional courses which are prescribed by the College of Education. The music studies are distributed between the instrumental and vocal departments so that, on graduation, a student is capable of being an instrumental, vocal, or general supervisor.

Observation and practice teaching are required in the Minneapolis and Saint Paul grade schools, and in the Minneapolis, Saint Paul, and University high schools.

Following are the specific regulations and requirements applying to this course:

For entrance.—All students wishing to register for the course in Public School Music must, upon matriculation, choose a major instrument, and pass an entrance examination in that instrument, before a committee of the faculty of the Music Department. Entrance requirements for a major, according to instruments are:

Piano—Any minor or major scale in octaves, thirds, sixths, or tenths, M.M. quarter notes—108; Bach Invention, or dances from one of the suites; a sonata by Haydn or Mozart; a modern composition of equal difficulty with the sonata.

Voice—Good natural equipment.

Violin—Major and minor scales, arpeggios; the simpler Kreutzer *Etudes;* a sonata by Handel, Haydn, Mozart, or Schubert; a more modern work displaying special technique peculiar to the violin.

Organ—Same as piano.

Students not majoring in piano, will be examined concerning requirements to be met in piano.

Fees.—For statement of special fees see Music and Music Education in Part II of College of Education bulletin.

FOUR-YEAR CURRICULUM IN PUBLIC SCHOOL MUSIC

Freshman Year

Course No.	Title	Credits
Comp. 4-5-6	Freshman Composition	9
Mus. 1-2	Ear Training	4
Mus. 3-4	Harmony	6
Mus.Ed. 1-2-3	Music Orientation	3
	Practical Music	6-12
	Physical Education	3
	Electives	

Sophomore Year

Course No.	Title	Credits
Psy. 1-2	General Psychology	6
Mus.Ed. 4-5-6	Applied Instrumental Technique	6
Mus. 8-9-10	Introduction to Music	6
Mus. 40-41-42 or[1]	Orchestra	3
Mus. 43-44-45	Chorus	3
	History	10
	Practical Music	6-12
	Physical Education	2
	Electives	

Junior Year

Course No.	Title	Credits
Mus.Ed. 50	Elementary Methods	3
Mus.Ed. 51	Comparative Methods	2
Mus.Ed. 52	Technique of Teaching Appreciation	1
Mus.Ed. 53	High School Methods	3
Mus.Ed. 54	Operetta Conducting	3
Mus.Ed. 70[2]	Accompanying and Sight Reading	2
Mus.Ed. 65	Instrumentation	3
Mus. 60	Instrumental Ensemble	2
Mus. 63	Vocal Ensemble	2
Mus. 40-41-42 or	Orchestra	3
Mus. 43-44-45	Chorus	3
Ed. 51-52-53	Introduction to Secondary School Teaching	9
Mus. 59	Technique of Vocal Instruction	2
	Practical Music	6-12
	Electives	

Senior Year

Course No.	Title	Credits
Mus. 76	Form and Analysis	3
Mus.Ed. 57	Orchestra Conducting	3
Mus.Ed. 58	Choral Conducting	2
Mus.Ed. 59	Adv. Conducting	2
Mus.Ed. 55	Survey of Materials (Vocal)	1
Mus.Ed. 56	Survey of Materials (Instrumental)	1
Mus.Ed. 60-61-62	Supervision and Teaching	9
	Special Methods—Academic Minor	4
	Electives	

[1] Three credits in chorus required, plus three credits in chorus or orchestra—the total credits in both not to exceed nine.

[2] Elective.

ROMANCE LANGUAGES

Major Adviser: F. B. Barton

French as a major subject:

Thirty-six credits in courses numbered above 4 including:

Course No.	Title	Credits
French 70-71-72	Survey of French Literature (or 73-74)	9 or 10
	and	
	One other literary course	3 to 9
French 50	French Pronunciation	3
French 53	French Composition	3
and		
French 54-55	French Conversation	4
or		
French 20	Oral and Written French	5
French 63	Advanced French Composition	3
French 103-104-105	French Syntax and Composition	3

French as a minor subject:

Eighteen credits in courses numbered above 4.

SCHOOL HEALTH WORK

Major Advisers: H. S. Diehl, Ruth E. Boynton

This course is designed to prepare students to develop comprehensive health programs in school systems. In the smaller systems such persons may teach health education and allied subjects, such as biology, in high school and supervise the health work in the elementary schools. Since the responsibility of persons in these positions will cover all phases of school health work such as physical inspections, control of contagious diseases, correction of physical defects and the teaching of health and physical education, the aim has been to provide a broad background in the whole field of health education, rather than a high degree of specialization in any one aspect of the problem.

Teachers of experience who are graduates of two-year courses in teachers colleges will be allowed the usual 90 credits toward the completion of the course. Graduates or students in nursing, physical education, home economics, elementary education, and others will be allowed advanced credit, determined in each case by their previous training. The work of all students desiring advanced credit toward the completion of the course will be evaluated and a program of studies worked out for each student on an individual basis.

Provision also is made whereby those who have completed the course and have had experience in the field may pursue a fifth year of graduate work, specializing in some phase of the school health problem such as physical education, school nursing, health instruction, etc.

Students in this course will be selected by the advisory committee on the basis of their ability and qualifications for the work.

Certification for teaching will be made in a minor field such as natural science or physical education.

FOUR-YEAR CURRICULUM IN SCHOOL HEALTH WORK[1]

Freshman-Sophomore Years

Course No.	Title	Credits
Comp. A-B-C or 4-5-6	Freshman English or Composition	15 or 9
Hist. 1-2	Modern World	10
Bot. 1	General Botany	4
Chem. 1,2,3 (or 4-5)	General Inorganic Chemistry	12 or 8
P.M.&P.H. 3	Personal Hygiene and Elementary Sanitation	2
Soc. 1	Introduction to Sociology	5
Psy. 1-2	General Psychology	6
Zool. 1-2-3	General Zoology	6
Anat. 3	Human Anatomy	5
Phys.Ed. 79	Anatomy	6
Physiol. 4	Human Physiology	4
Bact. 41	General Bacteriology	5
Speech 41-42	Public Speaking	6
P.M.&P.H. 2	First Aid	1
Phys.Ed. 1-2-3	Freshman Physical Education[1]	3
Phys.Ed. 22(23)	Elementary Swimming	2
Phys.Ed. 20	Sophomore Basket-Ball	
Phys.Ed. 21	Sophomore Baseball	
Phys.Ed. 43-44	Elementary Folk Dances and Games	1
	Total required credits	75 to 85

Approved electives to total 95 credits including required physical education courses are required.

[1] Men interested in this curriculum may take the required number of credits in physical education in their minor course in athletic coaching. Selection of the proper courses will be made in consultation with an adviser in the Department of Physical Education for Men.

Junior-Senior Years

Course No.	Title	Credits
Phys.Ed. 80	Principles of Play[1]	3
Phys.Ed. 56-57	Technique of Team Sports	2
Phys.Ed. 66	Kinesiology	3
P.M.&P.H. 53	Elements of Preventive Medicine	3
P.M.&P.H. 59	Social Hygiene	1
P.M.&P.H. 61	Mental Hygiene	3
P.M.&P.H. 69	School Nursing—Principles, Techniques and Practices	3
P.M.&P.H. 74	Health Instruction Methods and Materials	3
P.M.&P.H. 75	Practice Teaching in Health Education	3
P.M.&P.H. 80	Health Supervision of School Child	3
P.M.&P.H. 101	Public Health Administrative and Field Work	2
Ed. 51-52-53	Introduction to Secondary School Teaching	9
or		
Ed. 61-62-63	Introduction to Elementary School Teaching	9
Ed. Ad. 124	Public School Administration	3
Ed. Ad. 150	Supervision and Improvement of Instruction	2
Ed.T. 62-63-64	Special Methods and Practice Teaching	9
H.E. 70	Nutrition Survey	2
H.E. 171	Child Nutrition	3
Soc. 49	Occurrence of the Socially Inadequate	3
Soc. 52	Elem. Case Work	3
Soc. 90	Field Survey of Social Case Work	2
C.W. 170	Parental Education	3
Bot. 101	Elementary Biometry	3
	Total required credits	70-72

Approved electives to total 90 credits for the junior and senior years.

Recommended Electives

Course No.	Title	Credits
Ed.Ad. 133	Guidance in Secondary Schools	4
or		
Ed.Ad. 169	Extra-Curricular Activities	2
Ed.Psy. 134	Mental Tests	2
or		
Ed.Psy. 143-144	Individual Mental Examination	4
Ed.Psy. 159	Psychology of Personality	2
Ed.Psy. 146-147	Child Guidance	4
H.E. 170	Nutrition of Family	3
Bact. 101	Special Bacteriology	4
Bact. 116	Immunity	3
Anat. 135	Physical Development of the Child	2
C.W. 130	Development of the Young Child	3
P.M.&P.H. 106	Public Health Adm.	Ar
P.M.&P.H. 210	Seminar in Prev. Med. and Public Health	1-3

[1] Men interested in this curriculum may take the required number of credits in physical education in their minor course in athletic coaching. Selection of the proper courses will be made in consultation with an adviser in the Department of Physical Education for Men.

Graduate Work

Graduate work, leading to specialization along the lines of supervision in physical education, school nursing, or health education, may be followed by properly qualified students, preferably after some actual experience in the field of school health work. Permission to pursue graduate work in this field must be obtained from the advisory committee on school health work. Students who register in the Graduate School and fulfill its various requirements will receive appropriate graduate degrees.

SOCIAL STUDIES

Major Adviser: Edgar B. Wesley

Students who desire to specialize in the social studies are advised to follow one of the following plans:

1. Major in history, minor in the social studies. Students majoring in history who expect to teach high school courses in the social studies should, in addition to meeting the major requirement of 45 credits in history, secure a total of 35 credits in three of the social studies, 15 in one and 10 in each of the two others. Economics, geography, political science, and sociology are the fields from which selections may be made.

2. Major in social studies, minor in history. Students desiring to secure a major in social studies should meet the departmental requirements for a major in one of the following: economics, geography, political science, or sociology. In addition the student must earn a total of 25 credits in at least two other social studies. At least 18 credits in history must be earned to fulfill the minor requirements.

Students who desire to follow either of these plans should earn a minimum of 25 credits in the social studies in the freshman and sophomore years.

FIVE-YEAR COURSE LEADING TO DEGREE OF MASTER OF ARTS

Fifth Year in the Graduate School

Students who satisfactorily meet the requirements of the Graduate School (see Graduate School bulletin) may secure the Master's degree with a major in social studies and a minor in education. Programs should be arranged in consultation with a major adviser in the department.

SOCIOLOGY AND SOCIAL WORK

Major Advisers: F. S. Chapin, R. L. Finney

Sociology As a Major Subject

Note.—Students majoring in Sociology must complete two teaching minors in addition to the required professional courses. (See pp. 17-18.) Teachers who already hold a teacher's certificate may be relieved of this requirement upon petition.

a. Major in social theory—35-37 credits including the following:

Course No.	Title	Credits
Soc. 1	Introduction to Sociology	5
Soc. 6	Social Interaction	3
Soc. 14	Rural Sociology	3
Soc. 45	Social Statistics	5
or		
Soc. 53	Elements of Criminology	3
Soc. 49	The Socially Inadequate	3
Soc. 93	The Social Heritage and the Individual	3
or		
Soc. 119	The Family	3
or		
Soc. 120	Social Progress	3
Soc. 100	Social Psychology	3
Soc. 101	Social Organization	3
or		
Soc. 102	Social Control and Criminal Behavior	3
Soc. 110	Rural Organization	3
or		
Soc. 114	Rural Social Institutions	3
or		
Soc. 140	History of Social Theory	3
Soc. 122	Advanced Statistical Methods	3
or		
Soc. 141	Contemporary Social Theory	3

b. Major in applied sociology—36 credits including the following:

Course No.	Title	Credits
Soc. 1	Introduction to Sociology	5
Soc. 14	Rural Sociology	3
Soc. 45	Social Statistics	5
or		
Soc. 49	The Socially Inadequate	3
Soc. 52	Elementary Case Work	3
or		
Soc. 53	Elements of Criminology	3
Soc. 60	Social Protection of the Child	3
or		
Soc. 90	Field Survey of Social Case Work	2
or		
Soc. 100	Social Psychology	3
Soc. 110	Rural Organization	3
or		
Soc. 114	Rural Social Institutions	3
Soc. 112	The Rural Social Survey	2
or		
Soc. 123	Methods of Social Investigation	3
Soc. 115	Religion as a Social Institution	3
or		
Soc. 128	Principles of Administration, Publicity, and Finance Applied to Social Work	2
Soc. 119	The Family	3
or		
Soc. 134	Legal Protection of the Child	3

Sociology As a Minor Subject

Course No.	Title	Credits
Soc. 1	Introduction to Sociology	5
Soc. 6	Social Interaction	3
or		
Soc. 14	Rural Sociology, and 4 other courses	11 or 12
	Total 19 or 20 credits	

SPEECH

Major Advisers: F. M. Rarig, B. Bryngelson

Speech as a major subject:[1]

Course No.	Title	Credits
Speech 41-42-43	Fundamentals of Speech	9
or		
Speech 45-46	Fundamentals of Speech	10
Speech 55-56	Argumentation and Debate	6
Speech 61	Speech Correction	3
Speech 67	Phonetics	3
Speech 71-72	Elements of Play Production	6
Speech 81-82	Interpretative Reading	6
Speech 121-122	Advanced Speech Problems	6
	Total	39 or 40

Speech as a minor subject:

A minimum of 24 credits including Speech 41-42-43 or 45-46; 61 and 67; 55-56-57 or 71-72-73 or 81-82-83.

Speech Correction as a minor subject:[1]

Course No.	Title	Credits
Speech 41-42-43	Fundamentals of Speech	9
or		
Speech 45-46	Fundamentals of Speech	10
Speech 61	Speech Correction	3
Speech 67	Phonetics	3
Speech 162-163	Advanced Speech Correction	6
Psy. 144-145	Abnormal Psychology	6
	Total	27 or 28

All students majoring or minoring in Speech must present satisfactory evidence of interest and effective participation in one or more activities, such as debating, dramatics, oratory, public reading, or public speaking.

Because of the close relation between English and speech in the high schools in Minnesota, students majoring in speech should have one of their minors in English.

Students intending to take further work in speech correction, specializing in that field of speech alone, should include in their undergraduate course Physiology 4.

Students majoring in Speech register for practice teaching in Ed.T. 52-53-54.

TEACHERS OF SUBNORMAL CHILDREN

Major Adviser: J. G. Rockwell

Students will complete the first two years of this course in the Lower Division.

Students who complete the freshman and sophomore years of this course, who have had two years of teaching experience in elementary

[1] Students are advised to take Psy. 4-5 or 7. Students expecting to major in Speech should consult a major adviser as early as possible in their Lower Division course.

schools, and who complete a minimum of six credits in approved courses of the junior and senior years, will qualify for a special teaching certificate required of teachers of subnormal children in special classes for which state aid is received. All students who have not had the equivalent previously must take the courses in practice teaching and handwork to qualify them for this special certificate.

Unclassed students with proper prerequisites may pursue courses for which they are qualified in the junior and senior years, on the basis of previous training and experience.

FOUR-YEAR CURRICULUM FOR THE TEACHERS OF SUBNORMAL CHILDREN

Lower Division, College of Science, Literature, and the Arts

Freshman Year

Course No.	Title	Credits
Eng. A-B-C	Freshman English	15
	or	
Comp. 4-5-6	Freshman Composition or exemption from the requirement	9
ArtEd. 1-2-3	Fundamental Principles of Design	9
Zool. 1-2-3	General Zoology	10
Soc. 1	Introduction to Sociology	5
	Electives	6-12
	Physical Education	3

Sophomore Year

Course No.	Title	Credits
Psy. 1-2	General Psychology	6
Psy. 4-5	Psychology Laboratory	4
Hist. 1-2	Modern World	10
Ed. 51 or 61	Educational Psychology	3
Ind. 11	Special Class Woodwork	2
ArtEd. 37	Basketry	2
ArtEd. 32	Cardboard and Paper Construction	1
Phys.Ed. 43-44	Elementary Games and Folk Dancing	1
	Electives	16
	Physical Education	2

College of Education

Junior Year

Course No.	Title	Credits
Ed.Psy. 134-135-136	Mental Tests and Problems in Mental Testing	6
Ed.T. 181	Technique of Elementary Instruction	3
Ed.T. 143-144	Teaching of Reading in Elementary School	4
Ed.Ad. 155	Supervision of Arithmetic in the Elementary School	2
Phys.Ed. 80	Principles of Play	4
Ed.Psy. 184	Mental Deficiency	2
	Electives	

Senior Year

Course No.	Title	Credits
Ed.T. 17	Practice Teaching	5
Ed.Psy. 111	Measurements in the Elementary School	3
Soc. 49	The Occurrence of the Socially Inadequate	3
	Elementary Case Work	3
	Child Welfare	3
	Electives	

THEORY AND PRACTICE OF TEACHING

Major Advisers: Dora V. Smith, J. G. Umstattd

GRADUATE WORK

FIFTH YEAR FOR ENGLISH TEACHERS IN THE THEORY AND PRACTICE OF TEACHING

English teachers may secure a Master's degree with a major in the Department of Theory and Practice of Teaching and a supporting minor in English. Courses applicable to the teaching of English from which the student may profitably choose are as follows: Ed.T. 193, 194, 110, 122, and 196-197-198; Ed. 208; Ed.Ad. 113 and 169; Ed.Psy. 133 and 158. The seminar, Ed.T. 222-223-224, is required without credit for all students with a major or minor in theory and practice of teaching. Programs should be arranged in consultation with a major adviser in the department.

VISITING TEACHERS

Major Adviser: F. S. Chapin

The work of the visiting teacher is social work in the schools for the development of the individual child through adjustment of school-home problems, utilizing the special techniques of social work which are acquired through theory courses and field training. Those students interested in further information regarding social work are referred to the special bulletin of the Training Course for Social and Civic Work.

LOWER DIVISION, COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman Year

Course No.	Title	Credits
Eng. A-B-C	Freshman English	15
	or	
Comp. 4-5-6	Freshman Composition	9
Hist. 1-2	Modern World	10
	or	
	Foreign Language	10
Zool. 1-2-3	General Zoology	10
Pol.Sci. 1-2	American Government	10
Phys.Ed. 1-2-3	Physical Education	3

Sophomore Year

Course No.	Title	Credits
Hist. 7-8	American History	10
Econ. 6-7	Principles of Economics	10
Phys. 1-2	General Psychology	6
Soc. 1	Introduction to Sociology	5
Soc. 6	Social Interaction	3
Soc. 45	Social Statistics	5
Soc. 49	Occurrence of the Socially Inadequate	3
	Physical Education	2
	Electives	3

College of Education

Junior Year

Course No.	Title	Credits
Ed. 51-52-53	Introduction to Secondary School Teaching	9
Soc. 52	Elementary Case Work	3
Soc. 70	Group Work in the Community	3
Soc. 90	Field Survey of Social Work	3
Soc. 91-92	Elementary Field Training	8
H.E. 90	Home Management Problems for Social Workers	3
P.M.&P.H. 61	Mental Hygiene	3
	Electives[1]	13

Senior Year

Course No.	Title	Credits
Econ. 161	Labor Problems and Trade Unionism	6
Soc. 53	Elements of Criminology	
	or	
Psy. 144-145	Abnormal Psychology	6
Soc. 60	Social Protection of the Child	3
Soc. 129	Selected Problems in Social Case Work	3
Soc. 130	Advanced Case Work	3
Soc. 134	Legal Protection of the Child	2
Soc. 138-139	Mental Case Work	6
Soc. 153-154-155	Advanced Field Training	9
	Electives[1]	13 or 14

ZOOLOGY

Major Adviser: J. E. Wodsedalek

Zoology as a major subject:

Zool. 1-2-3, General Zoology, 10 credits and a minimum of 20 additional credits in the department. Medical Physiology (Course 4) is included among the electives.

Zoology as a minor subject:

Zool. 1-2-3, General Zoology and at least 10 additional credits chosen from the following: Genetics and Eugenics, General Physiology, General Ecology, Histology, Entomology, General Embryology, Ornithology, and Human Physiology (Medical Physiology, 4).

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[1] Electives should be selected under advisement in order to incorporate requirements A-B-C of the prescribed course of study for teachers of secondary school subjects. Ed.Psy. 195 is recommended. See pp. 17-18.

DESCRIPTION OF COURSES

GENERAL COURSES

Ed.50. Art Appreciation. The enjoyment of the visual arts. Illustration of governing principles by practical experience. No technical requirements. Contact for superintendents and supervisors and teachers in the general field with this so-called "special subject."

Ed.51-52-53.[2] Introduction to Secondary School Teaching. Objectives, organization, curricula, and methods of secondary schools and instruction with special reference to the fundamental facts of psychology involved therein. A combination and integration of topics commonly treated in courses in educational psychology, principles of education and general secondary school methods. Unit I. Psychological fundamentals. Unit II. Organization, objectives, materials. Unit III. Methods of instruction.

Ed.51-52-53.[2] Introduction to Secondary School Teaching—Independent Study. See above for description. Previously designated Limited Honors Course. The group will not meet each week but one class period a week will be arranged for conference. An average of B and permission of the instructor is required for registration in this course.

Ed.61-62-63.[1,2] Introduction to Elementary School Teaching. Objectives, organization, curricula and methods of elementary schools and instruction with special reference to the fundamental facts of psychology involved therein. A combination and integration of topics commonly treated in courses in educational psychology, principles of education and general elementary school methods. Unit I. Psychological fundamentals. Unit II. Organization, objective, materials. Unit III. Methods of instruction.

Ed.208. Methods in Educational Research. A study of the methods employed in the investigation and report of educational problems. Designed to aid students in the preparation of theses. Suggested for all candidates for graduate degrees.

Ed.228-229-230. Problems of College Education. Student personnel, curriculum and instruction, organization and administration.

ADMINISTRATION AND SUPERVISION

Ed.Ad.24. Public School Administration. The organization and administration of public schools in relationship to the teacher and other staff members. For teachers.

Ed.Ad.65.[3] The High School. Development of secondary education in the U.S.; types of secondary schools; recent tendencies in reorganization;

[1] A fee of $1 per credit is charged for this course.

[2] The entire course including the final examination covering all units must be successfully completed before credit is received for any quarter.

[3] Ed.T.15 and the final examination covering Ed.Psy.55, Ed.Ad.65, and Ed.T.15 must be successfully completed before credit is received for this course.

the aims and functions of secondary education; courses of study as related to aims; curriculum organization and programs of studies.

Ed.Ad.65a. The High School. For students majoring in administration. (See Ed.Ad.65.)

Ed.Ad.75. The Elementary School. A systematic study of the modern elementary school as an introduction to elementary education.

Ed.Ad.113-114. 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.

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.

Ed.Ad.119. The Elementary School Curriculum. A study of the principles underlying the selection and organization of subject-matter for courses in the elementary school and a survey of the methods and findings of research by subjects.

Ed.Ad.119T-120T. The Elementary School Curriculum. (Same as above for teachers.)

Ed.Ad.121. 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. Open to seniors and graduates, and juniors by permission of the instructor.

Ed.Ad.123. 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.

Ed.Ad.124. Public School Administration. The organization, administration, and general support of public schools in states and local school districts.

Ed.Ad.125. 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.

Ed.Ad.126. School Plant Management. Plant program planning and financing, including operation and maintenance of public school buildings.

Ed.Ad.128. 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.

Ed.Ad.133. Guidance in Secondary Schools. Basic principles and current practices in educational and vocational guidance in junior and senior high schools. Application of principles through case discussions.

Ed.Ad.150[1] Supervision and Improvement of Instruction. An analysis of the functions and duties of a supervisor as related to the improvement

[1] A fee of $1 per credit is charged for this course.

of instruction; specific supervisory technique; objective analysis of classroom activity; concrete applications to present day problems; case studies.

Ed.Ad.151.[1] 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.

Ed.Ad.152. 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.

Ed.Ad.153. 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.

Ed.Ad.154. 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.

Ed.Ad.155. Supervision of Arithmetic in the Elementary Schools. Locating supervisory needs; enrichment of instruction; selection, organization, gradation of the curriculum; diagnostic and remedial teaching; recent trends and research.

Ed.Ad.156.[1] Practice Supervision—Observation and Field Work. Classroom visitation in university demonstration schools and schools in or near the Twin Cities, followed by conferences. Supervisory techniques, the follow-up, special group projects in supervision.

Ed.Ad.157.[1] Practice in Supervision. Individual research on special supervisory problems; especially intended for supervisors in service.

Ed.Ad.158. 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.

Ed.Ad.159. Supervision of Reading. The improvement of supervision and instruction in reading by supervisors, principals, and faculties.

Ed.Ad.160.[1] Supervision of Elementary Subjects. An overview course for giving supervisor and superintendent information as to recent trends in elementary education.

Ed.Ad.161. Special Problems in School Supervision. Intended primarily for graduate students majoring in supervision and others qualified to make intensive studies of specific problems related to school supervision. Fall, general aspects of supervision; winter, supervision of arithmetic; spring, educational diagnosis.

Ed.Ad.164-165. High School Administration. Organization of secondary school units; housing; selection and assigning of the staff; schedule mak-

[1] A fee of $1 per credit is charged for this course.

ing; public relations and publicity; organization of guidance and of extra-curricular activities; pupil, equipment, and internal fund accounting and related problems of administration; government; problems related to instruction.

Ed.Ad.167-168. The Junior High School. Sources of the movement; theory, purposes, functions, and limitations; types of reorganization; fundamental problems of reorganization; reorganization of subject-matter.

Ed.Ad.169. Extra-Curricular Activities.

Ed.Ad.170. Special Problems in Secondary Education. Primarily for those at work in high schools who are qualified to make intensive studies. Consult instructor before registering.

Ed.Ad.172. 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.

Ed.Ad.175. 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.

Ed.Ad.178-179. 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.

Ed.Ad.180.[1] Practice in High School Administration. Practical experience in problems of administration, pupil personnel, curriculum administration, extra-curricular activities, staff problems, program and schedule making, etc. Consult instructor before registering.

Ed.Ad.184. Supervision of Practice Teaching. Primarily for teachers engaged in the direction of practice teachers in secondary education.

Ed.Ad.185. The Professional Education of Teachers. A study of the present status and of the problems that relate to the institutional training of teachers for public schools and higher education.

Ed.Ad.186. Special Problems in Teacher Training. Planned for those who have a special interest in this field. An intensive study of specific problems. Consult instructor before enrolling.

Ed.Ad.205-206-207. Seminar in Educational Administration.

Ed.Ad.218-219-220. Seminar in Secondary School Problems.

Ed.Ad.225-226-227. Seminar in Elementary School Problems.

AGRICULTURAL EDUCATION

Agr.Ed.11. Educational Psychology. The main facts and principles of educational psychology and the fundamental principles upon which education is based. Emphasis is placed on those phases which are most closely related to vocational education.

Agr.Ed.21. Vocational Education. A short history of vocational education; present status in Europe and the United States; industrial arts and

[1] A fee of $1 per credit is charged for this course.

home arts in an educational system; place of agriculture in the public schools with special reference to Minnesota.

Agr.Ed.41.[1] Apprentice Teaching. An introductory course in teaching, including observation of class work, apprentice teaching, and discussions of problems relating to teaching. Intended to initiate the student into the routine of classroom procedure. Professional readings.

Agr.Ed.42.[1] Supervised Teaching Experience. Preparation of lesson plans and actual teaching of classes under careful supervision in recitation and laboratory; criticism and discussion of plans, methods, and results of student teaching. Review and discussion of assigned professional readings.

Agr.Ed.64. Survey of Agriculture. A course in general agriculture designed to give students practical familiarity with fundamental principles and basic facts, best procedures, literature, and important problems of agriculture in this region.

Agr.Ed.75. Visual Presentation. To prepare persons for presenting materials by means of slides, films, charts, etc. Students assisted in assembling materials for their own use and in acquiring skill and technique in preparation and operation of various mediums.

Agr.Ed.81. Extension Work. Federal, state, and local extension aims, organization. Assembling and use of extension data and equipment. Development of extension methods especially as applied to the work of Minnesota.

Agr.Ed.82. Agricultural Extension Field Work. Actual field practices in extension work on part salary in addition to credits. Number admitted to course limited by positions available. Usually will cover summer quarter, may extend into fall quarter.

Agr.Ed.135. 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.

Agr.Ed.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.

Agr.Ed.144. 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.

Agr.Ed.154. Rural Education and Community Leadership. 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.

[1] A fee of $1 per credit is charged for this course.

Agr.Ed.161. Vocational Education in Agriculture. A study of the principles developed and established in agricultural education. The principles developed in other vocational education and their relation to agricultural education.

Agr.Ed.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.

Agr.Ed.164. Fundamentals in Agriculture. Basic principles of agricultural science and elements of practical agriculture. Emphasis on concrete problems in soils, crops, and animal husbandry, as related to classroom instruction and to school and home projects.

Agr.Ed.171. 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.

Agr.Ed.176. Problems in Visual Presentation. Special attention to use of visual aids in teaching agriculture. The development of proper visual methods by means of research.

Agr.Ed.181. Teaching Agriculture. Observations of class work, apprentice teaching, curriculum organization, farm practice, and use of the farm and community for teaching purposes.

Agr.Ed.182. Teaching Agriculture. Special methods course dealing with conducting a high school agriculture department. Fundamentals of method in teaching as related to teaching agriculture in the high school. Organizing subject-matter. Selection and manipulation of devices.

Agr.Ed.183. Teaching Agriculture. Organization and administration of agriculture in secondary schools including all day, part time, and evening school instruction. Special emphasis on equipment, text and reference books, extension work, and organizations.

Agr.Ed.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.

ART EDUCATION

DESIGN

ArtEd.1-2-3. Fundamental Principles of Design. Elementary problems involving space breaking, value relations, the decorative use of nature material, creative use of symbols; application to problems developed in the handicrafts, and to the home.

ArtEd.20-21-22. Principles of Harmony in Form and Color. Experience with color. Color theories discussed and exemplified, with analysis of color harmonies. Application of color harmonies in original designs with reference to execution in handicrafts and by industrial processes.

ArtEd.50-51. Commercial and Industrial Design. Advertising design and lettering; design for industry. Subject-matter appropriate for high school art teaching, with emphasis on governing principles.

ArtEd.55-56-57. Fundamental Art Principles. Planned for teachers of subjects other than art.

ArtEd.153-154. Design for the Consumer. 153—Problems of house planning, decoration, and furnishing; 154—Problems of costume selection and designing, settings and costumes in stage design. Subject-matter appropriate for art teaching in high schools and colleges. Emphasis on art principles; art history an important part of this course; original research problems and applications in the field.

DRAWING

ArtEd.4,5,6. Still Life. Drawing from objects in charcoal and pencil. Emphasis on form, value relations, perspective, and composition.

ArtEd.7,8,9. Sketch in Charcoal and Pencil from the Posed Figure. Action and memory drawing. Emphasis on action, form, and value relations.

ArtEd.10-11-12. Graphic Composition. Drawing from imagination. Stimulation by poetry and music.

ArtEd.23,24,25. Water Color Drawing. Emphasis on color, form, and technical handling.

ArtEd.26,27,28. Pencil and Pen Techniques. Drawing in these media. Fundamental to problems in commercial art.

ArtEd.29,30,31. Sketch from Pose. Rhythmic expression; memory drawing; blackboard experience.

ArtEd.60,61,62. Advanced Water Color.

ArtEd.63,64,65. Advanced Techniques.

ArtEd.66,67,68. Advanced Sketch.

HANDICRAFTS

ArtEd.32. Cardboard and Paper Construction. Subject-matter for public school work.

ArtEd.33. Bookbinding. Sequence of problems from simplest construction to the book sewed on cords or tapes. Problems with reference to grades, high schools, and for use in occupational therapy.

ArtEd.35.[1] Clay Modeling. Imaginative and decorative design carried out in plastic media.

ArtEd.37. Basketry. Reference to use in the grades and in occupational therapy.

ArtEd.38. Elementary Weaving and Allied Crafts.

ArtEd.39. Advanced Basketry.

ArtEd.40.[1] Advanced Weaving.

ArtEd.41.[1] Elementary Pottery. Hand building.

ArtEd.42-43.[1] Advanced Pottery. Work on wheels, castings, firing, and glazing.

[1] A fee of $1.50 is charged for this course.

ArtEd.44. Application of Design to Fabrics. By means of block printing, stenciling, batik, and other dyeing processes.

ArtEd.45. Application of Design in Needlecraft. Problems appropriate for public school work. Peasant stitches.

ArtEd.46.[1] Metal Work and Simple Jewelry. Fundamental processes of shaping, sawing, saw piercing, riveting, and soldering.

ART HISTORY AND APPRECIATION

ArtEd.70. Art of the Italian Renaissance.
See note under statement of requirements for the art major.

THEORY AND PRACTICE OF ART TEACHING

ArtEd.80,81,82.[2] Types of Art Instruction. A special methods course with especial reference to the problems needed in practice teaching in the Minneapolis public schools. Attendance upon art supervisor's meetings and visits to the supervisory office.

ArtEd.83. Problems in Art Education. A survey of art teaching practices; study of governing principles; history and philosophy of art teaching; making of courses of study for public school application.

ArtEd.86,87,88.[2] Practice Teaching in Art. Actual experience under public school conditions.

ArtEd.189. Application of Esthetic Theories in Public School Art Education. An integration course. Original research problems.

EDUCATIONAL PSYCHOLOGY

Ed.Psy.55. Educational Psychology. A survey of fundamental facts of human behavior, involved in educational activities. Particularly designed for high school teachers. Equivalent to Ed.51.

Ed.Psy.56. Educational Psychology for Elementary School Teachers. This course is similar to Ed.Psy.55 but particularly adapted to the needs of the elementary school teacher. Equivalent to Ed.61.

Ed.Psy.56-57. Educational Psychology for Elementary School Teachers. Same as Ed.Psy.56.

Ed.Psy.60. Introduction to Statistical Methods. The course includes a study of measures of central tendency, variability, and correlation.

Ed.Psy.111-112. 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.

Ed.Psy.113-114-115. Psychology of Elementary School Subjects. A discussion of the research studies in the field of the psychology of elementary school subjects.

[1] A fee of $1.50 is charged for this course.
[2] A fee of $1 per credit is charged for this course.

Ed.Psy.116-117. 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.

Ed.Psy.133. Systematic Educational Psychology. Advanced course covering the field of psychology as related to education.

Ed.Psy.134. Mental Tests. A laboratory study of group mental tests for all school levels with special emphasis on their reliability and validity as instruments for educational guidance.

Ed.Psy.135-136. Problems in Mental Testing. A study of practical problems in the administration and use of group mental tests.

Ed.Psy.138-139. 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.

Ed.Psy.141. Psychology of Speech Disorders.

Ed.Psy.143-144. 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.

Ed.Psy.145. Special Problems in the Field of Individual Mental Testing.

Ed.Psy.146-147. Child Guidance. Specific problems in school adjustment dependent upon physical and emotional factors of the child, the home, and the environment. Presentation by clinical case records.

Ed.Psy.149-150-151. 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.

Ed.Psy.153-154-155. Research Problems. Intended for properly prepared students who desire to pursue special investigation in the field of educational psychology.

Ed.Psy.157. Psychology of Child Development. The physical mental, social, and emotional development of children from birth to adolescence.

Ed.Psy.158. 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.

Ed.Psy.159. 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.

Ed.Psy.181. 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.

Ed.Psy.183. Psychology of Gifted Children. A study of the physical and mental traits of gifted children and the methods of their education.

Ed.Psy.184. 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.

Ed.Psy.189. The Human Organism. The development of the human organism in relation to educational practice.

Ed.Psy.190. Original Nature of Man. Advanced work in genetic psychology, man's unlearned behavior, and inherited capacities.

Ed.Psy.191. Individual Differences. A study of group and individual differences and their relations to educational practice.

Ed.Psy.192. Recent Literature in Educational Psychology. Readings and reports on problems in educational psychology.

Ed.Psy.193-194. Psychology of Learning. A study of the experiments in learning in the laboratory and in the classroom.

Ed.Psy.197-198-199. Special 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.

Ed.Psy.201-202-203. 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.

HISTORY AND PHILOSOPHY OF EDUCATION

H.Ed.1. Brief Course in History of Education. Current school problems and educational theories in the light of their history. Emphasis upon modern times.

H.Ed.3. Educational Sociology. A study of the social aspects of the teacher's work and of education as a means of solving social problems and directing the evolution of institutions.

H.Ed.5. Public Education in the United States. A survey of factors determining public education in the United States, followed by a study of the development of educational theory and the rise of state systems.

H.Ed.101. Historical 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.

H.Ed.102. History of Modern Secondary and Higher Education. A historical study of the origin, aims, growth of existing types of American and European secondary schools.

H.Ed.103. History of Modern Elementary Education. The development of educational theory and the evolution of the common school. Not open to students who have had H.Ed.1.

H.Ed.114. Sociological Philosophy of Education. A discussion of sociologically formulated ideals with an attempt to reach a positive philosophy of educational aims, methods, content and organization.

H.Ed.129-130. Educational Classics. An intensive study of selected writings of educational leaders from ancient times to the present day.

H.Ed.131-132. Comparative School Systems. A survey of the existing school systems in foreign countries including France, England, Germany. Emphasis upon present problems.

H.Ed.140-141. Topics in the History of Education.

H.Ed.187-188-189. Special Problems in Educational Sociology. The sociological foundations of educational theory. Lectures, readings, and problems.

H.Ed.211-212-213. Seminar in History of Education. Historical investigation of educational problems.

HOME ECONOMICS EDUCATION

H.E.Ed.40. Child Training. A brief study of the physical and mental development of the child is followed by a discussion of the problems of training small children. Emphasis is placed on the pre-school child. Lectures, observations in the Nursery School, and reports.

H.E.Ed.42.[1] Special Methods and Observation of Teaching Home Economics. The psychological bases for teaching; investigation and collection of facts on teaching situations through study, observation of school classes, conferences on teaching problems.

H.E.Ed.49.[1] Supervised Teaching of Home Economics. The application of psychological facts and principles to teaching situations. Actual teaching experience under supervision.

H.E.Ed.49a.[1] Observation and Supervised Teaching. The study of facts and principles as they apply to teaching situations. Observation. Teaching under supervision. (Only for those taking H.E.Ed.42su, 3 cred.)

H.E.Ed.141. 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.

H.E.Ed.142a. Educational Measurement in Home Economics. Problems of measurement in home economics; home economics tests and scales; construction and evaluation of objective tests.

H.E.Ed.142b. Educational Measurement in Home Economics. A continuation of Course 142a, dealing with methods of interpretation and utilization of test data.

H.E.Ed.143. 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.

H.E.Ed.147. 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.

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.

[1] A fee of $1 per credit is charged for this course.

H.E.Ed.242. Problems in Home Economics Education. Current problems in home economics education will be studied. Required of all candidates minoring in home economics education.

H.E.Ed.243. Administration and Supervision of Home Economics. A study of the duties and problems of teacher trainers, city and state supervisors of home economics.

H.E.Ed.245. Seminar in Home Economics Education. A research course for graduate students. Required of all students writing theses in Home Economics Education. Does not carry credit as course work.

INDUSTRIAL EDUCATION

Shopwork and drawing courses of wide variety are available in the College of Engineering, University and Farm campuses. Students may elect to pursue courses, day or evening, at the William Hood Dunwoody Industrial Institute without fees other than those paid to the University, except one dollar which is refunded. All shop and drawing courses should be taken under special advice and may be either extensive or intensive in resultant preparation for teaching. Those transferring from other institutions should bear in mind the maximum of forty-five quarter credits, for shopwork and drawing combined, which is enforced in this department.

Ind.1-2.[1] General Shopwork. Primarily for Industrial Education majors. Six shop activities.

Ind.5.[1] Wood Finishing. Theory and practice of modern wood and metal finishing; stains, fillers, varnishes, paints, enamels, and nitrocellulous lacquers; polychrome finishes; spray-gun work; refinishing.

Ind.11.[1] Special-Class Woodwork. For teachers of art, subnormal, and primary work; lectures, demonstrations, and shop practice; not open to those with college credit in woodwork. (Special fee for materials, $2.)

Ind.14.[1] Methods in Drawing. The selection and arrangement of course materials; methods of presentation and problems of the drawing room. *Not a course in drawing.*

Ind.20. Industrial History. A survey of industrial and commercial development; economic and social changes in America; the industrial revolution; resultant changes in industrial education.

Ind.25. Literature of Industrial Education. Acquaintance and methods of use; survey of useful books, periodicals, and reports; reference facilities, note taking, and organization; evaluation of texts in shop and drawing subjects.

Ind.30. Graphic Presentation. Typical methods of the graphical portrayal of data; use of educational and social facts for drill in construction and interpretation; corrected charts become student property.

Ind.40. Analysis. Necessity for, and types of, occupational analysis; individual work upon selected trade fields—for teaching purposes; instruction sheet problems.

[1] A fee of $1 per credit is charged for this course.

Ind.42. Course Organization. Makes definite use of trade analyses; content of courses selected and arranged for common and special teaching situations; both general and vocational classes and groups considered.

Ind.44. Equipment and Management. Sources, purchases, costs, and inventories; installation, upkeep, and safe operation; storage and issue of tools and supplies; financial accounts, bills of material, and disposal of product; relation to curriculum, courses, and methods.

Ind.50-51-52.[1] Practice Teaching. Three quarters or six credits required. (Consult with adviser or critic teacher.)

Ind.60. Philosophy of Vocational Education. Development and characteristics of vocational training; conservation of human and material resources; social and economic significance; results and weaknesses; current theories.

Ind.61. Practices in Vocational Education. Plans of organization and control; types of schools and classes; public versus private and corporation training; state and federal aid; teacher preparation; efficiency factors.

Ind.65.[1] Methods in Non-Vocational Subjects. Details of material and method in civics, industrial history, commercial geography, English, and other branches classified by the Smith-Hughes Law, as "non-vocational"; the needs of groups, course planning, and special devices.

Ind.66.[1] Methods in Related Subjects. Theories, practices, and problems of related instruction; special reference to mathematics, drawing, science, and safety; group study, unit courses, usable methods, and the means of supervision.

Ind.70.[1] Methods in Shop Subjects. Conduct of shop classes, with and without reference to production work; lesson plans, demonstrations, drill, grading, reports, and records; standards of workmanship.

Ind.80. General Industrial Training. Administration of the industrial offering for grades and high school in typical Minnesota towns; aims, offerings, schedules, teaching fitness, general management; consideration of the unifying opportunities within a department and a school. Recent data for our state.

Ind.101. Tests in Industrial Subjects. Acquaintance with such available tests of aptitude and achievement as are useful in industrial education; application of known techniques in remedial teaching to the work of shop and drawing instructors. Critical evaluation and planning.

Ind.105. Industrial Education. For superintendents, principals, and teachers not specializing in the field named; general and vocational phases considered; objectives, administration, and supervision; programs and practices; laws, rulings, and standards for aid; significant literature; how to judge teachers, courses, and methods in the special field.

Ind.110. Guidance in the Schools. The history of the educational and vocational guidance movement; typical public school means and methods; collection and use of occupational information; duties of the counsellor; organization and relationships.

Ind.150-151-152.[1] Problems in Vocational Education. Six credits offered. Survey of printed reports and theses; critical analysis; selection of

[1] A fee of $1 per credit is charged for this course.

thesis problems; formulation of work plans; reports of progress; organization and presentation. Graduates only.

Ind.170. Administration of Day Schools. National, state, and local organization and types; buildings and equipment; promotion and advertising; co-operative relationships; teaching staff; pupil guidance, training, and placement.

Ind.171. Administration of Evening Schools. Development of the after-training of adults; agencies and scope of the movement; national and state legislation; qualifications of instructors; problems and difficulties; records and certification; fees and charges; buildings, equipment, and instruction facilities.

Ind.172. Administration of Part Time Schools. A study of the new movement for part time education; social and economic background; organization of classes; study of special student groups; courses of study; typical schools; comparative state legislation and plans; Minnesota's problems.

INSTITUTE OF CHILD WELFARE[1]

C.W.40. Child Training. A study of the physical and mental development of the child followed by a discussion of the problems of training of young children. Observations in the Nursery School, lectures, and reports.

C.W.60. Modern Aspects of Child Study. To orient student with reference to the Nursery School and parental education. Consideration given also to the kindergarten and Montessori movement and to the physical and mental hygiene movement.

C.W.80. Child Psychology. A survey of child development with special reference to nursery school and kindergarten education.

C.W.90. Physical Development of the Young Child. The physical growth and development of the young child in its anatomical, physiological, and functional aspects.

C.W.120. 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. Opportunities for observation in the Nursery School and in clinics. With the co-operation of the Department of Pediatrics.

C.W.130. 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.

C.W.133-134[2]-135. Observational and Experimental Methods in the Study of the Development of the Young Child. A study of the various methods and techniques such as growth records, mental tests, ratings,

[1] The institute also offers Courses Ed.T.30-34, and Ed.T.85-90 listed under the Theory and Practice of Teaching.

[2] Two quarters must be completed before credit is received for any quarter.

controlled observations, etc., used in the experimental study of the young child. Practical exercises and problems on institute records and data.

C.W.170. 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.

C.W.173-174. 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.

C.W.190-191. Mental Examination of Pre-school Children. A study of the methods used in testing young children together with practice in such testing.

C.W.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.

C.W.233-234-235. Research in the Development of the Young Child.

C.W.250. Nursery School Education. Discussion of historical background and current practices, fundamental problems and theory, problems of administration and organization.

LIBRARY METHODS

Statement of fees.—A tuition fee of $3 per credit is charged for all courses in Library Methods under the Division of Library Instruction, except Course 1. (See Part II of this bulletin, p. 81.) Maximum fee for courses in Library Methods, not including courses in other subjects, for residents $40, for non-residents, $45.

Lib.Meth.101. Bibliography. Trade and national bibliography of the United States, Great Britain, and Europe; book ordering methods.

Lib.Meth.102. Cataloging. Elements of dictionary cataloging. Lecture, problems, and practice.

Lib.Meth.103. Cataloging. Continuation of 102, with special attention to difficult books and administrative aspects of a catalog department.

Lib.Meth.104. Classification. Classification by the Dewey Decimal System, subject headings, author numbers, shelf and accession records.

Lib.Meth.105. Classification. Continuation of 104. Library of Congress and other classifications; classed catalogs; special adaptations of classification.

Lib.Meth.107. School Library Administration. Administrative methods and problems of school libraries.

Lib.Meth.108. Public Library Administration. Administration, equipment, finance, and extension work of public libraries.

Lib.Meth.110. Library Binding. Economics of library binding. Materials, processes, records, book repair.

Lib.Meth.111. Library Practice. Practice, under supervision, in Minneapolis and St. Paul libraries. The time and character of the practice

will be arranged individually to suit student aptitudes, usually in the second and third quarters. Required of all students as prerequisite to a degree in library training.

Lib.Meth.112. Reference. Reference books and other material with emphasis on methods of search and adaptation of material to needs of users.

Lib.Meth.113. Reference—Continued. Specialized reference material, public documents, and periodicals. Reference lists and reports on special problems.

Lib.Meth.114. Selection of Books for Adolescents. Principles of selection and criticism of representative books. Study and preparation of book lists for adolescents in school and public libraries.

Lib.Meth.117. Library Printing. Preparation of copy, editing, proof reading, layout of library publications. Criticism of typical printed material.

Lib.Meth.118. Library Publicity. Preparation and use of print in library publicity. Library exhibitions, etc.

Lib.Meth.119. Current Library Problems. Discussion of typical problems and conditions in American libraries.

Lib.Meth.120. Current Library Problems. Further discussion of typical library problems, library buildings, library surveys, etc.

Lib.Meth.121. Library Work with Children. Administration of children's rooms and book selection.

Lib.Meth.122. Library Work with Children. Further discussion of administration of children's rooms and book selection.

Lib.Meth.123. Selection of Books for Adults. Principles of selection and criticism of representative books. Criticism and preparation of book lists.

Lib.Meth.124. Selection of Books for Adults. Further discussion of books and aids to book selection.

Lib.Meth.125. Selection of Books for Adults.

PHYSICAL EDUCATION FOR MEN

Statement of fees.—A gymnasium fee of $1.50 is charged for all courses in Physical Education for Men with the exception of the following, for which no fees are charged: Phys.Ed.7, 8, 9, 22, 23, 28, 31, 32, 33. Maximum gymanisum fee per student for any one quarter, $1.50. No gymnasium fee is charged for Phys.Ed.24-25 and 43-44-45 but the regular methods and practice teaching fee of $1 per credit is charged as indicated in the footnote.

Phys.Ed.1-2-3. Freshman Physical Education. Mass activities, corrective exercise, apparatus work, swimming, athletics, games, and efficiency test.

Phys.Ed.A,B,C. Elementary Physical Education. Elementary gymnastics, i.e., free exercises, marching tactics, apparatus work, gymnastic dancing, group games, physical efficiency tests. Majors in physical education must substitute this course for Phys.Ed.1-2-3.

Phys.Ed.7-8-9. Advanced Leaders. One hour of instruction; two hours leading squads in Phys.Ed.1-2-3 or 16-17-18 under supervision.

Phys.Ed.10-11-12. Minor Sports. Study of nature and function of play; use of leisure time; rules, theory, technique, and values of different sports. Fall: swimming; winter: hockey and winter sports, handball and squash racquets; spring: soccer and golf.

Phys.Ed.13-14-15. Corrective Work. By petition in place of Phys.Ed.1-2-3.

Phys.Ed.16-17-18. Drill Substitution. By petition in substitution for Military Science.

Phys.Ed.19-20-21. Gymnastics. Gymnastic marching, calisthenics, light and heavy apparatus work, and tumbling.

Phys.Ed.22-23. Kinesiology. A discussion of the principles and mechanics of bodily movements; the relation of posture to health and efficiency; the effects of various exercises upon the tissues and organs of the body.

Phys.Ed.24-25.[1] Methods in Physical Education. Lectures and quizzes on terminology, technique of teaching and various methods of teaching physical education activities.

Phys.Ed.28. 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.

Phys.Ed.29. Adaptation of Activities in Orthopedic Procedures. Lectures on theories governing the correction of physical and organic defects. Practice in handling classes and in executing the various remedial activities.

Phys.Ed.30. Athletic Training. Principles governing conditioning of men for various sports; diet, sleep, exercise, bathing, massage. Overtraining: its cause, diagnosis, prevention, and cure. Prevention and treatment of common athletic injuries.

Phys.Ed.31. History of Physical Education. A historical survey of physical education from ancient times to the present. Special consideration of different systems of physical education and contemporary developments.

Phys.Ed.32. Principles of Physical Education. Study of the aims and scope, and the biological aspects of physical education, with special reference to its place in education; comparative value of various activities; activities suitable to different sexes, ages, and varying conditions.

Phys.Ed.33. Organization and Administration of Physical Education. Problems of organization, administration, and supervision. Correlation of various phases of work; required and elective courses, intramural and interinstitutional athletics. Construction, equipment, and care of gymnasia and fields. Athletic management.

Phy.Ed.37. Football Coaching. Lectures on history, rules, theory, strategy, generalship, styles of attack and defense, methods of organizing practice

[1] A fee of $1 per credit is charged for this course.

and handling men, development of team spirit, officiating. Demonstrations and practice in the technique of fundamentals and position play.

Phys.Ed.38. Basket-Ball. Lectures on rules, styles of offense and defense, the conditioning and handling of a team. Practice in fundamental technique of footwork, passing, guarding, dribbling, goal throwing, etc.

Phys.Ed.39. Track Athletics. Instruction and practice in the standard track and field events. Lectures on the conduct of meets, rules of competition, officiating, track strategy, regulation of practice, and preparing contestants for competition.

Phys.Ed.42. Baseball. Theoretical consideration of, and actual practice in, batting, base running, and methods of playing each position. Special attention to "inside baseball" and the development of team play.

Phys.Ed.43-44-45.[1] Practice Teaching. Six hours of practice per week in teaching gymnastics and corrective exercise; coaching, supervising, and officiating in all branches of athletics.

PHYSICAL EDUCATION FOR WOMEN

Statement of fees.—Freshman Physical Education, $2.50 a quarter. All other exercise courses, including swimming, for which registration is required, except Course 24, $2 a quarter for classes meeting twice a week, $2.50 for classes meeting three times a week. Maximum gymnasium fee per student, $3.50 a quarter. No gymnasium fee is charged for Courses 4, 24, 39, 49, 66, 67, 80, 87, 89, 97. In addition a fee of $1 per credit is charged for all methods and practice teaching courses as indicated in the footnotes.

Phys.Ed.1-2-3. Elementary Physical Education. Orientation towards outdoor and indoor physical education activities through fundamental elements and principles and their application in indvidual and team sports. Orthopedic exercise. Personal hygiene lectures. Individual health conferences.

Phys.Ed.4. Preliminary Hygiene. The most essential aspects of the care of personal health. For nurses and transfer students.

Phys.Ed.7-8. Sophomore Physical Education. A course in gymnastics for special purposes and games.

Phys.Ed.9. Sophomore Archery.

Phys.Ed.10-11-12. Sophomore Orthopedic and Individual Gymnastics. For those not able to take regular work. Exercises are individualized to meet the needs of each student.

Phys.Ed.13-14-15. Sophomore Interpretive Dancing. Elementary techniques and group interpretations in which the purpose is to develop a sense of beauty of movement.

Phys.Ed.16-17. Sophomore Games and Folk Dancing.

Phys.Ed.18.[2] Sophomore Tennis.

[1] A fee of $1 per credit is charged for this course.

[2] Students must supply their own rackets and balls. A fee of $1 is charged for a tennis permit. This allows free use of the courts for the quarter.

Phys.Ed.19-20-21. Sophomore Major Sports. Hockey in autumn, basket-ball in winter, baseball in spring. Suitable in strength for A-B girls.

Phys.Ed.22-23. Sophomore Elementary Swimming. Fundamental strokes, deep water emergency measures, elementary diving.

Phys.Ed.24.[2] Sophomore Horseback Riding. Lessons for beginning and advanced classes under instruction by a member of the Physical Education Department. Students registering for this course will pay $12 for the 12 lessons and will be exempt from this physical education fee.

Phys.Ed.25-26. Sophomore Intermediate and Advanced Swimming. Technique of strokes and diving, stunts, games; water safety.

Phys.Ed.27.[3] Sophomore Elementary Golf. For beginners. Instruction and practice in fundamental strokes, rules, and etiquette.

Phys.Ed.28.[3] Sophomore Intermediate Golf. For students who know the rudiments of golf. Instruction in the technique of the strokes. Students registering for this course will be held for the regular golf fee.

Phys.Ed.30. Sophomore Life Saving and Water Sports. Instruction and preparation to pass senior Red Cross life saving test.

Phys.Ed.31. Sophomore Skating. Practice and technique of skating, including simple figure skating and form in speed skating.

Phys.Ed.36-37-38. Freshman Major Team Sports. Soccer, speed ball, volley ball, basket-ball, baseball, for majors in physical education.

Phys.Ed.39. First Aid. Principles and techniques in meeting emergency situations. Emphasis upon handling situations most frequently met in physical education activity.

Phys.Ed.40-41-42. Individual Sports and Fundamentals of Movement. Tennis in first half of fall quarter. Fundamentals in last half of fall and winter quarters. Track, archery, golf in the spring.

Phys.Ed.43-44. Elementary Games and Folk Dancing. Graded games, folk dances, stunts, and track for school and playground.

Phys.Ed.46-47-48. Sophomore Team Sports. Further practice in sports included in 36-37-38. Hockey instead of soccer. For those who are exempt from 36-37-38, or those needing further practice before entering Phys.Ed.56.

Phys.Ed.49.[4] Human Anatomy. A study of the human body with lectures, demonstrations, laboratory, and quizzes. Dissection for those interested.

Phys.Ed.50-51. Sophomore Individual Sports. Further practice in sports included in 40-42. For those who are exempt from 40-42, or those needing further practice before entering Phys.Ed.56.

Phys.Ed.54-55. Danish Gymnastics. Gymnastics, marching, and apparatus.

Phys.Ed.56-57-58.[5] Technique of Teaching Sports. Team games and individual sports. Special techniques for each sport and methods of teach-

[2] Students registering for riding will pay $12 for 12 lessons, but will be exempt from the regular physical education fee.

[3] Students must supply their own golf equipment. The golf course at the University Recreation Field will be used. Student tickets, 10 for $4.50 or 50 cents each.

[4] A laboratory fee of $2 is charged for this course.

[5] A fee of $1 per credit is charged for this course.

ing. Organization of extra-curricular activities. Practice in skills and practice teaching within the group.

Phys.Ed.59-60. Swimming for Majors. Instruction in strokes and diving, deep water emergency measures. Preparatory course for Phys.Ed.69.

Phys.Ed.61-62-63. Elementary Interpretive Dancing. Elementary techniques and group interpretations in which the purpose is to develop a sense of beauty of movement.

Phys.Ed.64-65. Modified Swedish Gymnastics. Gymnastics, marching, and apparatus.

Phys.Ed.66. Kinesiology. Principles of body movement based on anatomy and physics. A study of the efficient use of the body in various activities.

Phys.Ed.67. Physical Examination. Organization and technique of examination and measurement.

Phys.Ed.69-70.[5] Technique of Teaching Swimming. Description of strokes and diving, methods of teaching, practice in teaching and life saving.

Phys.Ed.71-72-73. Intermediate Interpretive Dancing. Group and individual interpretations and more advanced techniques than in elementary dancing.

Phys.Ed.74-75.[5] Technique of Teaching Gymnastics. A study is made of the educational philosophy underlying gymnastics, principles of progression, and methods of teaching gymnastics. Practice teaching is done within the group.

Phys.Ed.76. Theory of Orthopedics and Remedial Gymnastics. Principles and techniques involved in the use of exercise for the correction of functional or structural defects.

Phys.Ed.77. Advanced Folk Dancing. The racial characteristics and folk arts of peoples are studied as a background for folk dances.

Phys.Ed.78.[5] Technique of Teaching Folk Dancing. Practice teaching is done within the group.

Phys.Ed.80. Principles of Play. A consideration of nature and function of play, child interests at various ages, organization for activity, management.

Phys.Ed.81. Advanced Interpretive Dancing. Laboratory course for application of Phys.Ed.83.

Phys.Ed.82.[5] Technique of Teaching Rhythm. A consideration of teaching rhythmic activities to elementary, high school, and college classes. Practice teaching within the group.

Phys.Ed.83. Principles of Dancing. The dance is studied for the effect on its development of such influence as allied arts, religion, etc. The phases of the dance taught in this University are analyzed and the place of the dance in physical education determined.

Phys.Ed.84-85. Advanced Fundamentals of Movement. A summary of fundamental elements in movement with particular reference to the teaching approach in elementary and high school classes.

[5] A fee of $1 per credit is charged for this course.

Phys.Ed.87. Trends in Physical Education. A historical survey of trends in physical education beginning with Greece and including contemporary developments.

Phys.Ed.88. Principles of Physical Education. Philosophy of physical education, and principles underlying curriculum building, methods of teaching, and measurement of outcomes.

Phys.Ed.89. Health Education in Elementary and Secondary Schools. Study of principles, methods, materials, and problems of health education in preparation for practice teaching.

Phys.Ed.90. Problems in Physical Education. A study of problems in the entire field of physical education carried on by individuals or groups.

Phys.Ed.92-93-94.[1] Practice Teaching. Practice teaching in team and individual sports, orthopedic work, and fundamentals in university freshman classes; in games, health, fundamentals, and dancing in elementary or high schools in Minneapolis.

Phys.Ed.97. Administration of Physical Education. Study of organization of physical education and health departments in city, state, and university; construction and equipment; professional ethics.

Activities for Which No Registration Is Required

Elective Sports. Fall: field hockey, volley ball; winter: basket-ball, ice hockey; spring: track, baseball, swimming.

General Swimming. For both beginning and advanced swimmers and divers. Shower bath tickets may be bought of the matron.

Tap Dancing. Elementary and advanced routines.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

P.M.&P.H.2. First Aid. Laboratory demonstrations and practice. General care and observation of patients. Emergencies and first aid treatment.

P.M.&P.H.3. Personal Hygiene and Elementary Sanitation. Elementary principles of normal body function; predisposing and actual causes of disease; ways in which disease may be avoided.

P.M.&P.H.50. Public and Personal Health. Discusses the causes of diseases and of physical defects and presents the fundamental principles and working methods of health conservation and disease prevention. Lectures, demonstrations, discussions, inspection trips, and directed readings.

P.M.&P.H.52. Health Care of the Family. (See bulletin of College of Agriculture, Forestry, and Home Economics.)

P.M.&P.H.53. Elements of Preventive Medicine. 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; vital statistics.

P.M.&P.H.57. Health of Infant and Pre-school Child. Growth and development of baby and young child. Care and feeding of normal child. Prevention and correction of physical defects. Demonstration of infant clinics.

[1] A fee of $1 per credit is charged for this course.

P.M.&P.H.58. Maternal and Child Hygiene (for public health nurses). 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.

P.M.&P.H.59. Social Hygiene. Relation to public health; normal physiological development through adolescence; educational measures; responsibility of the public health nurse; prevention and control of venereal diseases.

P.M.&P.H.60. 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.

P.M.&P.H.61. Mental Hygiene. History of movement; social importance. Factors underlying emotional maladjustments and mental disease. Relation to social work, social agencies, and psychiatric practice. Illustrative case material.

P.M.&P.H.62. Principles of Public Health Nursing. History and development of public health nursing; a study of the underlying principles of organization, administration, and service—in a program of individual and family health supervision; methods of co-operative endeavor with social agencies; health teaching as an essential factor in promotion of individual and community well being.

P.M.&P.H.63. Special Fields in Public Health Nursing. This course deals with the application of the general principles underlying public health nursing to the specialized fields, including maternal and infant welfare, pre-school, school, industrial, tuberculosis, and rural nursing. The historical development, scope of program, analysis of service will be studied.

P.M.&P.H.64. 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.

P.M.&P.H.65. Field Practice in School Nursing. Routine inspections with the school nurse; assistance at medical examinations; general sanitary inspections; home visits; visits to special classes, as sight-saving, defective speech and hearing, subnormal, and open air.

P.M.&P.H.66. Field Practice in County Nursing. Student nurse observes and assists the nurse on her rounds in the county, in the routine physical inspection of school children, the home calls, the health talks and classes in home nursing, as well as the organizing, advertising, and conducting of the rural clinic.

P.M.&P.H.67. Field Practice in a Tuberculosis Sanatorium. Observation and practical care of pulmonary, osseous, laryngeal tuberculosis; tuberculous enteritis; general sanatorium treatment; special treatment; exer-

cise; laboratory; occupational therapy and the reading of literature on tuberculosis.

P.M.&P.H.68. Field Practice in Visiting Nursing. 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.

P.M.&P.H.69. School Nursing Procedures. Its objectives, program, and techniques. Discussion of procedures usually carried on by the school nurse in the conduct of a health program in both rural and urban schools. Opportunities for practice work will be provided. Open to public health nurses and students with teaching experience.

P.M.&P.H.70.[1] Methods and Materials in Teaching Home Nursing and Child Care. Theory and practice in the principles, content, and methods used in teaching home sanitation, home care of the sick, and prevention of illness to various lay groups in the community.

P.M.&P.H.71. Supervision in Public Health Nursing. This course is planned for the experienced public health nurse and deals with the principles and practices of supervision in public health nursing and with the problems encountered in both city and rural communities.

P.M.&P.H.73. Occupational Hygiene and Disease.

P.M.&P.H.74.[1] Health Instruction Methods and Materials. Discussion deals with administrative problems of health teaching and with programs and the actual techniques and methods employed in the classroom.

P.M.&P.H.75.[1] Practice Teaching in Health Subjects. An opportunity is given for the advanced student to do practice teaching under supervision.

P.M.&P.H.80. Health Supervision of the School Child. Intended for teachers interested in child health. Consideration of hygiene of physical and mental growth; health supervision of school children; special health classes and procedures, and sanitation of school plant.

For courses above 100 see Graduate School bulletin.

PUBLIC SCHOOL MUSIC

NOTE.—For description of courses in Music and statement of fees see bulletin of Science, Literature, and the Arts, Part I. For statement of fees, see also College of Education bulletin, Part II.

Mu.Ed.1-2-3. Music Orientation. A course designed to acquaint the student with the literature of music, and to assist in the more intelligent listening and appreciation thereof. Attendance at musicales and concerts is strongly urged.

Mu.Ed.4-5-6.[1] Applied Instrumental Technique. This laboratory course is divided into three quarters, strings, brass (and percussion), and wood-

[1] A fee of $1 per credit is charged for this course.

winds, respectively. It incorporates the theory and technical development of the instruments, and elementary instruction in the playing of the chosen vehicle of expression, with special attention to the routine of class instruction.

Mu.Ed.50.[1] Elementary Methods. Practical methods of teaching music in the kindergarten, and grades one to six, inclusive. Particular attention is given to the child voice, its care and development. Students are required to observe music teaching in the Minneapolis and St. Paul grade schools.

Mu.Ed.51.[1] Comparative Methods. An analysis of the various techniques of music teaching and supervision, stressing the learning processes, psychology of method, and standards of attainment of each.

Mu.Ed.52.[1] Technique of Teaching Appreciation. A practical course in the teaching of appreciation of music to children in the elementary grades. Materials and methods of presentation will be discussed and demonstrated, using the class as a laboratory.

Mu.Ed.53.[1] High School Methods. Organization and methods of teaching chorus and voice classes, appreciation and theoretical music in the modern high school. Particular attention to the changing voice. Students are required to observe in the Minneapolis, St. Paul, and University high schools.

Mu.Ed.54.[1] Operetta Conducting. Materials and methods of presenting and organizing high school operettas, pageants, cantatas, etc. An operetta is presented by the class, paying particular attention to the details of the work from the director's standpoint.

Mu.Ed.55.[1] Survey of Materials (Vocal). A laboratory course in materials used by the music departments of the public schools, paying particular attention to the psychology of program building. A survey of the well-known and newer publications in the field of public school music.

Mu.Ed.56.[1] Survey of Materials (Instrumental). A laboratory course in materials used by instrumental ensembles, paying particular attention to the psychology of program building. A survey of the well-known and newer publications in the field of public school music.

MuEd.57.[1] Orchestra Conducting. This course is a laboratory for practice in orchestra and band conducting. The class is in itself the ensemble, and the responsibility of conducting is rotated among the members. Technique of the baton, interpretation, seating arrangement, and auditorium acoustics are discussed.

Mu.Ed.58.[1] Choral Conducting. A practical course in choral conducting. The class is used as a laboratory for student conducting. Essentials of expression and interpretation are demonstrated in class.

Mu.Ed.59.[1] Advanced Conducting. A study of the techniques of conducting, interpretation, and expression, the art of program making, rehearsals, organization, and the essentials of musical leadership.

Mu.Ed.60-61-62.[1] Supervision and Teaching. Principles of music supervision, including the problems of the new teacher and supervisor, and

[1] A fee of $1 per credit is charged for this course.

an analysis of the various extra-curricular duties relevant to such a position. A thesis with research work in a particular field is required. Practice teaching is done in both grade and high schools in Minneapolis and St. Paul.

Mu.Ed.65.[4] Instrumentation. This course involves a theoretical study of orchestral and band instruments, in combination. The physics of tone color is explained. Revision of materials suitable for school use, and discussion of capacity and capability of school performance on the various instruments are undertaken.

Mu.Ed.70. Accompanying and Sight Reading. A laboratory course aimed to develop proficiency in the art of accompanying and sight reading.

SPECIAL EDUCATION

Ed.Psy.195. Seminar on the Work of the Visiting Teacher. An intensive study of case histories of pupils referred by the schools to visiting teachers. Opportunity will be offered students to present case histories drawn from their experience.

THEORY AND PRACTICE OF TEACHING[1]

UNDERGRADUATE COURSES[2]

GENERAL METHODS

Ed.T.15.[4] Technique of High School Instruction. A general introductory course in the field of high school methods. Equivalent to Ed.53.

SPECIAL METHODS AND PRACTICE TEACHING—COMBINED COURSE[3]

The teachers' courses in methods of teaching and in practice teaching are combined in one-year course in the following subjects:

Ed.T.23-24-25.[4] Geography. (For junior high schools.)
Ed.T.49-50-51.[4] English. (For junior high schools.)
Ed.T.52-53-54.[4] English. (For senior high schools.)
Ed.T.56-57-58.[4] Mathematics.
Ed.T.62-63-64.[4] Secondary School Science.
Ed.T.66-67-68.[4] History and Social Science.
Ed.T.70-71-72.[4] German.
Ed.T.73-74-75.[4] Latin.
Ed.T.76-77-78.[4] Romance Languages (French and Spanish).
Ed.T.80-81-82.[4] Commercial Subjects.

[1] For the specific requirements in the theory and practice of teaching in the special subjects, consult the special curricula. For list of major advisers see page 19.

[2] For courses giving graduate credit see page 101.

[3] Arrangements for practice teaching in the academic subjects should be made through Mr. Charles W. Boardman before the close of the junior year. Such arrangements should be completed before the student registers for other courses.

[4] A fee of $1 per credit is charged for this course.

PRACTICE TEACHING FOR SPECIAL STUDENTS

Ed.T.16.[1] Practice Teaching. Teaching under supervision in the University High School and in the Twin City schools. The course calls for one period daily at the school where the work is assigned. Registration in this course is limited to students who have completed special methods courses or have had teaching experience. Practice teaching in academic subjects is normally combined with Special Methods courses into a one-year Teachers' Course.

Ed.T.17.[1] Practice Teaching of Subnormal Children. Students will have opportunity to observe work with the special classes, and to teach under direction. Conducted in co-operation with the public schools of Minneapolis and St. Paul.

Ed.T.46.[1] Practice Teaching with Special Methods in Elementary Schools. Teaching under supervision in graded or rural schools in the vicinity of the University; discussion of special methods in their application to actual problems of teaching.

SPECIAL METHODS COURSES IN SENIOR HIGH SCHOOL SUBJECTS

Ed.T.18.[1] Teachers' Course in Zoology.

Ed.T.19.[1] Teachers' Course in Botany.

Ed.T.20.[1] Teachers' Course in Chemistry.

Ed.T.21.[1] Teachers' Course in English Composition.

Ed.T.22.[1] Teachers' Course in English Literature.

Ed.T.35.[1] Teachers' Course in Norwegian.

Ed.T.37.[1] Social Science for Senior High Schools. Selection, organization of content, preparation and presentation of data, methods of teaching.

Ed.T.38.[1] Methods and Problems in Secondary School Science. Organization and methods of secondary school sciences. Attention to general science, lesson planning, methods of presentation, assignments, measuring achievement.

Ed.T.41.[1] Teachers' Course in Swedish.

Ed.T.47. Field Problems in High School Normal Training Departments. Observation of the organization and management of a training department; the department in relation to administration and supervision; program of studies; projects in the field.

Ed.T.52-53-54.[1] Special Methods and Practice Teaching in English. A one-year course. This course or Ed.T.49-50-51 is required of all students with a major in English or Speech.

Ed.T.52.[1] The Teaching of Composition in the Senior High School. Objectives of composition; selection of subject-matter and its relation to the problem—project method of assignment; problems of grading composition; problems of teaching grammar, punctuation, and spelling; oral composition. Practice teaching and observation are combined with this course except in special cases.

Ed.T.53.[1] The Teaching of Literature in the Senior High School. Objectives of literature teaching; differentiated method for appreciation and

[1] A fee of $1 per credit is charged for this course.

information; methods of handling different types such as fiction, drama, poetry, and essay; survey courses; home reading; illustrative material. Practice teaching and observation are combined with this course except in special cases.

Ed.T.56-57-58.[1] Special Methods and Practice Teaching in Mathematics. A one-year course required of all students with a major in mathematics.

Ed.T.56a-57a.[1] The Teaching of Secondary School Mathematics. Discussion of procedures in selecting and organizing materials and in teaching secondary school mathematics.

Ed.T.62-63-64.[1] Special Methods and Practice Teaching in Secondary School Science. A one-year course required of all students with a major in natural science.

Ed.T.62a-63a. The Teaching of Secondary School Science.

Ed.T.66-67-68.[1] Special Methods and Practice Teaching in History and Social Studies. A one-year course required of all students with a major in history or the social studies.

Ed.T.66a-67a. The Teaching of Social Science in Senior High School.

Ed.T.70-71-72.[1] Special Methods and Practice Teaching in German. A one-year course required of all students with a major in German.

Ed.T.73-74-75.[1] Special Methods and Practice Teaching in Latin. A one-year course required of all students with a major in Latin.

Ed.T.76-77-78.[1] Special Methods and Practice Teaching in Romance Languages. A one-year course required of all students with a major in French or Spanish.

Ed.T.80-81-82.[1] Special Methods and Practice Teaching in the Commercial Subjects. A one-year course required of all students in the specialized curriculum in commercial education.

Ed.T.83.[1] Teachers' Course in Journalism.

SPECIAL METHODS COURSES IN JUNIOR HIGH SCHOOL SUBJECTS

Ed.T.14.[1] Teaching Junior High School Mathematics. Discussion of the courses of study and methods of presentation in the junior high school.

Ed.T.23-24-25.[1] Special Methods and Practice Teaching in Geography. The teaching of geography in junior high schools. A teacher's course in methods and practice teaching combined into a one-year course. Required of all students with a major in geography.

Ed.T.39.[1] Social Science for Junior High Schools.

Ed.T.49-50-51.[1] Special Methods and Practice Teaching in English. The teaching of English in junior high schools. A one-year course. This or Ed.T.52-53-54 required of all students with a major in English.

Ed.T.49.[1] The Teaching of Composition in the Junior High School. Aims of composition teaching in relation to pupil interests and general life needs. Importance of classroom presentation. Project motivation. Group method. Problems of measurement. The place of grammar, punctuation, and spelling.

[1] A fee of $1 per credit is charged for this course.

Ed.T.50.[1] The Teaching of Literature in the Junior High School. Differentiated purposes in reading and literature. Methods of classroom presentation. Motivation by group and project methods in extensive reading. Testing. Illustrative materials.

METHODS IN THE ELEMENTARY SCHOOL

Ed.T.42. Fundamental Educational Theories Relating to Instruction in the Elementary School. A study of current educational concepts as related to problems in the elementary school.

Ed.T.43. The Teaching of English in the Elementary School. A consideration of the materials and the means for improving instruction in spelling, language and reading processes; emphasis on silent reading technique in Grades 1-6.

Ed.T.44. Children's Literature. A study of the varied purposes of reading in the elementary school. Bases of selecting materials for extensive reading. Analysis of studies of children's interests. Extensive critical survey of old and new materials for children's reading.

Ed.T.45. 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.

METHODS IN THE KINDERGARTEN AND NURSERY SCHOOL

Ed.T.30. 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.

Ed.T.31. 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.

Ed.T.32[1] Plastic Materials. The materials used in constructive work, paper, crayons, paints, clay, woodwork, sewing, sand, etc. The student is given some opportunity for actual use of the materials and will gain considerable knowledge of the abilities of children of different ages.

Ed.T.33. Rhythms, Games, and Music for the Young Child. A course designed to train the student in the handling of a music and rhythm period and in group games. The student will be expected to take part in the rhythms and music work in both the nursery school and the kindergarten.

Ed.T.34. 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.

Ed.T.85-86-87.[1] Methods and Observation. Two hours each week will be spent observing in the nursery school or in the kindergarten. There will be written reports of the observations and a class discussion of one hour in alternate weeks.

[1] A fee of $1 per credit is charged for this course.

Ed.T.88-89-90.[1] Practice Teaching in Kindergarten or Nursery School. Students must choose either nursery school or kindergarten practice teaching. If they desire, students may do practice teaching in both schools by putting in additional hours, but they can receive credit for only one. Practice will be arranged to give the student a varied experience, and each student will be assigned one child for intensive study throughout the year.

SPECIAL METHODS IN SPECIAL SUBJECTS

For courses in the theory and practice of teaching in the special subjects see special curricula.

COURSES OPEN TO GRADUATE STUDENTS

Ed.T.110. Measurement in Secondary Education. The application of educational measurements to the solution of the problems of high school instruction. Analysis of the specific learning process 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.

Ed.T.118. Problems in Junior High School English.

Ed.T.122. Literature for Adolescents. 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.

Ed.T.143-144. 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.

Ed.T.148-149. The Teaching of Arithmetic. Methods of teaching in the primary and intermediate grades; methods of enriching the subject; individualizing of instruction; techniques of diagnosis; preparation of informational units.

Ed.T.150.[1] Teaching and Administration in Teachers Colleges. In this course emphasis is placed on the historical development, the present status, and the prospects of future development. An intensive study is made of curricula, departmental organization, and practice teaching. Emphasis is placed also on the supervision of instruction.

Ed.T.181-182.[1] Technique of Elementary School Instruction. A critical study of types and methods of elementary classroom activity with emphasis upon the techniques and the function of the newer methods with observation in the demonstration school.

Ed.T.188[1] Advanced Course in Methods of Teaching Modern Languages. An advanced course of the seminar type in methods of teaching modern foreign languages. Designed primarily for experienced teachers and graduate students. Lectures, readings, discussion.

[1] A fee of $1 per credit is charged for this course.

Ed.T.191.[1] Advanced Course in the Teaching and Supervision of Secondary School Mathematics. Evaluation on the available scientific evidence of present procedures in methods and content of junior and senior high school mathematics.

Ed.T.193. 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 subject-matter and to classroom procedure. Each member will work primarily in the field of his teaching choice, with a final synthesis by the class as a whole.

Ed.T.194.[1] Advanced Course in Methods of Teaching English. Evaluation of present practices in methods and content of junior and senior high school English courses in the light of the known results of scientific investigations in that field.

Ed.T.196-197-198. Special Problems in Techniques of Secondary School Instruction. Special research problems in the field of the student's individual choice.

Ed.T.201-202-203.[1] Advanced Course in the Methods of Teaching History and the Social Studies.

Ed.T.222-223-224. Seminar in Techniques of Secondary School Instruction. No credit. Required of students working on theses.

See also Ed.228-229-230 under General Courses, page 73.

For graduate courses in the theory and practice of teaching in special subjects see the respective departmental course description.

[1] A fee of $1 per credit is charged for this course.

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The Bulletin *of the* University *of* Minnesota

Department of Music Announcement for the Year 1931-1932

Vol. XXXIV No. 50 September 17 1931

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DEPARTMENT OF MUSIC

FACULTY

Carlyle M. Scott, Professor and Chairman of the Department of Music
Donald N. Ferguson, M.A., Professor of Music
Gertrude Hull, Associate Professor of Music
Earle G. Killeen, M.Mus., Professor of Music
William Lindsay, Associate Professor of Music
George H. Fairclough, F.A.G.O., M.Mus., Assistant Professor of Music
Archie N. Jones, B.S., Assistant Professor of Education
Blanche Kendall, Assistant Professor of Music
Abe Pepinsky, B.A. Assistant Professor of Music
Gertrude Reeves, Assistant Professor of Music
Clyde W. Stephens, Assistant Professor of Piano
Harold Ayers, Instructor in Violin
Cecil Birder, LL.B., Instructor in Voice
Alexandre Duvoir, Instructor in Oboe
Christian Erck, Instructor in Cello
Roger Gauthier, Instructor in English Horn
Rudolph Goranson, B.S., Instructor in Public School Music
Georges Grisez, Instructor in Clarinet
Michael Jalma, Director of Band
Paul Lemay, Instructor in Viola
Richard Otto Lindenhahn, Instructor in French Horn
Karl Scheurer, Instructor in Violin
Miles Sery, Instructor in Tuba and Cornet
Agnes Rast Snyder, Instructor in Voice
George Stump, B.A., Instructor in Voice
Kate Mork Twichell, Instructor in Piano
Henry J. Williams, Instructor in Harp
Mary Malcolm, B.S., Assistant

COURSES OF STUDY

Two major courses of study are offered to the student of music as follows:

1. Course in Arts and Music leading to the degree of bachelor of arts with a major in music.

2. Course in Public School Music leading to the degree of bachelor of science in education and the state teacher's certificate.

Students desiring to follow the first course of study will register in the College of Science, Literature, and the Arts. Those desiring to follow the course in Public School Music will register in the College of Education.

Opportunities are also offered through registration in the General Extension Division to those who desire to take special work in practical and theoretical music without qualifying for a degree.

The Department of Music also offers its courses as electives to the students of any school or college of the University subject to the rules of the school or college in which the student is registered, and subject to satisfying the general requirements for admission to practical courses in music as stated below.

ADMISSION

1. *Admission to the freshman year.*—Admission to the University is either by certificate (for graduates of accredited secondary schools) or by examination. Candidates must have completed the equivalent of a four-year high school course and must present:

a. Four units of English; or three units of English and four units of a foreign language; or three units of English and two units of each of two foreign languages.

b. One unit of algebra and one unit of plane geometry or two units of unified mathematics.

c. Enough additional work to make in all fifteen units, of which not more than four may be in Group F (vocational and miscellaneous subjects).

A detailed statement of admission requirements may be found in the bulletin of general information.

2. *General requirements for admission to the work of the Music Department.*—All students wishing to register in one of the four-year courses of study listed above must, upon matriculation, choose a major subject in practical music and pass an examination in that subject before a committee of the faculty of the Music Department. Entrance requirements for a major, according to instrument are:

a. Piano: Any major or minor scale in octaves, thirds, sixths, or tenths, M.M. quarter notes = 108; Bach Invention or dance from one of the suites; a sonata by Haydn or Mozart; a modern composition of equal difficulty with the sonata.

b. Voice: Good natural equipment and 2 years of piano.

c. Violin: Major and minor scales, arpeggios; the simpler Kreutzer Etudes; a sonata by Handel, Haydn, Mozart, or Schubert; a more modern work displaying special technic peculiar to the violin.

d. Organ: Same as piano.

Also, all public school music students *not majoring* in piano and all Science, Literature, and the Arts students *majoring* in voice will be examined concerning requirements to be met in piano. (See I and II regarding practical music requirements for graduation.)

Students from other departments or colleges electing courses in practical music must take simple preliminary examinations in those courses.

3. *Admission to extension courses.*—Any student who meets the general requirements under 2, above, may register for extension courses in music. Such courses, however, will not carry credit toward a university degree until entrance requirements under 1, above, have been met.

FEES

DEGREE COURSES OF STUDY

Tuition fee (per quarter)	
Residents of Minnesota	$20.00
Non-residents	30.00
Credit hour tuition fee (unclassed students, auditors, and others carrying less than full work)	
Residents of Minnesota	1.75
Non-residents	2.50
Incidental fee (per quarter)	6.00
Matriculation deposit (first quarter only)	15.00
($5.00 for women)	
Special fees	
Examination for removal of condition	1.00
Examination for credit (after the first quarter in residence)	5.00
Special examination	5.00
Special methods and practice teaching fee*	
Laboratory fee†	
Graduation fee	10.00
Music fees, per quarter (for piano, organ, voice, violin)	
Two lessons per week (one-half hour)	65.00
One lesson per week	35.00
Music fees, per quarter (for all courses except piano, organ, voice, and violin)	
Two lessons per week (one-half hour)	75.00
One lesson per week	40.00
Practice fees	
Organ (per hour)	
Small	.20
Large	.40
Piano (six hours per week) per quarter	5.00
($.50 per quarter for each additional hour per week)	

* The following courses carry the special methods and practice teaching fee of $1 per credit hour:

Mu.Ed. 50. Elementary Methods
Mu.Ed. 51. Comparative Methods
Mu.Ed. 52. Technique of Teaching Appreciation
Mu.Ed. 53. High School Methods
Mu.Ed. 54. Operetta Conducting
Mu.Ed. 57. Orchestra Conducting
Mu.Ed. 58. Choral Conducting
Mu.Ed. 59. Advanced Conducting
Mu.Ed. 60. Supervision
Mu.Ed. 61. Practice Teaching
Mu.Ed. 65. Instrumentation

† The following courses carry the special laboratory fee of $1 per credit hour:

Mu.Ed. 1-2-3. Applied Instrumental Technique
Mu.Ed. 55-56. Survey of Materials (Vocal, Instrumental)

EXTENSION COURSES

Tuition fee per credit hour $3.33
Music fee (for each course in practical music) same as above.

Students in other schools and colleges of the University are required to pay the music fees for each course in practical music in addition to the regular fees of the curriculum in which they are registered.

I. GENERAL COURSES LEADING TO DEGREE OF BACHELOR OF ARTS WITH A MAJOR IN MUSIC

The four-year course leading to the degree of bachelor of arts combines the theoretical and practical work in music with the study of psychology, modern languages, English literature, and history. The object is to provide a well-rounded cultural course for those whose major interest is music.

To secure the degree of bachelor of arts with a major in music, students must fulfill the requirements of both the Junior and Senior colleges as stated in the bulletin of the College of Science, Literature, and the Arts, securing 144 credits in courses other than practical music (piano, voice, etc.). They must earn 36 credits in practical music, the number of credits required in their major subject to be determined by the department. Students majoring in voice must, before graduation, meet the entrance requirement for a major in piano. (See 2a under Admission.)

SCIENCE, LITERATURE, AND THE ARTS

FRESHMAN AND SOPHOMORE YEARS

	Credits
English A-B-C or equivalent	15
Foreign language to fulfill the requirements for admission to Senior College	0 to 20*
History 11-12-13, Medieval History	10
Psychology 1-2 and 4-5 or 7, General Psychology with laboratory	10
Ear Training 1	3
Harmony 2-3-4	9
Counterpoint 5-6	6
Introduction to Music 7-8-9	6
Practical Music under the direction of an adviser	24
Physical Education	3
Electives to make a total of 90.	

JUNIOR AND SENIOR YEARS

A major sequence	27 or 30
A minor sequence (9 credits in senior college courses in one department)	9
Practical Music	12-24
Electives to make a total of 183 credits.	

* A student must present for entrance four years of one foreign language, or he must complete twenty credits of one language in college, or he must continue a language which he presented for entrance, according to the following schedule:

Amount Presented for Entrance	*Amount Required in Junior College*
Four years of one language	None
Three years of one language	5 credits in same language
Two years of one language	10 credits in same language
One year of one language	15 credits in same language
Less than a year of one language	20 credits in one language

FIRST YEAR

Fall	Credits	Winter	Credits	Spring	Credits
English*	—	English	—	English	—
History 11	3	History 12	3	History 13	4
Music 1	3	Music 2	3	Music 3	3
Music 7	2	Music 8	2	Music 9	2
Practical Music	4	Practical Music	4	Practical Music	4
Physical Education	1	Physical Education	1	Physical Education	1
Electives		Electives		Electives	

SECOND YEAR

Psychology 1	3	Psychology 2	3	Psychology 7†	4
Language	0 or 5	Language	0 or 5	Language	0 or 5
Music 4	3	Music 5	3	Music 6	3
Practical Music	4	Practical Music	4	Practical Music	4
Physical Education	1	Physical Education	1	Physical Education	1
Electives		Electives		Electives	

THIRD YEAR§

Major Sequence A		*Major Sequence B*		*Major Sequence C*	
Ensemble	6	Advanced Harmony	6	Ensemble	6
History of Music	9	Ensemble	6	History of Music	9
Analysis	3	History of Music	9	Normal Piano	6
Practical Music	6 or 12	Practical Music	6 or 12	Practical Music	6 or 12

FOURTH YEAR§

Major Sequence A		*Major Sequence B*		*Major Sequence C*	
Bach-Beethoven	9	Bach-Beethoven	9	Advanced Normal Piano	6
Romantic Movement	6	Composition-Orchestration	6	Bach-Beethoven	9
Practical Music	6 or 12	Practical Music	6 or 12	Practical Music	6 or 12
Electives		Electives		Electives	

II. FOUR-YEAR COURSE IN PUBLIC SCHOOL MUSIC LEADING TO THE DEGREE OF BACHELOR OF SCIENCE

The Public School Music Course is a four-year course leading to the degree of bachelor of science, in which the theoretical, practical, and methods courses in music are combined with the study of English composition, psychology, and such subjects as the College of Education demands as a definite requirement. The object is to provide a well-rounded course for candidates for the bachelor of science degree in public school music.

For graduation, students must earn 185 credits and 185 honor points for women and 186 credits and 186 honor points for men and a C+ average in their major instrument with a C average in the rest of the work. They must earn 24 credits in Practical Music, 18 of which shall be the minimum requirement for their major subject and six of which must be in a second field other than the major. Either the major or minor must be in voice. (Students not majoring in piano shall be required to take one year of Piano A, B, C, 2 credits per quarter, exemption dependent upon entrance examination.) (See 2 under Admission.)

* English A, B, C, or 4, 5, 6, or exemption from requirement. See Composition program.

† General Psychology and laboratory may be taken concurrently.

§ Credits in each case are for one year's work.

A teaching minor in one academic secondary school subject is required, English, history or languages are suggested.

Pending the development of a specialized curriculum in instrumental music, elective credits to the extent of 7, may be used.

An academic minor is required for graduation of all public school music students. For advice concerning a minor, see departmental adviser.

FIRST YEAR

Fall	Credits	Winter	Credits	Spring	Credits
English*	3	English	3	English	3
Practical Music	2 or 4	Practical Music	2 or 4	Practical Music	2 or 4
Music 7	2	Music 8	2	Music 9	2
Music 1	3	Music 2	3	Music 3	3
Physical Education	1	Physical Education	1	Physical Education	1
Electives		Electives		Electives	

SECOND YEAR

Practical Music	2	Practical Music	2	Practical Music	2
Music Education 1	2	Music Education 2	2	Music Education 3	2
General Psychology	3	General Psychology	3	Educational Psychology	3
Chorus or Orchestra†	1	Chorus or Orchestra†	1	Chorus or Orchestra†	1
Physical Education	1	Physical Education	1	Physical Education	1
Medieval History	3	Medieval History	3	Medieval History	4
Electives		Electives		Electives	

THIRD YEAR

Practical Music	2	Practical Music	2	Practical Music	2
Music Education 50	3	Music Education 51	2	Music Education 52	1
Music 63	2	Music Education 53	3	Music Education 54	3
Music 60	2	Music Education 70‡	2	Music Education 65	3
Chorus or Orchestra†	1	Chorus or Orchestra†	1	Chorus or Orchestra†	1
Electives		The High School Ed.Ad. 65	3	Technic of High School Instruction Ed.T. 15	3
		Electives		Music 59	2
				Electives	

FOURTH YEAR

Music 76	3	Music Education 55	1	Music Education 56	1
Music Education 57	2	Music Education 58	2	Music Education 59	2
Music Education 60	3	Music Education 61§	6	Special Methods—Academic Minor	2
Special Methods—Academic Minor	2	Special Methods—Academic Minor	2	Electives	
Electives		Electives			

COLLEGE OF SCIENCE, LITERATURE, AND ARTS

A New Course

Mu.7f,8w,9s. Introduction to Music. Analytical and historical discussion of the elements, principles of structure, and various forms of music, designed to give a general survey of musical literature and the foundations of an appreciative attitude. Extensively illustrated. No prerequisite.

* Unless exempted by placement tests. See all three quarters Composition program.
† Three credits in chorus required, plus three credits in either chorus or orchestra.
‡ Elective.
§ See instructor for assignments.

New Courses

Mu.Ed.51. Comparative Methods. An analysis of the various techniques of music teaching and supervision, stressing the learning processes, psychology of method, and standards of attainment of each.

Mu.Ed.52. Technique of Teaching Appreciation. A practical course in the teaching of appreciation of music to children in the elementary grades. Materials and methods of presentation will be discussed and demonstrated, using the class as a laboratory.

Mu.Ed.55. Survey of Materials (Vocal). A laboratory course in materials used by the music departments of the public schools, paying particular attention to the psychology of program building. A survey of the well-known and newer publications in the field of public school music.

Mu.Ed.56. Survey of Materials (Instrumental). A laboratory course in materials used by instrumental ensembles, paying particular attention to the psychology of program building. A survey of the well-known and newer publications in the field of public school music.

Mu.Ed.59. Advanced Conducting. A study of the techniques of conducting, interpretation, and expression, the art of program making, rehearsals, organization, and the essentials of musical leadership.

Mu.Ed.70. Accompanying and Sight Reading. A laboratory course aimed to develop proficiency in the art of accompanying and sight reading.

The Bulletin
of the University of
Minnesota

ANNOUNCEMENT AND PROGRAM of EXTENSION CLASSES

in MINNEAPOLIS
in ST. PAUL
on THE CAMPUS

1934 - 1935

University of Minnesota
General Extension Division

FIRST SEMESTER
October 1 to February 2

SECOND SEMESTER
February 4 to June 1

VOL. XXVII NO. 36 JULY 28 1934

Entered at the postoffice in Minneapolis as second-class matter, Minneapolis, Minn.
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CALENDAR

1934			
September	17	Monday	Registration, first semester, begins
October	1	Monday	Classes begin
October	6	Saturday	Last day for registration without extra fee
November	26	Monday	Mid-semester grades due
December	20	Thursday	Christmas recess begins
December	27	Thursday	Classes resumed
1935			
January	21	Monday	Registration, second semester, begins
January 28 to February	2		Examinations, first semester
February	2	Saturday	First semester closes
February	4	Monday	Second semester classes begin
February	9	Saturday	Last day for registration without extra fee
April	1	Monday	Mid-semester grades due
May 27 to June	1		Examinations, second semester
June	1	Saturday	Second semester closes
June	16	Sunday	Baccalaureate service
June	17	Monday	Sixty-third annual commencement

WHERE TO REGISTER

Minneapolis: (Campus)	402	Administration Building, University of Minnesota, Main 8177, Richard R. Price, Director
Minneapolis: (Downtown)	690	Northwestern Bank Building, Marquette Ave. and Sixth St. South, Main 0624, A. H. Speer, Resident Manager
St. Paul:	500	Robert St., Extension Center, Cedar 7312, C. H. Dow, Resident Manager
Duluth:	404	Alworth Building, Melrose 7900, John L. Macleod, Resident Manager

The Administration Building on the University campus may be reached by going two blocks on Church Street from the Washington Avenue car line, or three blocks on 17th Avenue S.E., from the Oak-Harriet car line.

OFFICE HOURS

From September 24 to October 6, and from January 28 to February 9 (registration periods), 8:30 a.m. to 8:30 p.m., including Saturdays.

At other times, 8:30 a.m. to 5:00 p.m.; Saturday, to 12 m.

From September 1 to February 1 the campus office will be open from 8:30 a.m. to 8:30 p.m., except on Saturday.

REGISTRATION TIME

All registrations should be made and fees paid, before the first week of each semester. Registrations made later than Saturday, October 6, for the first semester, and Saturday, February 9, for the second semester, are subject to a late registration fee.

ANNOUNCEMENT AND PROGRAM

of

EXTENSION CLASSES

In Minneapolis, Downtown — In St. Paul, Downtown

On the Campus

UNIVERSITY OF MINNESOTA

1934-1935

First Semester	Second Semester
October 1 to February 2	February 4 to June 1

This book contains all information regarding extension classes, as well as the program for the current year. Classes are grouped in four units, as follows:

FOREWORD

The General Extension Division offers again a program of extension classes for the Twin Cities and vicinity rich in variety of subjects designed to supply a varied need. Classes for those interested in degrees or certificates still occupy a large part of the offering, but place has been made for many classes that are quite outside the usual order of college courses. In particular an especial effort has been made to supply opportunity for education for leisure, and to arrange classes that can be offered at small or moderate fees.

It has long been recognized by forward-looking thinkers that there is a growing need, both individual and social, for education for leisure. Leisure increases with all modern developments; its wise use is highly important. Only very recently has educational practice taken steps to meet this need. Anything educational is appropriate to leisure use; one man's vocation may easily become another's recreation. But in general we are apt to think of some things, such as games, as being purely recreational, leisure occupations. Both of these points of view are recognized in the classes offered—one may find his interest in a science, a language, an art, while another may select a skill like dancing, or a hobby like stamp collecting.

A number of college subjects, or classes in them, are offered this year for the first time. With the introduction of botany the list of sciences is now practically complete. Air conditioning, perhaps the most modern of developments in human conveniences needs study by those who supply apparatus for the purpose, and by those who use it. The beginning of a new sewage system for the Twin Cities has developed an interest in the engineering that is back of its construction. These and others are new to this program.

On the following page will be found a list of these new offerings, with a reference to their description later in the book.

KEEP THIS BOOK FOR FUTURE REFERENCE

NEW, SHORT, AND UNIQUE CLASSES

PROGRAM INFORMATION

Extension classes are ordinarily offered on the basis of a demand already established, and of the distribution of that demand over a series of years. Some classes are offered every year, a few every semester; other classes may have a limited demand and cannot be offered so frequently. Those described and programmed in this bulletin are those for which it is anticipated there will be a sufficient demand during the year to insure their organization.

Classes on Demand.—Extension classes will be conducted in any available subject on petition of a sufficient number of students. The exact number will depend on the subject and the conditions of offering, and will be determined on application. Such a petition may be made to any office of the Division, and should be accompanied by self-addressed envelopes for each petitioner, in which notice may be given of the status of the class. When a class is organized in this manner fees may be paid without the late registration fee any time during the week of the first class meeting, but **no refund of fees will be made for cancellation.**

Minimum Size Classes.—Classes programmed for any semester will not ordinarily be organized for a smaller enrolment than fifteen. Under exceptional circumstances some advanced or continuation classes may be conducted for a smaller enrolment, while on the other hand in some classes a larger number may be required. All such variations of the rule are made only with the approval of the director.

Any announced class may be withdrawn if its registration is not considered sufficient. In such case students may transfer their registration to some other class, or may have a full refund of the fees paid. If a class with subminimum registration is continued no refunds will be made for cancellation therefrom.

Class Schedule.—The majority of classes meet once a week for two (academic) hours for a period of seventeen weeks, the last of which is devoted to the examination, and carry three credits. This may be considered the standard class. Exceptions, such as classes meeting for a longer period, or those in laboratory sciences meeting twice a week, and carrying more credit, are noted in the description and program of the class.

Five-credit classes in beginning languages, history, mathematics, and some other subjects are announced in some number in this program. Such classes meet for an actual time of two hours and forty-five minutes, which, with an allowance for a recess, makes a session of approximately three hours.

Wherever possible classes are scheduled either at 6:20 p.m., closing at 8:00, or at 8:05 p.m., closing at 9:45. This enables a student to attend two classes in one evening. Classes meeting for more than two hours cannot conform to this schedule. The time of meeting for each class is stated in the program.

Holidays.—Extension classes meet regularly for the entire semester without regard to holidays, except for the Christmas recess. For this recess, classes will be suspended at the close of meetings Wednesday, December 19, and will resume on Thursday, December 27. Classes whose meetings fall on any holiday may, by agreement between students and instructors, be dismissed, but such meetings must be made up by extra meetings before the close of the semester in which they occur.

Places of Meeting.—Classes meet in designated buildings on the University campus, Minneapolis, or in places chosen for convenience in downtown Minneapolis and St. Paul. The location of these places is printed on the outside back cover of this bulletin.

English Placement Tests.—All students beginning the work in English composition are, by general university regulation, required to take the placement tests prescribed by the Department of English. These tests will be given according to the following schedule:

First Semester:	
7:30 Friday September 28	Room 110, Folwell Hall, Campus
7:30 Friday October 5	Room 110, Folwell Hall, Campus
7:30 Friday September 28	St. Paul, Extension Center 200
Second Semester:	
7:30 Friday February 1	Room 110, Folwell Hall, Campus
7:30 Friday February 8	Room 110, Folwell Hall, Campus
7:30 Friday February 1	St. Paul, Extension Center 200

Class Indications.—The number prefixed to the title of a class, as well as the title itself, is usually the same as that used for the corresponding class in the bulletin of the college where it originates. The letters *ex* affixed to a number indicate either

that the class has no corresponding class offered in day classes, or that it is a material modification for extension purposes of a corresponding day class; it does not indicate necessarily that a class does not carry credit toward a degree.

Classes marked with a † are what is known as continuation classes requiring the completion of two, or sometimes three, classes before credit is given for either.

The time and place of meeting of classes is indicated by abbreviations, which in most cases, will be obvious. The days of the week are indicated by the first letters, and the buildings in St. Paul and Minneapolis by the titles or abbreviations of them. For example, "T 6:20 St.P.Pub.Lib.Aud." means that the class will meet on Tuesday at 6:20 in the auditorium of the St. Paul Public Library. In some cases a number precedes the letter indicating the day of the week. This refers to the number of the class offered so that there may be no confusion as to which class is offered in either semester.

GENERAL INFORMATION

ADMISSION

Because of the broad and general purpose for which they are organized, extension classes are open to all persons who can profitably pursue them. The only requirements, therefore, are sufficient maturity and ability to study successfully the work undertaken.

Those wishing to count extension class study toward any university degree must satisfy requirements for admission to the University as well as specific requirements for the degree concerned. These requirements are explained in paragraphs below (see page 5). Those who do not desire this credit need not meet any university entrance requirements, and may freely choose among the classes offered in terms of their needs and desires, ordinarily without regard to prerequisites.

Regularly Matriculated University Students.—No student regularly registered for the day class work of any unit of the University of Minnesota may register for an extension class without the approval of the dean of his college. Such approval is not usually granted when the extension class would increase the student's work beyond the normal load.

A student who has been dropped by any unit of the University may not register for extension classes until such time as he has been accepted for readmission to his unit.

CREDITS

A large proportion of all extension courses carry credit that may be applied toward a university degree whenever a student becomes properly registered in one of the colleges of the University, and has met the prerequisites for the courses involved. Students may accumulate credits toward a degree in advance of registration in a particular college, but are advised to secure the acceptance of their credentials for admission as early as possible.

In response to particular demands some classes are offered that are outside the field of regular university instruction. They may, however, carry credit toward an appropriate General Extension Division certificate. (Exception must be made of the Junior College certificates since that is part of the work for a degree and may include only courses which carry degree credit.) Such courses are indicated in the program of classes. A few subcollegiate classes are offered carrying no credit whatever.

Every student who successfully completes the work of an extension class, including the final examination, receives the credit stated in the announcement of the class. This credit is permanently recorded in the office of the university registrar and remains as extension credit until such time as the student may qualify for its transfer to some other college of the University.

It is assumed that every student registers on this credit basis, plans to do the work of the class, to take the final examination, and to receive a grade. This is probably good educational procedure, assuring the best results for the student.

Auditors.—Students who do not desire, or are unable, to do the entire work of a class may be accepted as auditors, upon petition for this privilege upon blanks provided. Those in this status will not be expected to participate in class work, nor take the final examination, and may never receive credit for the work. A registration may be changed to the status of auditor at any time during the progress of a class up to the time for the final examination. Auditors pay the same fees as other students.

An auditor may change to the credit status not later than the eighth week of a semester. Apply to any extension office.

Amount of Credit.—Classes meeting for two hours once a week for a semester normally carry 3 quarter credits. (Altho extension classes are on a semester basis, credits are computed in quarter hours in accordance with the regular university usage.) Classes meeting oftener than once a week, or for more or less than the two-hour period carry appropriate credit based upon their relation to the normal three-credit class. Such variations are indicated in connection with each class concerned.

Prerequisites for Credit.—For the benefit of students who expect to use their credits toward a degree each class announcement contains a statement of prerequisites. These consist of other classes that should precede the class to which they refer. Extension students may ordinarily disregard these prerequisites. **The only requirement for such students is that they be sufficiently mature and competent to do the work of the class for which they register.** Of this the instructor will be the judge; and only when the lack of previous classes results in inability to do the work of a class will a student be excluded.

Candidates for a degree may even enter classes without prerequisites, provided they are otherwise competent, but they must ultimately meet the prerequisites in some way before the credit can be used toward a degree.

Residence Credit.—By action of the University Senate attendance in extension classes in Minneapolis, St. Paul, and Duluth is interpreted as meeting the requirements of residence at the University; that is, such attendance may be counted in fulfilling the requirement of time spent in residence study, as prescribed for various degrees by the University or by the separate colleges. (This interpretation does not apply to extension classes outside the three cities named, nor to correspondence study.)

CREDIT TOWARD A UNIVERSITY DEGREE

Students who wish to become candidates for a degree must meet the requirements for admission into the school or college granting the degree, and the requirements regarding the conversion of extension credits into credits toward a degree. Admission to the University is either by certificate or by examination, as defined below.

Admission by Certificate.—The applicant must present a certificate of graduation from an accredited preparatory school, or certificates showing that he has passed examinations in preparatory subjects as given by the Minnesota State Board of Education, or corresponding examinations in another state where such examinations are recognized by the state university in that state, or examinations given by the College Entrance Board, or by the regents of the University of the State of New York, or examinations in preparatory courses offered by correspondence by the University of Minnesota. Such certificates are to be filed for evaluation by the university registrar. (For specific subjects and units of each required, see the bulletin of General Information of the University.)

Admission by Examination.—Applicants for admission to the University (this does not apply to admission to extension classes; see above under Admission to Extension Classes) 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 upon payment of a fee of $5 at any scheduled date. Those failing to pass test (a) may enter only upon satisfactorily meeting the entrance requirements by the certificate method.

Conversion of Extension Credit into University Credit.—Extension credit will become credit toward a university degree when the student has formally presented himself to the proper official of the college of his choice and has been accepted as having completed the required work for entrance into an accepted curriculum at the time of his application. In the College of Science, Literature, and the Arts application will be made to the assistant dean for the Senior College, following the completion of the two years' work of the Junior College. In the School of Business Administration and the College of Education, application will be made to the Students' Work Committee of the college concerned.

In the College of Engineering and Architecture extension credits must be validated by the successful completion of a comprehensive examination in the work covered by the

extension classes, the examination to be set by the college. The necessary examinations will be given to the student when he applies for admission into the college at the time when he is ready to complete the work for a degree beyond what can be given in extension classes.

It is possible, as an increasingly large number of students are realizing, to complete a considerable portion of the requirements for a Bachelor's degree in extension classes. The curriculum requirements of each college must be met and the student will be held for any requirements, such as comprehensive final examinations, which may be given from time to time. In the major and minor subjects chosen by the candidate for a degree there will always be advanced courses which cannot be offered by the Extension Division because of insufficient demand. In order that the student may make a practical program which will enable him to get the greatest benefit from his extension classes and reduce to a minimum the time that is spent in securing advanced courses in day classes, it is necessary that advice and assistance should be sought at the earliest possible moment.

Advanced Standing.—This University accepts credits earned at all reputable colleges and universities, state teachers colleges, and junior colleges if they are accredited to the University. Such credits are accepted as far as they represent courses equivalent to those offered in this University. They must be certified upon the official blank of the institution granting them and give specific information regarding the subject and its descriptive title, time spent, number of credits, the grade, the preparatory units presented for entrance, and a statement of honorable dismissal.

Work done at non-accredited institutions will be accepted for advanced standing only upon satisfactory completion of a comprehensive examination for each course presented. If such examinations are taken within six weeks after formal matriculation they are given without charge. A fee of $5 is charged if the examination is taken at a later date. Students desiring advanced standing should consult the Students' Work Committee through which arrangements will be made either for the evaluation of credentials or for special examinations.

Filing of Credentials.—Students who have previous records in other institutions are urged to file their credentials for admission with advanced standing as early as possible. This makes possible the determination of the student's present status and the giving of specific advice as to the work which should be taken up.

Graduate Credit.—Under the regulations of the Graduate School credits earned in extension classes may not regularly be counted toward a graduate degree.

REGISTRATION

1. **Registration Dates.**—First semester, September 17 to October 6; second semester, January 21 to February 9. Registrations will be accepted after these dates, on terms stated below, paragraph 6.

2. Registration may be either by mail, or by personal application. Those desiring to register by mail should make application (by mail, telephone, or in person) to the main office of the General Extension Division for registration blanks, program of classes, and other necessary material. These will be promptly supplied so that students may not be delayed in making necessary study of classes offered and in filing registration.

3. The registration blank, consisting of several sections, no one of which should be detached, must be filled out completely according to instructions printed thereon.

4. Registration accompanied by the payment for fees may be mailed to the main office of the General Extension Division, 402 Administration Building, University of Minnesota, Minneapolis. The receipted fee statement, constituting formal acceptance of the registration, will be returned by mail. Registrations with fee payments will be accepted if delivered in person to any of the offices of the General Extension Division.

5. Those desiring to register in person will apply at any one of the offices during their office hours, as listed on inside cover. Students registering for the first time are advised to register in person in order that they may be assisted or advised by those in attendance. A member of the Students' Work Committee is in attendance during the office hours at the main office, and resident managers in other offices endeavor to be available for most of the registration period.

6. **Late Registration.**—Students should register before the first meeting of their classes, but they are permitted to register up to and including Saturday of the third week of either semester. For this privilege a late registration fee is charged. For registrations made from Monday, October 8 to Saturday, October 13, for the first semester, and from Monday, February 11, to Saturday, February 16, for the second semester, the fee is one

dollar ($1). Dates are inclusive. Following these periods the fee is two dollars ($2). The fee applies to each class for which registration is made.

N.B.—Registrations sent by mail and postmarked later than midnight of October 6 for the first semester, and February 10, second semester, will be subject to the late registration fee and will be held up until the fee is paid.

Students desiring to register later than the third week of a semester must secure the approval of the Students' Work Committee.

7. **Completion of Registration.**—A registration is completed when payment of fees is received; the receipted fee statement mailed to the student is his evidence of completion. Class cards are mailed to the instructor and become his evidence of the completion of the student's registration. The failure of an instructor to receive a class card usually indicates that the registration has failed of completion; the student should make sure of his responsibility in the matter. Matters of irregularity may be referred to the Students' Work Committee. No credit for a class will be granted unless registration is complete.

8. **Change of Registration.**—Students who desire to transfer from one class to another may do so by making application to the main office of the General Extension Division. There is no fee for transfers. After the third week of the semester such a change requires the approval of the instructor to whose class the change is made. If the change is made after the eighth week of the semester no credit can be allowed for either class involved. Failure to observe this regulation, so that proper record of transfer may be made, may result in loss of credit.

9. **Cancellation.**—Students who cease to attend a class should have their registration officially cancelled by application to the main office of the General Extension Division. Failure to do this leaves an incomplete record which has the possibility of becoming an embarrassment.

10. **Advice on Registration.**—The Students' Work Committee of the General Extension Division is ready to advise students regarding a number of matters. Students registering for the first time may learn what classes are most appropriate for them, in view of their preparation. Those planning to earn a certificate, or a degree, may save themselves mistakes in choosing classes which do not count in their courses. Those who have accumulated a number of credits may be advised as to what certificate or degree they should work for, and what classes to choose. Credits may be submitted for evaluation and the determination of advanced standing. Consultations may be had any time either by telephone or by personal interview. Students who wish to make most effective use of their study should not neglect to check their work with the committee.

All candidates for degrees will be directed to the proper official in the college involved, from whom authoritative advice regarding the degree and the appropriate curriculum may be had.

FEES

The usual fee for an extension class meeting once a week, for two hours, and continuing for one semester, carrying 3 credits, is $10. Wherever the fee is more or less than this standard the amount is stated in the announcement of the class. For classes meeting for two hours and forty-five minutes, and carrying 5 credits, the fee is $17. Classes in chemistry and other sciences have fees varying with the amount of laboratory involved. These are tuition fees, do not include texts or materials, and are the same for auditors as for regular students.

Laboratory Fees.—These charges for materials or service are made in connection with certain classes where necessary. In most cases they are payable with the tuition, but in classes in chemistry at the Chemistry Department.

Material Fees.—In some classes material is furnished, usually in place of textbooks, and a minimum charge is made, payable at time of registration. All classes involving extra fees are indicated in their description (announcement).

Late Registration.—For the privilege of registration after the regular time a fee is charged, on a schedule set up in paragraph 6, under Registration.

Registration is not complete until fees have been paid. Checks should be for the exact amount due, and made payable to the University of Minnesota.

Special Fees for Examinations.—For the removal of a grade of Condition, examinations are given, for which the fee is $1. This should be paid before the examination; the grade cannot be recorded until the fee is paid. For special examinations for credit for work done elsewhere a fee of $5 is charged, except under conditions specified on page 6 (Advanced Standing). This exception applies to comprehensive examinations given for credit in the College of Engineering.

Refunds.—Students who cancel their registration before the ninth week of a semester may obtain a pro rata refund of the tuition fee according to a scale established by the Board of Regents, provided written notice is given any office of the General Extension Division at the time of cancellation. **No refund is made after the eighth week of the semester, nor to a member of a special class or a class organized on a minimum registration.** Two dollars ($2) of each fee is non-refundable, being withheld to cover registration expense. Remittance of refunds by mail requires a period of time, but immediate refunds may be had by making application in person between 9:00 a.m. and 12:00 m. or 1:00 and 3:00 p.m., at the campus office of the General Extension Division.

EXTENSION STUDENT LOAN FUND

The General Extension Division has at its disposal a fund from which it can make loans for tuition to needy and worthy students. Prospective students who find it difficult or impossible to pay tuition fees should make application to the director for assistance.

STUDENTS' WORK REGULATIONS

Admission.—Students are accepted in extension classes whenever they manifest the desire, the maturity, and the ability to profit by the work. No university entrance requirements need be met. The only provision is that students shall be of such ability that their presence in a class will not impair the work of the rest of the class. Instructors will be the judges of this ability. In some classes of an advanced nature admission will be conditional on experience or preparation. No regulation is intended to exclude any student who can profit by the work. (For details dealing with regularly matriculated students, dropped students, see under Admission, page 4.)

Normal Load.—The maximum amount of extension work to be carried by students regularly employed in some vocation is 9 or 10 credit hours, the equivalent of 3 three-credit or 2 five-credit classes, per semester. Twelve credit hours may be allowed by permission of the Students' Work Committee, provided the student's record of a previous semester shows an average of 1½ honor points per credit hour. Permission for more than 12 credit hours may be granted under exceptional circumstances.

Correspondence Study.—Students may be enrolled for both extension classes and Correspondence Study courses only with the permission of the Students' Work Committee. The amount of work taken by such a combination may not exceed the permissible maximum stated in the paragraph above.

Attendance.—Attendance at every meeting of a class is expected; success in the work of a class is based on this attendance. Instructors are required to report continuous absences in order that the Students' Work Committee may inquire into the causes of absence and the student's intentions, may recommend what may be best for the student, and determine the student's status. Such inquiry and recommendation is entirely in the interest of the student and in no sense disciplinary; extension students are in classes for very definite purposes, are quite competent to govern their comings and goings, and may be trusted to give the attendance necessary to the accomplishment of their purposes.

Examinations.—Examinations in all classes are given during the last week of each semester. All students desiring credit must pass these examinations.

Other examinations or quizzes are entirely at the option of the instructor.

Examinations for the removal of the grade of Condition (E) will be given on application, at a time and place agreed upon by the student and the instructor. A fee of one dollar ($1), payable at any office of the General Extension Division, is charged for a condition examination.

Special examinations for advanced standing or for credit for work done elsewhere will be given on application. (See page 6.)

Grades.—Four grades, A, B, C, and D are given for work of varying degrees of merit, D being the lowest passing grade. Work below passing is marked E, a condition, or F, a failure. Work which is of at least D grade, but for acceptable reasons, not complete may be marked I, incomplete, provided not more than one fourth remains incomplete.

A condition is a temporary grade representing a deficiency which may be made up without repeating the course. It may be removed by additional work, by an examination, or by both. If not removed within two semesters following the resumption of the student's extension class work it becomes a failure. Pending such removal the student may register for a continuation or dependent class in a succeeding semester. The permanent grade resulting from the removal of a condition may not be higher than C.

A failure represents a deficiency so serious that the student must repeat the course in order to obtain credit in it. Following a failure the student will not be permitted to register for a continuation class.

Incomplete work may be completed in any way the instructor may prescribe, and should have the student's earliest attention. If this is not done within two semesters following the resumption of the student's extension class work the grade becomes a condition or a failure, as the instructor may elect, subject to the rules applying to those grades.

Credits and Honor Points.—Credits are used to indicate the amount of work done, in terms of the time spent in classes and in preparation for them. It is expected that at least two hours will be spent in preparation for every hour spent in class. Quality of work is expressed in honor points assigned to the several grades. Each credit with a grade of C carries one honor point; of B, two; of A, three. The grade D carries no honor point, and the grade F one minus honor point which cannot be cancelled by repeating the course with a passing grade.

Grade Reports.—Reports of students' grades are sent to the office of the university registrar at the close of each semester. A report of each student's grades and credits is sent from that office, and will not be furnished by the office of the General Extension Division.

Instructors are required to report at each mid-semester all grades below D, on the work so far completed. On the basis of these reports students are advised and counselled by the Students' Work Committee.

The Students' Work Committee.—This committee of the General Extension Division has direct supervision of the work done by students of the division. It functions in an advisory capacity for those desiring information about the sequence of courses, certificates, relation of extension classes to the work of other colleges, credits presented from other colleges, the organization of a program of study, and other similar matters. For candidates for degrees it offers its services in securing the advice and direction of the proper officials of the college concerned, from whom only can issue authoritative information.

Appointments with the committee may be made at any time by application at any office of the General Extension Division. Under ordinary circumstances these conferences should be held during usual business hours; during registration periods these hours are extended to the evening; at other times special appointments may be made as necessary.

STUDENT SEASON ATHLETIC BOOKS

The student season athletic book admits to all intercollegiate athletic events, except swimming, during the college year. It is a privilege book and consequently the privilege may be denied to any student who violates any of the conditions under which the book is issued.

Who May Purchase.—Any student enrolled in any department of the University including Graduate, Extension, etc., whether regular or special, who presents a receipted fee statement at the time of the sale covering a course of study running concurrent with the time for which the book is issued, is entitled to purchase one book if single, or two if married. The book purchased by extension students during the fall semester must be renewed at the beginning of the second semester and it will not be renewed unless a receipted fee statement for the second semester is presented. **Students in correspondence courses are not eligible to this privilege.**

The price of the student book is $7.

Where Purchased.—The sale begins Freshman Week each year and ends the day before the first game. Books may be purchased at the Minneapolis or St. Paul offices of the Extension Division or at the ticket booth in the Administration Building. Extension students are expected to make their purchase through the office where they register. They must appear in person with fee statement. If the student is buying an additional book for husband or wife, the husband or wife must also be present at the time for the purpose of photographic identification.

Seat Location.—At football games the seat location will be in the student section, the exact seat to be determined by lottery. This section is not open to non-students nor can students sit outside of this section. Non-students will not be admitted to the section at basket-ball games. For all other events the book admits to unreserved sections.

Cancellation of Registration—Refunds.—The student season book is a privilege extended to students only and it becomes void the moment an individual ceases to be a student in the University whether by cancellation of registration, expulsion, or in any

other manner. The book is not transferable and cannot be resold, nor will the purchase price be refunded after the book has been used for any event except in cases where the student is required, by the University, to cancel his registration.

SCIENCE, LITERATURE, AND THE ARTS CLASSES

The classes offered in this department are selected from the program of the College of Science, Literature, and the Arts, or from classes offered by other colleges but carrying credit in the College of Science, Literature, and the Arts. This selection makes available a portion, at least, of the university offerings in liberal arts to those who may be interested in pursuing a college degree, and also to those who are interested in exploring for their own satisfaction the various fields of human knowledge.

Candidates for Degrees.—All students who have the slightest desire or hope to acquire a Bachelor's degree should consult the Students' Work Committee regarding the details of the completion of the work of the Junior College, the application for acceptance in the Senior College, and the appointment of a major adviser. The assistant dean and advisers in the Senior College are ready to give their assistance but application must be properly made. Students should make no delay but ascertain early their status. The college requires that 45 credits be completed subsequent to the student's acceptance.

EXTENSION CERTIFICATES

Credits earned in this department may be applied towards either of two certificates which are offered by the General Extension Division for the completion of 90 credits of work, the equivalent of two years' full time residence in the University. These certificates are as follows:

Junior College Certificate.—Requirements for this certificate correspond to the requirements for the first two years of the work of the College of Science, Literature, and the Arts. These represent one half of the work for a Bachelor's degree, and consequently, all of the credits must conform to degree standards as to the subjects and courses involved, prerequisites, and correspondence to similar courses offered in day classes. In addition, a candidate for this certificate must have met university entrance requirements, (see page 5).

1. To obtain this certificate the student must earn 90 credits and must maintain a C average. (Honor points may not be counted to reduce the total of 90 credits, but they may be applied whenever these credits are employed in meeting the requirements of a degree in a senior college.)

2. The following group requirements must be met:

   a. Ten credits (9 if in 3-credit units) in each of five subjects, one to be chosen from each of Groups A, B, C, and two to be chosen at large from Groups A, B, C, D.

      Group A. *Humanities:* English and foreign languages and literature, speech, music, fine arts,
      Group B. *Social Studies:* Anthropology, economics, geography, history, political science, sociology.
      Group C. *Natural Sciences:* Astronomy, botany, chemistry, geology (including laboratory), physics, psychology (including laboratory), zoology.
      Group D. Philosophy, mathematics.

   b. English Composition 4-5-6 (9 credits) or English A-B-C (15 credits) or exemption from the requirement. All students desiring to register for these classes will take a placement test. See page 3.

   c. Foreign Language. A total of 20 credits (18 if in 3-credit units) in one foreign language, in high school and college courses combined. For every full year of such language presented for entrance, the above requirement shall be reduced 5 credits. Students, for instance, who have had two years of a foreign language in high school may complete by taking 10 credits in that same language in college courses.

The work done in English or a foreign language may be counted toward the subject requirement in Group A.

3. These credits may be earned in any classes offered by the University, or by correspondence study courses, or may be transferred from another accredited institution under the regular university rules of transfer.

4. Students who have, previous to September, 1934, begun work on these requirements under the provisions existing at that time may complete under those provisions.

5. These requirements may be modified to conform to the requirements for admission to specific schools and colleges of the University, such as the pre-business, pre-medical, pre-dental, or other requirements. Specific information regarding this will be given by the Students' Work Committee.

6. A student may not count credits for the beginning courses (two semesters) in more than one foreign language (exclusive of Greek and Italian), except on petition.

7. The requirements in Physical Education and Military Drill, which cannot be offered in extension, are considered as postponed until such time as the student may enter the Senior College.

The order in which the credits are accumulated is not material. It is always best to take classes in one subject in their regular order, each preparing for that which follows. Outside of this, subjects or classes may be taken in any order to suit the student.

Liberal Education Certificates.—In contrast to the Junior College certificate this represents work that may be done without regard to any degree requirements, any particular sequence of classes, or prerequisites, except ability of the student to do the work of the class. The requirements are reduced to a minimum, that minimum being quite flexible; they are a requirement in English, a breadth or spread requirement, and a concentration requirement. The details are as follows:

1. English—9 credits, in any classes for which student has preparation.
2. Spread—at least 6 credits, two classes, in each of the three following fields: natural science (astronomy, chemistry, geology, physics, psychology, zoology, or mathematics); social science (anthropology, economics, geography, history, political science, sociology); arts or humanities (fine arts, languages, philosophy, speech.) Total, 18 credits.
3. Concentration—at least 18 credits in one subject, or in closely related subjects.
4. Electives—45 credits. To make a total of 90. All elections may be made regardless of college lines, as student interest dictates.

This certificate is recommended to those who are not interested in a college degree, but nevertheless wish to pursue their study with some sort of system and organization.

All extension classes are open to registration by any person qualified by maturity and ability to profit by the study. In practically all cases only those who expect to qualify for a university degree will be expected to meet the requirements of prerequisites. PREREQUISITES ARE STATED FOR INFORMATION, NOT AS OBSTACLES.

DESCRIPTION AND PROGRAM OF CLASSES

ACCOUNTING

(See Business Classes, page 32)

ADVERTISING

(See Business Classes, page 34)

ANATOMY

5 Human Anatomy. 4 credits. $13.50.

Primarily for students in physical education. Study of dissected specimens, but no dissection. No prerequisites.

FIRST SEMESTER

MT 7:30 Campus Anatomy 304, Erdmann

Phys.Ed.22 Kinesiology. 4 credits. $13.50.

The science of muscle movement; especially of the therapeutic use of these movements. Prereq., for degree, see instructor.

SECOND SEMESTER

MT 6:20 Campus Anatomy 304, Erdmann

ANTHROPOLOGY

41 Introduction to Anthropology. Not offered 1934-1935.

113 Peoples of Europe. 3 credits.

Racial and cultural characteristics of the three secondary races in Europe. All are members of the primary white race whose historic nest has been in Europe. Physical and temperamental characteristics distinguish the three races. For prereq. for degree see instructor.

FIRST SEMESTER

W 6:20 Campus Wesbrook 206, Jenks

114 The American People. 3 credits.

In time the factors of heredity, environment, history, and ideals produce distinctive human groups. Even in 300 years the old-line Americans are physically and temperamentally different from any of the three secondary white races in Europe, from whom they are descended by varied and intricate hybridization. For prereq. for degree see instructor.

SECOND SEMESTER
W 6:20 Campus Wesbrook 206, Jenks

ART

(See Fine Arts, p. 15; Art Education, p. 27; Engineering, p. 39; Cartooning, p. 13.)

ASTRONOMY

11 Descriptive Astronomy. 3 credits.

The general principles and fundamental facts of astronomy; illustrated by lantern slides, simple problems, and naked eye and telescopic observations. Higher mathematics not necessary. No prerequisites.

FIRST SEMESTER
W 6:20 Campus Physics 133, Luyten

13 Practical and Stellar Astronomy. 3 credits.

Supplements Astronomy 11, which however is not prerequisite; higher mathematics not necessary. A detailed description of the constellations and individual stars, the structure of the sidereal universe, and such problems as the determination of time from the stars; extended opportunity for the use of the telescope and the observation of the heavenly bodies.

SECOND SEMESTER
W 6:20 Campus Physics 133, Luyten

BACTERIOLOGY

41 General Bacteriology. 5 credits. $17 and $2 laboratory fee.

Culture media; methods of staining and identification; principles of sterilization and disinfection; examination of air, water, milk; relation of bacteriology to the industries. Prereq. for degree, 10 cred. in chemistry and 10 cred. in biology.

FIRST SEMESTER
TTh 7:30 Campus Millard 214, Gunderson

101 Special Bacteriology. 4 credits. $13.50 and $2 laboratory fee.

The pathogenic bacteria especially in relation to definite diseases; principles of infection and immunity. For technicians and others. Prereq. for degree: Bacteriology 41.

SECOND SEMESTER
TTh 7:30 Campus Millard 214, Gunderson

116 Immunity. 3 credits. $10 and $2 laboratory fee.

General and special laboratory technique; immunological phenomena; preparation of vaccines; production and collection of immune sera; demonstration of various immune substances; technique of forensic blood tests, the Wasserman test, modified Wasserman, and the Kahn test; allergy, anaphylaxis, atopy; blood grouping. Primarily for technicians; for prerequisites for credit, see instructor.

FIRST SEMESTER
MW 7:30 Campus Millard 214, Gunderson

BIRDS OF MINNESOTA

(See Zoology, p. 26.)

BOTANY

1 General Botany. 4 credits. $13.50.

A survey lecture course on plants and their human interest, contributing to liberal culture; characteristics of living matter; fundamental facts of structure, growth, and reproduction; relation of plants to their environment and to each other; principles underlying inheritance, variation, plant breeding, and organic evolution. No prereq.

FIRST SEMESTER
M 6:20-8:30 Campus Botany Aud., Huff

2 Elementary General Morphology of Plants. 3 credits.

A laboratory course in evolution and classification of plants; the habits, structure, and reproduction of selected types of algae, fungi, liverworts, mosses, ferns, and seed plants; general survey of entire plant kingdom. Both meetings each week will be devoted to laboratory, with only occasional discussions. Prereq., Bot. 1.

SECOND SEMESTER
MW 6:20 Campus Botany 4, Huff

CARTOONING

Cartooning. Extension credit only. $10 each quarter.

Principles and art of devising and drawing cartoons for reproduction in newspapers and magazines; the problem of the cartoon so far as its message is concerned; the technique of drawing with especial reference to reproduction and individual style; the comic strip, the political cartoon, etc. No previous training in drawing necessary. Meets once a week for two and one half hours.

First Quarter, October 3 to December 12
Second Quarter, January 9 to March 20
Third Quarter, April 3 to June 12
W 7:00 Campus Jones 207B, Asch

CHEMISTRY

See Engineering Classes, p. 40.

CHILD WELFARE

40 Child Training. 3 credits.

The physical and mental development of the child; the training of young children; behavior problems and their various aspects; technique of good and bad management. Prereq. for degree, Psy. 1-2.

FIRST SEMESTER	SECOND SEMESTER
T 8:05 Mpls. N. W. Bank Bldg. 603, Faegre	M 7:30 Mpls. N. W. Bank Bldg. 690, Faegre
M 8:05 St. P. Ext. Center 200, Cummings	

80 Child Psychology. 3 credits.

A survey of child development with special reference to nursery school and kindergarten. Prereq., Psy. 1-2.

FIRST SEMESTER
T 8:05 Campus Folwell 105, McGinnis

82ex Later Childhood and Adolescence. 3 credits.

The meaning of adolescence; growth and personality development; vocational guidance; sex education, social adjustment, and emancipation from the family. Prereq., Psy. 1-2.

SECOND SEMESTER
T 8:05 Campus Folwell 105, McGinnis

ENGLISH

Courses in Composition

Subfreshman Composition. No credit. $7.50.

Intensive drill on grammatical forms, punctuation, sentence structure, and theme writing; for those not prepared to carry successfully English 4-5-6.

FIRST SEMESTER	SECOND SEMESTER
T 6:20 Campus Folwell 212, Flanagan	T 6:20 Campus Folwell 212, Power

A-B-C Freshman English. 5 credits each semester. Met by completion of Composition 4-5-6 (see next below) and Eng. 1-2-3 (see Freshman Literature below).

4-5-6 Freshman Composition. 3 credits each semester.

Practical training in writing, largely exposition, analysis of specimens of good prose; reports on assigned readings. Designed for students having the equivalent of high school English, presupposes a mastery of spelling, grammar, and punctuation.

N.B.—All students registering for Composition 4 will take required tests in English before permanent assignment to classes. **See page 3.**

FIRST SEMESTER	SECOND SEMESTER
4 M 6:20 Campus Folwell 226, Litchfield	4 T 6:20 Campus Folwell 206, Kerr
W 6:20 Campus Folwell 204, Nolte	Th 8:05 St. P. Ext. Center 201, Nolte
Th 8:05 St. P. Ext. Center 204, Nolte	5 M 6:20 Campus Folwell 226, Litchfield
5 M 6:20 Campus Folwell 209, Behm	Th 8:05 St. P. Ext. Center 204, Litchfield
6 M 6:20 Campus Folwell 204, Grandy	6 M 6:20 Campus Folwell 204, Grandy
Th 8:05 St. P. Ext. Center 201, Guthrie	

27-28† Sophomore Composition. 3 credits each semester. Both required for credit.

The first two quarters of a course newly adopted in the Department of English, covering Exposition in the first semester, and Description and Narration in the second. It replaces Courses 11-12, and 18-19, previously offered and should be elected by those wishing to go on with a writing course following Composition 4-5-6. The latter, or exemption, is prerequisite.

FIRST SEMESTER	SECOND SEMESTER
27 T 6:20 Campus Folwell 204, Christie	28 T 6:20 Campus Folwell 204, Christie

29 Sophomore Composition—Free Writing. 3 credits.

This is the third quarter of Sophomore Composition (described above) and replaces Eng. 20, Informal Essay. In it the student will have opportunity to develop his own particular talent and interest quite freely. Prereq., 27-28.

FIRST SEMESTER
T 6:20 Campus Folwell 206, McFadyen

69-70† Short Story Writing I and II. 3 credits each semester. Both required for credit.

The technique of the short story with constructive work in story writing. For those with experience in writing. Prereq., junior standing, average of B in two semesters of 27-28, 29 or 65.

FIRST SEMESTER	SECOND SEMESTER
69 M 6:20 Campus Folwell 205, Briggs	70 M 6:20 Campus Folwell 205, Briggs

81-82-83 Essay Writing. 3 credits each semester.

Practice in writing didactic, biographical, critical, and informal essays. Analysis of modern essays. A class for those who have completed preparatory work in composition and wish to acquire skill in essay writing particularly. For prerequisites see instructor.

FIRST SEMESTER	SECOND SEMESTER
81 M 6:20 Campus Folwell 202, Scallon	82 M 6:20 Campus Folwell 202, Scallon

91-92 Seminar in Writing (Advanced Short Story). 3 credits each semester.

For advanced students who write with facility and desire personal direction. Criticism of manuscript submitted. Prereq., senior standing and 9 credits in Senior College courses.

FIRST SEMESTER	SECOND SEMESTER
91 M 8:05 Campus Folwell 307, Phelan	92 M 8:05 Campus Folwell 307, Phelan

31ex English for Everyday. No credit.

Drill in the mechanics of good English, clearing up common errors in grammar, usage, sentence structure, for those grown careless or puzzled as to correct form, or for teachers desiring a simple method for language fundamentals. No prereq.

FIRST SEMESTER
T 6:20 Campus Folwell 201, Hayes
M 6:20 St. P. Ext. Center 204, Hayes

Classes in Literature

SPECIAL NON-CREDIT SHORT COURSES:

Significant Modern Writers. No credit. Ten weekly meetings. $6.

Lecture discussions of significant contemporary writers. Thomas Mann, *The Magic Mountain;* Marcel Proust, *Swann's Way;* Virginia Woolf, *Orlando, To the Lighthouse;* Aldous Huxley, *Point Counterpoint, Brave New World;* Ernest Hemingway, *Farewell to Arms;* Dos Passos and the Proletarian Novel; Somerset Maugham, *Of Human Bondage;* Sinclair Lewis, *Arrowsmith;* Willa Cather, *My Antonia, A Lost Lady;* Norman Douglas, *South Wind.* Open to all, begins October 1.

FIRST SEMESTER
M 8:05 Campus Folwell 101, Acker
T 8:05 St. P. Ext. Center 204, Acker

Current Literature. No credit. Six weekly meetings. $3.50.

Oral reviews of the new books of the fall and winter; fiction, biography, poetry, plays. Discussion by the class will be invited. Begins: first semester October 2, second semester April 9. Open to all.

FIRST SEMESTER	SECOND SEMESTER
T 4:00 St. P. Ext. Center 204, Acker	T 8:05 Campus Folwell 101, Acker
W 8:05 Campus Folwell 101, Acker	

World Masterpieces in Literature. No credit. Ten weekly meetings. $6.

Oral reviews of ten great novels, titles to be announced later. Meetings begin April 8. Open to all.

SECOND SEMESTER
M 8:05 Campus Folwell 101, Acker
W 8:05 St. P. Ext. Center 206, Acker

N.B.—Additional classes may be organized on application of a sufficient number of interested persons at times and places to suit their convenience. Make application to any General Extension Division office.

1-2-3 Freshman Literature. 2 credits each semester. $7.

A beginning course in the study and appreciation of English literature. Forms the literature part of Eng. A-B-C (5 credits each) offered to all beginning students in the College of Science, Literature, and the Arts; the requirements of this sequence may be met by the completion of Eng. 1-2-3 and Comp. 4-5-6. Course 1, Prose; Course 2, Drama; Course 3, Poetry. No prereq. Students may enter either semester.

FIRST SEMESTER	SECOND SEMESTER
1 M 8:05 Campus Folwell 204, Litchfield	3 M 8:05 Campus Folwell 204, Litchfield
2 Th 6:45 St. P. Ext. Center 204, Litchfield	

21-22-23 Introduction to Literature. 5 credits each semester. $17. Meets one period of 3 hours each week. Two consecutive semesters necessary for credit. Students may enter any semester.

A survey of English literature, as to history and types of writing. 21, pre-eighteenth century; 22, eighteenth century; 23, nineteenth century. Prerequisites to major sequence; 22 and 23 required for teacher's certificate. Prereq., Composition 4-5-6 or exemption.

N.B.—Course 21 offered on the campus, Course 23 offered in St. Paul.

FIRST SEMESTER			SECOND SEMESTER		
21 W	6:20	Campus Folwell 201, Litchfield	22 W	6:20	Campus Folwell 201, Litchfield
23 M	6:20	St. P. Ext. Center 206, Hessler	M	6:20	St. P. Ext. Center 206, Hessler

Judging Modern Books and Plays. See Journalism Classes, p. 18.

A class designed to assist the reader in passing rather critical judgment on books and plays as they appear. Open to all, with or without credit.

40-41 Bible As Literature I and II. 3 credits each semester.

A study of the Bible with relation to the history out of which it grew, with special attention to literary form. First semester deals with history and biography, second semester with prophecy and poetry. Prereq., Composition 4-5-6.

(40 not offered 1934-35)

SECOND SEMESTER

41 T 8:05 Mpls. N. W. Bank Bldg. 690, Powell
M 8:05 St. P. Ext. Center 204, Powell

55-56 Shakespeare I and II. Not offered 1934-35.

73-74† American Literature I-II. 3 credits each semester. Both required for credit.

Lectures on American literature with extensive readings from the principal poets and prose writers of the United States; little attention to novelists. Prereq., Composition 4-5-6, or exemption, and 6 additional credits, or 10 credits in 21-22-23.

FIRST SEMESTER			SECOND SEMESTER		
73 W	6:20	Campus Folwell, 206, McDowell	74 W	6:20	Campus Folwell, 206, McDowell
T	6:20	St. P. Ext. Center 201, Nichols	T	6:20	St. P. Ext. Center 201, Nichols

129 Modern Drama. 3 credits.

Contemporary drama from 1880 to the present time. Prereq., 6 cred. above 50, incl. 55-56.

FIRST SEMESTER

T 6:20 Campus Folwell 202, Scallon

151 Recent Poetry. 3 credits.

Poetry in England and America since the death of Queen Victoria; the main traditions and tendencies now prevailing. Prereq., 8 credits in courses above 50.

SECOND SEMESTER

T 4:15 Mpls. N. W. Bank Bldg. 603, Powell
M 4:15 St. P. Ext. Center 204, Powell

FINE ARTS

For technique classes see Art Education, p. 27, Cartooning, p. 13, and Engineering classes, p. 39; Esthetics, see Psychology, p. 22.

3 History of Painting. 3 credits.

A general survey of the development of painting from Giotto to Cezanne and the moderns; emphasis on the outstanding artists, their lives, artistic personalities, and works; criticism of these from the historical and the appreciative points of view. Lectures illustrated with lantern slides, outside readings, and study of photographs, with visits to the Minneapolis and the University Little galleries. No prerequisites.

FIRST SEMESTER

Th 6:20 Campus Jones Aud., Upjohn

53 The High Renaissance and Baroque in Italy. 3 credits.

The flowering of the Italian Renaissance; examination in some detail of the paintings of Raphael, Michael Angelo, Corregio, Titian, and other great Venetians; consideration of the later phases, the "baroque," with special reference to the Church of St. Peter's in Rome. Lectures, readings, study of reproductions, and visits to galleries. No prerequisites except approval of instructor.

SECOND SEMESTER

Th 6:20 Campus Jones Aud., Upjohn

10ex Appreciation of the Arts. Non-credit. One-hour meetings. $3.50 each quarter.

An informal, gallery-conducted consideration of the pleasure giving possibilities of the arts. A few lectures laying down certain general principles of appreciation will be amplified by regular meetings in the Little Gallery to examine the works there exhibited, criticize, and enjoy them. Open to all.

First Quarter, October 4 to December 13
Second Quarter, January 3 to March 14
Third Quarter, March 28 to June 6
Th 8:05 Campus Jones Aud., and Northrop 403 (Univ. Gallery), Upjohn

GEOGRAPHY

43 Political Geography. 3 credits.

A study of geographic conditions as affecting problems of political units. No prereq.

FIRST SEMESTER

Th 6:20 Campus Burton 103, Hartshorne

51 (11) Human Geography. 5 credits. $17. Basic for all geography classes.

A study of the factors of environment (space relationships, climate, soils, drainage, topography, mineral wealth, contact with sea, fauna and flora) with particular reference to their limiting effect on human activities. No prereq.

FIRST SEMESTER

T 6:20 Campus Burton 103, Davis
W 6:20 St. P. Ext. Center 206, Davis

71 Geography of North America. 3 credits.

The geographic regions of North America and their development as affected by the physical environment. Prereq. for degree, Geog. 51.

SECOND SEMESTER

W 6:20 St. P. Ext. Center 206, Dicken

102 Trade Routes and Trade Centers. 3 credits.

A study of major land and ocean trade routes and trade centers and the geographic conditions affecting them. Prereq. for degree, Geog. 41.

SECOND SEMESTER

Th 6:20 Campus Burton 103, Hartshorne

110 Geography of South America. 3 credits.

The major geographic regions of South America with emphasis upon the economic activities and their geographic basis. Prereq. for degree, 51.

FIRST SEMESTER

W 6:20 Campus Burton 103, Brown
T 6:20 St. P. Ext. Center 204, Brown

120 Geography of Asia. 3 credits.

Areal differentiation in the major geographic regions of Asia; special consideration of China, Japan, and India. Prereq. for degree, 51.

SECOND SEMESTER

T 6:20 Campus Burton 103, Davis

GEOLOGY

1 General Geology (Dynamic). 3 credits.

A General Geology Laboratory. 2 credits. $7.

These classes, 1 and A combined, constitute Geology 1 of the College of Science, Literature, and the Arts.

An introductory treatment of the materials of the earth and the geologic processes; principles of earth sculpture, glaciation, volcanic activity, mountain building etc.; the geologic occurrence of gems, ores, oils, and other economic mineral resources. No prereq.

N.B.—Registrations may be made for the combined classes or for Geol. 1 alone. Students who have already completed 3 credits in Geol. 1 or 8 may register for Geol. A.

FIRST SEMESTER

1 T 6:20 Campus Pillsbury 210, Thiel
A Th 6:20 Campus Pillsbury 220, Dutton

2 Historical Geology. 3 credits.

B Historical Geology Laboratory. 2 credits. $7.

These classes, 2 and B combined, constitute Geology 2 of the College of Science, Literature, and the Arts.

A study of the changing geology and life of the earth during the geologic past as interpreted from the rock record. Prereq. for degree, Geol. 1 or 8.

N.B.—Registrations may be made for the combined classes, or for Geol. 2 alone. Students who have already completed three credits in Geol. 2 may register for Geol. B.

SECOND SEMESTER

2 T 6:20 Campus Pillsbury 210, Dutton
B Th 6:20 Campus Pillsbury 210, Dutton

Geology of Minnesota. Not offered 1934-35.

19 Regional Geology of the United States. 3 credits.

A study of the relation between the present form of the land surfaces with the geologic structure, with regard to the physiographic subdivisions of the U. S.; emphasis on areas of special interest, such as the national parks. Prereq. for degree, Geol. 1 or 8 and 2.

SECOND SEMESTER

Th 6:20 Campus Pillsbury 210, Dutton

23 Mineralogy. 3 credits.

A study of the physical and chemical characteristics of minerals; occurrence, genesis and uses; determinative work and identification of rock and ore minerals by physical tests and blowpipe analysis. (May be used to satisfy day classes in 23w and 24s.) Consult instructor for prereq.

FIRST SEMESTER
Th 6:20 Campus Pillsbury 100, Gruner

GERMAN

1-2-3 Beginning German A, B, C. 5 credits each. $17.

N.B.—Classes in German 1-2-3-4 are offered in 5-credit units to correspond with regular day classes, meeting one period a week for 3 hours, each course counting as equivalent to one year preparatory school German.

FIRST SEMESTER
1 M 6:20 Campus Folwell 207, Davies
T 6:20 St. P. Ext. Center 200, Prottengeier
3 M 6:20 Campus Folwell 206, Wangsness
Th 6:20 St. P. Ext. Center 200, Downs

SECOND SEMESTER
2 M 6:20 Campus Folwell 207, Davies
T 6:20 St. P. Ext. Center 200, Prottengeier

4 Intermediate German. 5 credits. $17.

Modern narrative prose. Prereq., 3.

SECOND SEMESTER
4 M 6:20 Campus Folwell 206, Wangsness
Th 6:20 St. P. Ext. Center 200, Downs

17 German for Graduate Students. No credit.

Enables candidates for advanced degrees to acquire a reading knowledge of German. Presupposes no knowledge of the language.

FIRST SEMESTER
M 6:20 Campus Folwell 212, Lussky

SECOND SEMESTER
M 6:20 Campus Folwell 212, Lussky

56-57 Essay Writing. 3 credits each semester.

Syntax, structure, and style; criticism of essays on assigned subjects. Prereq., Ger. 52.

FIRST SEMESTER
56 Th 6:20 Campus Folwell 204, Pfeiffer

SECOND SEMESTER
57 Th 6:20 Campus Folwell 204, Pfeiffer

68 Survey of German Literature. 3 credits.

German writing from the earliest beginnings down to the present; the classical period emphasized particularly. Lectures and discussion in English; collateral readings.

FIRST SEMESTER
M 6:20 Campus Folwell 209½, Downs

77 Goethe's Faust, Part 1. 3 credits.

Reading and interpretation of the text; genesis of the work; the Faust legends, Faust books, puppet-plays, Marlowe's *Faustus*.

SECOND SEMESTER
M 6:20 Campus Folwell 209½, Downs

GOLF

(See Physical Education Classes, page 29)

GREEK

17 Greek Sources of English (Everyday Greek). 1 credit each quarter. One-hour meetings. $3.50.

A brief course in Greek sources of English words. The practical purpose is to enable students to trace the origin and feel the force of words, especially scientific terms, derived from Greek. Prereq. for degree, one year of any foreign language.

FIRST QUARTER, October 4
Th 7:00 Campus Folwell 114, Savage

SECOND QUARTER, January 3
Th 7:00 Campus Folwell 114, Savage

45 Greek Mythology. 3 credits. No knowledge of Greek required.

The origin and evolution of the myth, its relation to the literature, philosophy, and religion of ancient Greece, its influence on later literature. Illustrative readings and lectures with stereopticon. No prereq.

FIRST SEMESTER
M 7:00 St. P. Pub. Lib. 6, Savage

44 Greek Literature and Life. 3 credits. No knowledge of Greek required.

The character and influence of Greek culture, especially in literature and art; readings in translation by the class; illustrative readings and lectures by the instructor; stereopticon views. No prereq.

SECOND SEMESTER
Th 8:05 Campus Folwell 114, Savage
W 7:00 St. P. Pub. Lib. 6, Savage

HISTORY

1-2† The Modern World. 5 credits each semester. $17.

Political, social, and economic factors. Course 1—1500-1799; Course 2—1799 to the present. Both required for credit. Meets 3 hours once a week. No prereq.

FIRST SEMESTER			SECOND SEMESTER		
1 M	6:20	Campus Folwell 104, Mudgett	2 M	6:20	Campus Folwell 104, Mudgett
T	6:20	St. P. Ext. Center 206, Mudgett	T	6:20	St. P. Ext. Center 206, Mudgett

7-8† American History. 3 credits each semester. 7-8-9 required for credit.

Course 7—1766-1840; 8—1840-1877. No prereq.

FIRST SEMESTER			SECOND SEMESTER		
7 T	6:20	Campus Folwell 104, Kane	8 T	6:20	Campus Folwell 104, Kane
M	6:20	St. P. Ext. Center, 200, Kane	M	6:20	St. P. Ext. Center, 200, Kane

9 Recent American History (Since 1877). 3 credits.

Special emphasis on the social and economic factors. Prereq., 7-8.

FIRST SEMESTER

W 6:20 Campus Folwell 104, Kane

56-57-58† Early Modern European History. 3 credits each semester.

57 and 58 not offered 1934-35; 56 completes cycle begun 1933-34. Europe from 1648 to 1789; the age of Louis XIV and the eighteenth century to the French Revolution. Prereq. for degree, junior standing. All three required for credit.

FIRST SEMESTER

56 T 8:05 Campus Folwell 104, Kane

Current History. Non-credit. Eight meetings, alternate weeks, each semester, $5.

A fortnightly current events discussion group, rather than a class of the traditional sort, for those who wish to keep abreast of the march of time. Topics of current interest will be taken up, with some attention to current books and periodicals; so far as possible the discussion will follow the lines of indicated class preference. Open to all.

FIRST SEMESTER			SECOND SEMESTER		
Begins October 3-4			Begins February 6-7		
Th	8:05	Campus Folwell 104, Mudgett	Th	8:05	Campus Folwell 104, Mudgett
W	8:05	St. P. Ext. Center 203, Mudgett	W	8:05	St. P. Ext. Center 203, Mudgett

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HOME ECONOMICS

Interior Decorating. See Educational Classes, p. 27.

Textiles. See Business Classes, p. 37.

JOURNALISM

13 Introduction to Reporting. 3 credits.

A study of news, its sources, methods of finding and gathering; correct style of written presentation; brief survey of the place and purpose of the newspaper and the processes of newspaper production. Prereq. for degree, Eng. Comp. 4-5-6, or exemption.

FIRST SEMESTER

W 8:05 Campus Sch. of Bus. 6, Steward

69 Newspaper and Magazine Articles. 3 credits.

The special feature article; typical subjects and their preparation for magazines, trade papers, Sunday newspapers, syndicates, house organs, etc.; the qualities that make stories salable, and the market; principles of illustration. Prereq., Reporting, 13.

SECOND SEMESTER

W 8:05 Campus Sch. of Bus. 6, Steward

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76 Judging Modern Books and Plays. 3 credits. Equivalent to Critical Writing.

A class for the reader who wishes to approach modern works with a better discrimination; not a technical journalism class. Standards of judgment and the need for them; application to fiction, poetry, essays, biography, criticism, humor, scientific and philosophical writings; the modern theater and its development; the work of the dramatic critic; the motion picture and its present stage of development; responsibility of reviewers. Open to all; degree students consult instructor for prerequisites.

FIRST SEMESTER

T 8:05 Campus Folwell 110, Ford

MATHEMATICS

(Numbers of the classes are those used in the College of Science, Literature, and the Arts)

A-Bex Elementary Algebra
Cex Solid Geometry
5 Higher Algebra
6 Trigonometry
7 College Algebra
30 Analytic Geometry
50 Differential Calculus
51 Integral Calculus

For description and program of these classes see Engineering Classes, p. 42.

106 Differential Equations. Not offered 1934-35.

Classes Primarily for Teachers of Mathematics.

60 College Geometry (Synthetic Metric Geometry). 3 credits.

The modern developments of Euclidean geometry, with a detailed study of some of the more modern geometry of the triangle and the circle. Prereq., Analytic Geometry or consent of instructor.

FIRST SEMESTER
M 6:20 Campus Folwell 105, Gibbens

55 Geometric Constructions and Problems of the Ancient Greeks. 3 credits.

A study of the possibilities and limitations in geometric constructions with various prescribed instruments, including in particular a treatment of the famous construction problems of the ancient Greeks. Prereq., Analytic Geometry or consent of instructor.

SECOND SEMESTER
M 6:20 Campus Folwell 105, Gibbens

MEDICINE

Tuberculosis and Other Diseases of the Chest. Open to practicing physicians only.

Diagnosis and treatment of bronchitis, bronchiectasis, bronchial asthma, pulmonary abscess, pneumoconiosis (particularly silicosis), carcinoma, etc. The new viewpoint on tuberculosis control will be presented, with the most modern methods of diagnosis and treatment, with special emphasis on artificial pneumo-thorax.

FIRST SEMESTER
Th 7:30 Campus Univ. of Minn. Hosps. Eustis
Aud., Myers

P.M.&P.H. 60 Tuberculosis and Its Control.

A non-technical class, particularly for nurses, social workers, teachers, and others interested. History of tuberculosis movement and campaign in the United States; early diagnosis and sanitary treatment; tuberculosis in children; psychology of tuberculosis; supervision of returned sanitoria patients; state program for the eradication of tuberculosis; legislation. For credit and prerequisites consult instructor.

SECOND SEMESTER
Th 7:30 Campus Univ. of Minn. Hosps. Eustis
Aud., Myers

Preventive Medicine, see Education Classes, p. 30.

MUSIC

3-4-5 Harmony (First Year). 3 credits each semester.

Study of chords, their construction, relations, and progressions. Each semester corresponds to a quarter in day classes. No prereq.

FIRST SEMESTER
3 T 6:20 Campus Music 103, Malcolm
5 T 8:05 Campus Music 103, Malcolm

SECOND SEMESTER
4 T 6:20 Campus Music 103, Malcolm

8-9-10† Introduction to Music. 3 credits each semester.

A course in historical appreciation. Previously offered under that name but now given the numbers and title used by the College of Science, Literature, and the Arts. Designed to give an understanding of music as literature. A non-technical account of the principal music forms, the historical origins and associations; the nature and scope of musical expressions. Extensive musical illustrations. No prereq. Entire course required for credit.

FIRST SEMESTER
8-9 Th 6:20 Campus Music 103, Ferguson

SECOND SEMESTER
9-10 Th 6:20 Campus Music 103, Ferguson

40-41-42 Orchestra. 3 credits for the year. $5 per semester.

The University Symphony Orchestra is made available for registration through the General Extension Division. Section 1 consists of the Symphony Orchestra, open to those qualified, both day and extension students; section 2 will furnish opportunity for acquiring the skill and orchestral

routine necessary for membership in the Symphony Orchestra. Try-outs to determine section membership, for both day and extension students. Open to all players of orchestral instruments.

FIRST SEMESTER				SECOND SEMESTER			
Sec. 1	W	7:30	Campus Northrop Aud., Pepinsky	Sec. 1	W	7:30	Campus Northrop Aud., Pepinsky
Sec. 2	T	7:30	Campus Music Aud., Pepinsky	Sec. 2	T	7:30	Campus Music Aud., Pepinsky

56-57† Bach, Beethoven, Wagner, and Brahms. 3 credits each semester.

Critical study of selections from the master works of the four greatest composers; biographical readings, topics and analyses, giving historical and literary background to culminative periods in composition. Open to those who have been in extension classes in music appreciation. 56-57-58 required for credit. Prereq., Mu. 8-9-10.

FIRST SEMESTER				SECOND SEMESTER			
56	W	6:20	Campus Music 103, Ferguson	57	W	6:20	Campus Music 103, Ferguson

60-61-62 Ensemble. 3 credits each semester.

Open to players of the piano, violin, or wood-wind instruments suitable for chamber music; practice in duets, trios, quartets, and similar combinations of string and wind instruments.

FIRST SEMESTER				SECOND SEMESTER			
M	6:20	Campus Music Lib., Pepinsky		M	6:20	Campus Music Lib., Pepinsky	

76 Form and Analysis. 3 credits.

The architecture of music in its many forms presented from a logical basis, correlated with the various epochs in music history; differentiation between rational and emotional factors in musical composition, for a better understanding of music esthetics; the physical basis of music and tone-psychology; comparison of oriental and occidental music for the exotic element; tendencies in modern music. Prereq., harmony.

FIRST SEMESTER

M 8:05 Campus Music Lib., Pepinsky

Church Music. No credit toward degree. $10.

Place of music in worship; qualities church music should have; characteristic church music and composers of different periods—as Gregorian, polyphonic, Bach, Palestrina—and use and interpretation appropriate to each; hymnology; service playing for organists; choir administration. Designed to develop discrimination in understanding and interpreting music of the church service; of interest primarily to clergymen, choir singers, directors, and organists. Outstanding church compositions analyzed for interpretation (as illustrations). Open to all without prerequisites.

FIRST SEMESTER

T 8:05 Campus Music 4, Sircom

N.B.—Individual instruction in music, as well as study in the regular classes offered by the Department of Music, is open for registration through the General Extension Division by students who are not able to attend day classes full time. This includes instruction in piano, organ, voice, violin, cello, and all orchestral instruments, as well as classes in history and theory of music. Students will register as for extension classes but attend the regular day sessions. The courses offered, the time and place of meeting, and the fees for individual instruction will be found in the program of classes for the College of Science, Literature, and the Arts, in the Combined Class Schedule. For further information consult any office of the General Extension Division.

NURSING

(See Education Classes, page 29)

ORIENTATION

1-2† Orientation I-II. 3 credits each semester.

A survey of certain aspects of contemporary thought concerning the specific physical and social sciences; non-technical, designed for the layman. First semester, physical; second semester, social sciences. No laboratory work and no knowledge of science required. No prereq. For degree, both required for credit.

N.B.—Students may enter either class; I is not prerequisite to II.

FIRST SEMESTER				SECOND SEMESTER			
1	T	6:20	Campus Main Eng. 104, Kuypers	2	T	6:20	Campus Main Eng. 104, Kuypers
	Th	6:20	St. P. Ext. Center 203, Schmidt		Th	6:20	St. P. Ext. Center 203, Schmidt

PHILOSOPHY

1 Problems of Philosophy (Introduction). 3 credits.

Introduction to the problems of philosophy; the main fields of investigation; permanent problems; principal methods and schools of philosophy; historical and contemporary views. No prereq.

SECOND SEMESTER

T 8:05 Campus Folwell 322, Conger
W 8:05 St. P. Ext. Center 204, Castell

2 Logic. 3 credits.

Practical aids to effective thinking; the nature of knowledge; the laws of reasoning; principles and methods of scientific proof; sources of error and incorrect thinking; prejudice and fixed convictions as interferences. No prereq.

FIRST SEMESTER
W 8:05 St. P. Ext. Center 204, Castell

3 Principles of Ethics. 3 credits.

A sketch of the development of morality; analysis of conscience; the nature and authority of moral principles. No prereq.

FIRST SEMESTER
Th 8:05 Campus Folwell 322, Nilson

52 Modern Philosophy. 3 credits.

The story of the development of philosophy from the Renaissance to the present time. For prereq. for degree, see instructor.

SECOND SEMESTER
Th 8:05 Campus Folwell 322, Nilson

101 Psychology of Religion. 3 credits.

The organization of mental life in emotions, sentiments, and values; studies in the psychology of conversion, faith, healing, mysticism, etc.; Oriental religious attitudes. For prereq. for degree, see instructor.

FIRST SEMESTER
T 8:05 Campus Folwell 322, Conger

PHYSICS

3 Elements of Mechanics. 3 credits.

First part of general course in physics; laws of motion, force, and energy applied to solids, fluids, and gases. Prereq. for degree, trigonometry.

FIRST SEMESTER
M 7:30 Campus Physics 166, Erikson

SECOND SEMESTER
(Repeated on demand)

33 Light. 3 credits.

A study of the principles underlying light phenomena. Prereq. for degree, Physics 3.

SECOND SEMESTER
W 7:30 Campus Physics 166, Valasek

43 Electricity. 3 credits.

The principles underlying electrical phenomena. Prereq. for degree, Physics 3.

FIRST SEMESTER
W 7:30 Campus Physics 166, Zeleny

PHYSIOLOGY

25ex. Advanced Physiology for Nurses. 3 credits.

Physiological principles involved in nursing procedures. Open only to graduate nurses.

FIRST SEMESTER
M 8:05 Campus Millard 315, Greisheimer

POLITICAL SCIENCE

1-2-3†. American Government and Politics. 4½ credits each semester. $15.

A survey of the American political system and national, state, and municipal government organizations; basic principles and problems of government in the modern industrial age. Entire course required for credit for degree. No prereq.

FIRST SEMESTER
W 6:20 Campus Burton 209, Young

SECOND SEMESTER
W 6:20 Campus Burton 209, Young

25 World Politics. 3 credits.

A study of the foreign policies, including national relations, of the leading European powers today. Prereq., 9 credits.

SECOND SEMESTER
Th 6:20 Campus Burton 209, Young

148 European Dictatorships. 2 credits. Meets for one quarter, 11 weeks, beginning January 7. $7.

Description and evaluation of contemporary absolute government, especially in Soviet Russia, Italy, and Germany; organization and policies of political parties. Prereq. for degree, see instructor.

WINTER QUARTER
Begins January 7, 1935
M 6:20 Campus Burton 209, Starr

Democracy and Dictatorship. No credit. 8 one-hour meetings, beginning March 25. $2.50.

Lectures, with discussion, on outstanding contemporary political problems, for the layman, the man on the street, the worker. Capitalistic political democracy (England, France, United States), dictatorial capitalism (Italy, Germany), and autocratic socialism (Russia)—their essential principles and something of their history. Open to all.

SECOND SEMESTER
Third Quarter, begins March 25
M 8:05 Campus Burton 209, Lippincott

PREVENTIVE MEDICINE AND PUBLIC HEALTH

53 Elements of Preventive Medicine
58 Maternal and Child Hygiene
62 Principles of Public Health Nursing
63 Special Fields in Public Health Nursing
71 Supervision of Public Health Nursing
80 Health of the School Child
See Education Classes, p. 30.

60 Tuberculosis and Its Control. See Medicine, p. 19.

PSYCHOLOGY

1-2 General Psychology. 3 credits each semester. Both required for credit, except for certain extension certificates.

An introductory survey of psychology; its materials, fundamental laws, applications, and relations to the other sciences. No prereq.

FIRST SEMESTER			SECOND SEMESTER		
1 M	6:20	Campus Folwell 110, White	2 M	8:05	Campus Folwell 110, White
M	8:05	Campus Folwell 109, White	W	6:20	Campus Folwell 110, White
Th	8:05	Campus Folwell 110, White	Th	8:05	Campus Folwell 110, White
T	6:20	St. P. Public Lib. Aud., White	T	6:20	St. P. Public Lib. Aud., White

1-2 (General) Combined Course. Psychology 1 first 8 weeks, 2 the second 8 weeks. $10 each class, $20 total. Registrations accepted for combined course or for one class at a time, either class.

SECOND SEMESTER
MTh 6:20 Campus Folwell 109, White

3 Psychology Applied to Daily Life. 3 credits.

Applications of psychology to selected problems in advertising, selling, law, medicine, sociology, and daily life. Prereq., 1 or 2.

FIRST SEMESTER			SECOND SEMESTER		
T	6:20	Campus Psychology 211, Williamson	W	8:05	Campus Folwell 109, White
W	6:20	St. P. Pub. Lib. Aud., White			

56 Psychology of Advertising. 3 credits.

Analysis of advertising, national and local, from the standpoint of attention, memory, desire, and action; experimental techniques for investigating advertising problems. Of fundamental value to all advertisers. Prereq., 1-2, and Principles of Economics.

FIRST SEMESTER
T 6:20 Campus Psychology 115, Longstaff

72 Psychological Esthetics (Psychology of Beauty). 3 credits.

The psychology of esthetic experience; factors which constitute beauty of various kinds and for different individuals, and the capacity for enjoying and originating beauty; illustrations from music, literature, painting, etc.; emphasis upon experimental studies. Prereq., 1-2.

FIRST SEMESTER
M 6:20 Campus Psychology 115, Hevner

Educational Psychology. See Education Classes, p. 28.

Child Psychology. See Child Welfare, p. 13.

ROMANCE LANGUAGES

French

1-2† Beginning French. 3 credits each semester.

Grammar, pronunciation, reading, and practice in speaking. No prereq. Both required for credit.

FIRST SEMESTER			SECOND SEMESTER		
1 W	6:20	Campus Folwell 124, Clefton	2 W	6:20	Campus Folwell 124, Clefton
T	6:20	St. P. Pub. Lib. 5, Johnson	T	6:20	St. P. Pub. Lib. 5, Johnson

3-4 Intermediate French. 3 credits each semester.

Grammar, review, composition, readings from modern authors. Prereq., 2 or 2 years of preparatory French.

FIRST SEMESTER
3 T 6:20 Campus Folwell 227, Sirich

SECOND SEMESTER
4 T 6:20 Campus Folwell 227, Sirich

5 French for Graduate Students. No credit.

Grammar and reading, preparing candidates for advanced degrees for French examination. No prereq.

FIRST SEMESTER
T 6:20 Campus Folwell 207, Frelin

SECOND SEMESTER
T 6:20 Campus Folwell 207, Frelin

20a-b Elementary French Conversation and Composition I, II. 3 credits each semester.

A practical course in oral and written French with emphasis upon pronunciation and practical phonetics. Prereq., 3-4.

FIRST SEMESTER
20a M 8:05 Campus Folwell 205, Minault

SECOND SEMESTER
20b M 8:05 Campus Folwell 205, Minault

78-79 Eighteenth Century French Readings. 3 credits each semester.

Selections from standard eighteenth-century writings. Prereq. for degree, French 4.

FIRST SEMESTER
78 M 8:05 Campus Folwell 227, Guinotte

SECOND SEMESTER
79 M 8:05 Campus Folwell 227, Guinotte

Spanish

1-2† Beginning Spanish. 3 credits each semester.

Grammar, pronunciation, reading, and practice in speaking. No prereq. Both required for credit.

FIRST SEMESTER
1 M 6:20 Campus Folwell 102, Grismer
T 7:00 St. P. Nor. Pac. Bldg. 1110, Le Fort

SECOND SEMESTER
2 M 6:20 Campus Folwell 102, Grismer
T 7:00 St. P. Nor. Pac. Bldg. 1110, Le Fort

3-4 Intermediate Spanish. 3 credits.

Review, composition, readings from modern authors. Attention to correspondence and commercial practice if desired. Prereq., 1-2 or 2 years of preparatory Spanish.

FIRST SEMESTER
3 M 6:20 Campus Folwell 201, Brackney

SECOND SEMESTER
4 M 6:20 Campus Folwell 201, Brackney

56-57 Spanish Composition I-II. 3 credits each semester.

Practical composition, including correspondence. Prereq., 3-4.

FIRST SEMESTER
56 T 6:20 Campus Folwell 209, Grismer

SECOND SEMESTER
57 T 6:20 Campus Folwell 209, Grismer

SCANDINAVIAN

Norwegian

1-2 Beginning Norwegian. 3 credits each semester.

Grammar, composition, selected readings, and easy prose and poetry. No prereq.

FIRST SEMESTER
1 Th 6:20 Campus Folwell 206, Madsen
W 6:20 St. P. Ext. Center 204, Madsen

SECOND SEMESTER
2 Th 6:20 Campus Folwell 206, Madsen
W 6:20 St. P. Ext. Center 204, Madsen

61 Earlier Norwegian Literature. 3 credits.

Literature from the period of the Saga to the age of Holberg, about 1750; history, reading, conversation, and limited composition. Prereq. for degree, Norwegian 1-2 or equivalent.

FIRST SEMESTER
Th 8:05 Campus Folwell 206, Madsen

62 Ibsen. 3 credits.

Readings, reports, conversation, and limited composition. Prereq. for degree, Norwegian 1-2 or equivalent.

SECOND SEMESTER
Th 8:05 Campus Folwell 206, Madsen

Swedish

7-8 Beginning Swedish. 3 credits each semester.

Grammar, composition, conversation, reading of selected prose. No prereq.

FIRST SEMESTER
7 W 8:05 Campus Folwell 206, Stomberg

SECOND SEMESTER
8 W 8:05 Campus Folwell 206, Stomberg

107-108 Modern Swedish Literature. 3 credits each semester.

A study of the Swedish novel from Fredrika Bremer to Selma Lagerlöf. Prereq. for degree, Scand. 10-11 or equivalent.

FIRST SEMESTER
107 T 8:05 Campus Folwell 206, Stomberg

SECOND SEMESTER
108 T 8:05 Campus Folwell 206, Stomberg

SOCIOLOGY

I. Classes in Sociology; prerequisite to technical social work classes.

1 Introduction to Sociology. 3 credits.

A study of the culture of human society and effect upon it of such influences as location, sex, race, custom, invention; culture patterns, processes, and social interactions; social change and means of control. No prereq.

FIRST SEMESTER
M 6:20 Campus Jones 109, Monachesi
T 8:05 St. P. Ext. Center 201, Schmid

SECOND SEMESTER
M 6:20 Campus Jones 104, Monachesi

6 Social Interaction. 3 credits.

The basis and forms of social interaction and social relationships with detailed attention to some of the fundamental behavior patterns of contemporary society. Prereq., Soc. 1.

SECOND SEMESTER
M 6:20 Campus Jones 109, Kirkpatrick
T 8:05 St. P. Ext. Center 201, Kirkpatrick

14 Rural Sociology. 3 credits.

A study of rural and urban relationships; the principles of sociology applied to the position of an agricultural class in an industrial society; the contributions and obligations of farmers to the larger society, and vice versa. Prereq., Soc. 1.

SECOND SEMESTER
M 6:20 Campus Folwell 3, Lundquist

49 Social Pathology. 3 credits.

A survey course in contemporary social problems with especial emphasis on the conditions and processes in personal demoralization and social disorganization. The scientific approach to the study of poverty, physical diseases and defectiveness, feeble-mindedness, insanity, vagrancy, etc. Prereq. for degree, 10 cred. in soc.

FIRST SEMESTER
W 6:20 Campus Jones 109, Schmid

53 Elements of Criminology. 3 credits.

Causes and social control of crime; treatment from the point of view of processes of social interaction. Prereq., 10 cred. in soc.

SECOND SEMESTER
W 8:05 Campus Jones 109, Vold

101 Social Organization. 3 credits.

The social mind and its communication; problems of democracy, of class and caste, of social conflict and revolution; integration and disintegration of social groups and institutions; the rational and scientific basis for social efficiency and progress. Prereq., 4 courses in soc., or Soc. 1, and 15 credits in soc. sci., educ., phil., or psy.

FIRST SEMESTER
M 6:20 Campus Folwell 3, Lundquist

102 Social Control. 3 credits.

The social, psychological, and physical factors controlling special relationships; origin, direction, technique, limits, and purposes of social control. Prereq., same as 101.

FIRST SEMESTER
W 6:20 Campus Folwell 3, Lundquist

110 Rural Organization. 3 credits.

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. Prereq., same as for 101.

SECOND SEMESTER
Th 6:20 Campus Folwell 3, Lundquist

119 The Family. 3 credits.

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. Prereq., 4 courses in soc., or Soc. 1 and 15 cred. in soc. sci., educ., phil. or psy.

FIRST SEMESTER
W 8:05 Campus Jones 109, Kirkpatrick

120 Social Progress. 3 credits.

Theories of progress and a critique of the idea of progress; contributions of fundamental social institutions; converting drift into progress. Prereq., same as 101. 3 credits.

FIRST SEMESTER
Th 6:20 Campus Folwell 3, Lundquist

141. Contemporary Social Theory. 3 credits.

An intensive study of developments in the social theory of the late nineteenth and early twentieth centuries. Prereq. for degree, junior standing and preparation in sociology.

SECOND SEMESTER
W 6:20 Campus Folwell 3, Lundquist

II. Classes in Technical Social Work. Credit from these classes will be accepted to satisfy the requirements in professional organizations.

52 Elementary Case Work. 3 credits.

An introduction to the problems and methods of social case work. Prereq., Soc. 49. Special attention to the subject of relief administration.

FIRST SEMESTER
T 6:20 Campus Jones 109, Lamb

SECOND SEMESTER
Th 6:20 St. P. Ext. Center 204, Heckman

60 Social Protection of the Child. 3 credits.

Social obligations to the child; development of the child-saving movement in the United States; infant and child mortality, recreation, education; courts, institutions, societies, and other public efforts for the child. Prereq., Soc. 49 and 52.

FIRST SEMESTER
T 8:05 Campus Jones 109, Leahy

64 Human Behavior. 3 credits.

Normal behavior and its transition to abnormal behavior; problems of motivation and influences of environment on human behavior.

FIRST SEMESTER
M 6:20 St. P. Wilder Disp., Lippman

65 Psychiatric Aspects of Social Case Work. 3 credits.

A detailed discussion of cases that have been under intensive treatment, and analysis of methods and philosophy of treatment. Prereq., Soc. 129 or equivalent. Limited to twenty members; registration by permission of a major adviser in the Training Course for Social and Civic Work.

SECOND SEMESTER
M 6:20 St. P. Wilder Disp., Lippman

127 Legal Aspects of Social Work. 3 credits.

A selected group of legal problems treated from the viewpoint of the social worker; the court system; legal process; protection and enforcement of the legal rights of indigent persons; problems of the small wage earner—garnishment, small loans, eviction; problems in domestic relations. Not designed to teach technical law, but to furnish background for understanding social problems having legal implications.

FIRST SEMESTER
T 6:20 Campus Jones 104, Finke

129 Selected Problems in Social Case Work. 3 credits.

Social case work practices as applied to selected problems. Prereq., Soc. 52, 91, or simultaneously.

SECOND SEMESTER
Th 6:20 Campus Jones 2, Fenlason

139 Psychiatric Problems in Social Case Work. 3 credits.

The intellectual and emotional factors in human adjustment and their significance in case work. Prereq., Soc. 52, 91, and Psy. 144-145 or Prev. Med. 61.

SECOND SEMESTER
Th 6:20 Campus Jones 109, Leahy

SPEECH (PUBLIC SPEAKING)

Extempore Speaking. No credit. 11 weekly meetings each quarter. $7 each quarter.

Designed for business men and women and leaders in the professions who recognize the importance of effective speaking in private conversation as well as public address. It deals only with the problems of practical speech making in everyday life, helping the student to acquire the ability to organize his ideas in such a way that they may be expressed with confidence and effectiveness. Open to all. Students may enter either quarter.

First quarter, October 4 to December 10
Second quarter, December 31 to March 14
Third quarter, March 25 to June 3
T 6:20 Campus Folwell 5, Fulton

Vocabulary Building. No credit. Meets weekly for one hour. $5.

Deals with the technique of increasing one's speaking and reading vocabulary. Methods of word collecting; presentation and discussion of words; questions of usage; questions of pronunciation; standards.

FIRST SEMESTER
T 7:00 Campus Folwell 102, Hurd

41-42-43† Fundamentals of Speech 1, 2, 3. 3 credits each semester. All required for credit.

A course for the practical needs of business and professional persons. Extemporaneous speaking, organization of speech material, study of model speeches, technique of body and voice. Practice for correctness and effectiveness in delivery. Prereq., Eng. Comp. 4-5-6 or exemption.

FIRST SEMESTER				SECOND SEMESTER			
41	M	6:20	Campus Folwell 308, Fulton	41	T	6:20	Campus Folwell 308, Bryngelson
	T	6:20	Mpls. N. W. Bank 603, Gislason		M	8:05	St. P. Ext. Center 201, Knower
	M	6:20	St. P. Ext. Center 201, Knower				
42	T	6:20	Campus Folwell 308, Bryngelson	42	T	6:20	Mpls. N. W. Bank 603, Gislason
	M	8:05	St. P. Ext. Center 201, Knower		T	8:05	Campus Folwell 308, Bryngelson
					M	6:20	St. P. Ext. Center 201, Knower
43	T	6:20	Campus Folwell 308, Bryngelson	43	T	6:20	Mpls. N. W. Bank 603, Gislason
	M	8:05	St. P. Ext. Center 201, Knower		T	8:05	Campus Folwell 308, Bryngelson
					M	6:20	St. P. Ext. Center 201, Knower

51-52 Advanced Public Speaking 1-2. 3 credits each semester.

Speeches on public questions; analysis and outlining; methods of reasoning; adaptation of material to audience. Conducted on discussion plan with free, extemporaneous rebuttal to speeches. Prereq., 41-42-43.

FIRST SEMESTER				SECOND SEMESTER			
51	Th	7:00	St. P. Pub. Lib. Aud., Rarig	52	Th	7:00	St. P. Pub. Lib. Aud., Rarig

71-72-73† Elements of Play Production. 3 credits each semester. All three required for credit toward degree.

Principles of the production of plays; directing, rehearsing, staging, make-up; organization and management of the production staff; knowledge and use of stage equipment; reading of plays; history of the theater. Conducted on practical production plan. Prereq., 41-42-43.

N.B.—Students may register for either 71, 72, or 73 in either semester. Any member of class eligible to try out for parts in all the University Theatre productions.

FIRST SEMESTER				SECOND SEMESTER			
M	6:20	Campus Music 19, Riley		M	6:20	Campus Music 19, Riley	

STAMP COLLECTING (PHILATELY)

Stamp Collecting. No credit. Regular weekly periods. $10.

A class for collectors and those who might be collectors. The story of stamps and collecting; the language of philately and its significance; collecting and buying, what to do and not to do, for pleasure and for possible profit; what makes value; materials for, and handling of, a collection. Open to all.

FIRST SEMESTER			
M	6:20	Campus Folwell 109, Burgess	

SWIMMING

(See Physical Education Classes, page 29)

TEXTILES

(See Business Classes, page 37)

ZOOLOGY

1-2† General Zoology. 5 credits each semester. $17. Both required for credit.

Structure, physiology, embryology, classification, and evolution of animals. Equivalent to 1-2-3 in day classes. No prereq.

FIRST SEMESTER				SECOND SEMESTER			
1	TTh	6:20	Campus Zoology 211, Wodsedalek	2	TTh	6:20	Campus Zoology 211, Wodsedalek

Birds of Minnesota. No credit for degree.

A laboratory and field class in identifying and enjoying the birds of this region. Early meetings will make use of the collections of the Museum of Natural History, but as soon as weather permits the class will meet in field locations. Study will be based on the manual by Dr. T. S. Roberts, who will make some appearances before the class. Open to all.

SECOND SEMESTER			
T	8:05	Campus Zool. 204, Swanson	

EDUCATION CLASSES

Classes offered under this head are primarily for teachers in service who are unable to attend day classes on the University campus. Only those courses have been listed that are primarily for credit in the College of Education. Many other courses are offered, especially in the academic classes of the College of Science, Literature, and the Arts, which are accepted for credit toward a degree in the College of Education. All classes are open to students other than teachers who may have an interest in any phase of formal education and its methods of instruction and supervision.

Credit in the College of Education is dependent upon the qualifications of the student who must have completed the two years' work required for admission to the College of Education. This work may be completed either by graduation from a teachers college or normal school, a two-year course in the Junior College of the University or any accredited college, or in extension classes.

Students expecting to qualify for a degree should secure a copy of the College of Education bulletin, which contains a statement of general requirements for graduation, of required courses in majors and minors, and of the specialized curricula, and should consult a major adviser as early in their course as possible. Failure to do so often delays graduation and makes extra work necessary.

The Students' Work Committee of the General Extension Division will be glad to assist students by explaining the various curricula and printed requirements for each; by advising what credits may be secured through extension classes; by assisting in securing the necessary official advice from the proper persons in the College of Education.

N.B.—Classes in Education, unless otherwise stated, carry credit only in the College of Education. They may, however, be acceptable toward General Extension Division certificates when properly approved.

All extension classes are open to registration by any person qualified by maturity and ability to profit by the study. In practically all cases only those who expect to qualify for a university degree will be expected to meet the requirements of prerequisites. PREREQUISITES ARE STATED FOR INFORMATION, NOT AS OBSTACLES.

DESCRIPTION AND PROGRAM OF CLASSES

ADMINISTRATION AND SUPERVISION

119 Elementary School Curriculum. 3 credits. Materials fee $1.

The principles underlying the selection and organization of subject-matter for courses in the elementary schools; critical examination of current practices. Prereq., senior standing.

SECOND SEMESTER
T 8:05 Campus Main Eng. 203, Sorenson

150 Supervision and Improvement of Instruction. Not offered 1934-35.

ART EDUCATION

3 Interior Decorating (Principles of Design 3). 3 credits.

Design principles in relation to the home; identification of period furniture; wall treatment; floor coverings; furniture arrangement; color schemes; a window treatment; field trips to the Institute of Arts and to furniture stores. No prereq.

FIRST SEMESTER
M 6:20 Campus Jones 207A, Lewis
T 6:20 Campus Jones 207A, Lewis

SECOND SEMESTER
M 6:20 Campus Jones 207A, Lewis

23 Advanced Interior Decorating (Second year Design). 3 credits.

Continuation of Interior Decorating 3, emphasizing color theories in relation to room color schemes, floor coverings, draperies, etc.; classification and use of fabrics, period and present day; decorative arts; room interiors appropriate to types of furniture. Prereq., 3.

SECOND SEMESTER
T 6:20 Campus Jones 207A, Lewis

1 Fundamental Principles of Design. 3 credits.

Fundamental principles of design applied to a series of interesting and practical problems using a variety of techniques; a basic course which is useful in other fields of art and of value in advertising. No prereq.

FIRST SEMESTER
T 4:30 Campus Jones 203, Lewis

4-5-6 Still Life. 3 credits.

Drawing from objects in charcoal; emphasis on form, value relations, perspective, and composition. No prereq.

FIRST SEMESTER
T 4:30 Campus Jones 203, Lewis

32-46 Orientation in Simple Handicrafts. 3 credits each semester.

Experience in simple handicrafts selected from several courses with reference to their recreational value, for those interested in camps, playgrounds, clubs, and adult education. First semester: paper, clay, and metal—problems in bookbinding, cardboard, and paper construction, pottery, and easy metal and jewelry; second semester: textile processes—hand-loom weaving, basketry, wood blocking, stenciling, crayonex, batik, wood carving, and leather tooling. Students may elect to concentrate on some items and omit others, and may enter either semester. No prereq.

FIRST SEMESTER
W 6:20 Campus Jones 10, Ross

SECOND SEMESTER
W 6:20 Campus Jones 10, Ross

Cartooning, see S., L. & A. Classes, p. 13.

EDUCATIONAL PSYCHOLOGY

55 Elementary Educational Psychology. Now taught as Ed.51 for secondary school curricula, and Ed.61 for elementary. See General Education.

60 Introduction to Educational Statistics. 3 credits.

Statistical methods applied to educational investigations; measures of central tendency, variability, and correlation; for classroom teachers and principals. No higher mathematics required. Prereq., 6 cred. in psy.

SECOND SEMESTER
Th 4:15 Mpls. N. W. Bank Bldg. 603, Sorenson
W 4:15 St. P. Ext. Center 202, Sorenson

111 Educational Measurements in the Elementary School. 3 credits.

The typical educational problems involving educational scales and standard tests; nature of tests; methods used; analysis of results obtained; remedial educational procedure. Prereq., 55 or equivalent.

FIRST SEMESTER
Th 5:00 Mpls. N. W. Bank Bldg. 603,
Van Wagenen

134 Mental Tests. 3 credits.

Laboratory study of group mental tests for all school levels; reliability and validity as instruments for educational guidance. Prereq., 55 and 60.

SECOND SEMESTER
W 6:20 St. P. Ext. Center 200, Sorenson

GENERAL EDUCATION

51 (61) Introduction to Teaching—Psychological Fundamentals. 3 credits.

A survey of the fundamental facts of human behavior involved in educational activities. Formerly Ed.Psy. 55. 51 for secondary school teaching, 61 for elementary. Prereq., 6 cred. in psy.

SECOND SEMESTER
T 6:20 Campus Main Eng. 203, Sorenson
W 8:05 St. P. Ext. Center 200, Sorenson

Adult Mental Ability. Non-credit. Weekly for 8 weeks. $5.

A discussion of adult mental powers, learning abilities, mental growth and decline; effect of exercise and of disuse on mental abilities; emphasis on age and its relationship to intellectual powers. Open to all without prereq. Begins February 7.

SECOND SEMESTER
Th 8:05 Campus Main Eng. 203, Sorenson

How To Study. Non-credit. Weekly for 8 weeks; begins April 4. $5.

The principles of efficient study—time budgeting, effective and accurate reading, note taking, mental concentration, organization of knowledge, preparation for examinations. Open to all without prereq. Begins April 4.

SECOND SEMESTER
Th 8:05 Campus Main Eng. 203, Sorenson

HOME ECONOMICS

Interior Decorating, see Art Education, p. 27.

Textiles, see Business Classes, p. 37.

MATHEMATICS

Mathematics for Teachers. See S., L. & A. Classes, p. 19.

NURSING EDUCATION

70ex Principles of Teaching and Supervision in Schools of Nursing. Open to graduate nurses. 3 credits.

Conditions favoring best preparation of the student nurse; sources, selection, and organization of subject-matter; evaluation of nursing; principles and practices, and teaching methods; content and methods of clinical teaching.

FIRST SEMESTER

T 8:05 Campus Millard 129, Petry

60 Ward Administration. Open to graduate nurses. 2 credits. $7.

Principles of administration, their application to ward management; opportunities for clinical teaching through efficient ward administration.

SECOND SEMESTER

T 8:05 Campus Millard 129, Densford

53ex. Research Methods Applied to Nursing. 2 credits. $7.

Time studies, questionnaires, and other methods of compiling and analyzing data on nursing problems; the graphic method of presentation of the data.

FIRST SEMESTER

M 8:05 Campus Millard 129, Gordon

Physiology for Nurses. See S., L. & A. Classes, p. 21.

PHYSICAL EDUCATION

3ex Swimming—for Women. Non-credit. $5.

Class and individual instruction. Gymnasium rules prohibit woolen suits. Health examination at first meeting. One-hour meetings.

FIRST SEMESTER

M 7:00 Campus Women's Gym., Starr
M 8:00 Campus Women's Gym., Starr
W 6:30 Campus Women's Gym., Starr
W 7:30 Campus Women's Gym., Starr
Th 6:30 Univ. Farm Gym., Kaercher
Th 7:30 Univ. Farm Gym., Kaercher

SECOND SEMESTER

M 7:00 Campus Women's Gym., Starr
M 8:00 Campus Women's Gym., Starr
W 6:30 Campus Women's Gym., Starr
W 7:30 Campus Women's Gym., Starr
Th 6:30 Univ. Farm Gym., Kaercher
Th 7:30 Univ. Farm Gym., Kaercher

Swimming—for Men. Non-credit. $5.

Class and individual instruction. Woolen bathing suits not permitted. Health examination at first meeting. One-hour meetings. Other sections arranged on demand.

FIRST SEMESTER

T 8:05 Campus Indoor Sports Bldg., Thorpe

SECOND SEMESTER

T 8:05 Campus Indoor Sports Bldg., Thorpe

N.B.—Pending the completion of the Indoor Sports Building the class will meet in the Armory—probably for four meetings.

Elementary Golf—for Women. Non-credit. One hour, twice weekly, five weeks. $3.

Class and individual instruction. Classes limited to 12. Each term (five weeks) complete. Terms begin first, seventh, thirteenth Monday of each semester. Equipment (clubs and soft balls) furnished by members of the class. Meets in Room 153.

FIRST SEMESTER

First Term, October 1
MW 6:30 Campus Women's Gym., Kissock
Second Term, November 12
MW 6:30 Campus Women's Gym., Kissock
Third Term, December 31
MW 6:30 Campus Women's Gym., Christensen

SECOND SEMESTER

First Term, February 4
MW 6:30 Campus Women's Gym., Christensen
Second Term, March 18
MW 6:30 Campus Women's Gym., Kissock
Third Term, April 29
MW 6:30 Campus Women's Gym., Snell

Golf—for Men. Non-credit. Weekly, one hour, 17 weeks. $5.

Fundamentals of golf—the clubs, the grips, stance, drive etc.; some attention to historical and tournament aspects. Early meetings in classroom with driving net for practice; adjournment to University Golf Course, practice field, as soon as weather permits, about April 15. (Hour then changed to adjust to light.) Students furnish own clubs and balls. Extra sections arranged on demand, at desired hours.

SECOND SEMESTER

M 7:00 Campus Indoor Sports Bldg. 235, Armstrong

Games for Mixed Groups: Badminton, Deck Tennis, Duck Pin Bowling, Archery, etc. Non-credit. One-hour meetings. $5, plus $1 laboratory fee.

Instruction and practice in the games; adaptation for use at picnics, outings, and other informal situations; progression from game to game as rapid as skill permits. Open to men and women.

FIRST SEMESTER	SECOND SEMESTER
M 7:30 Campus Women's Gym. 151, Snell	M 7:30 Campus Women's Gym. 151, Lee

Interpretive Dancing—for Women. Non-credit. Meets for one hour weekly. $5, plus $1 laboratory fee.

The development of rhythmic movements of the entire body; stress as needed upon rhythm, relaxation, strength, ease; the idea of grace and beauty of movement predominates; as much work will be done with original composition and interpretation as class ability and interest permit.

FIRST SEMESTER
M 7:30 Campus Women's Gym. 153, Baker

Tap Dancing—for Men and Women. Non-credit. Meets for one hour weekly. $5, plus $1 laboratory fee.

Elementary and intermediate clog dances and tap routines.

FIRST SEMESTER	SECOND SEMESTER
M 6:30 Campus Women's Gym. 151, Warnock	M 6:30 Campus Women's Gym. 151, Warnock

PREVENTIVE MEDICINE AND PUBLIC HEALTH

N.B.—Classes marked with ¶ carry credit in the College of Science, Literature, and the Arts.

53¶ Elements of Preventive Medicine. 3 credits.

Nutrition, diet, susceptibility, resistance, and immunity to disease; methods of spread and prevention of communicable and degenerative diseases; protection of food, water, and milk; school health work; vital statistics. Prereq., 12 cred. in biological sciences, or consent of instructor.

FIRST SEMESTER
M 6:20 Campus Millard 129, Diehl

58 Maternal and Child Hygiene. 3 credits.

The maternal welfare program; importance of breast feeding; conduct of infant welfare clinics; consideration of child of pre-school and school age as to malnutrition, physical defects, cardiac and nervous disorders. Prereq., 40 or 53.

FIRST SEMESTER	SECOND SEMESTER
W 6:20 Campus Millard 129, Boynton	M 8:05 St. P. Ext. Center 200, Boynton

60 Tuberculosis and Its Control. See Science, Literature, and the Arts Classes, p. 19.

62 Principles of Public Health Nursing. 3 credits.

Development of principles of organization, administration, and supervision of public health nurses; methods of co-operation of social agencies; health teaching in promotion of individual and community well-being. Primarily for public health nurses. Prereq., 53.

FIRST SEMESTER
W 8:05 St. P. Ext. Center 200, Butzerin

63 Special Fields in Public Health Nursing. 3 credits.

Development, scope of program, and analysis of services in various special fields of public health nursing. Prereq., 62 or equivalent.

SECOND SEMESTER
Th 8:05 St. P. Ext. Center 203, Butzerin

71 Supervision of Public Health Nursing. 3 credits.

Planned for the experienced public health nurse. The principles and practices of supervision of public health nursing; the problems encountered in both city and rural communities. Prereq., 61, 63, or permission of instructor.

FIRST SEMESTER
T 6:20 Campus Millard 129, Butzerin

80¶ Health of the School Child. 3 credits.

For teachers and others interested in the health and development of the school child. Mental and physical growth; discovery of physical defects; exercises; fatigue; emotional problems; health habits; diseases of school children; practical problems of health supervision and health instruction. Prereq., 40, 52, or 53; will be waived for teachers and school nurses.

SECOND SEMESTER
M 6:20 Campus Millard 129, Diehl

BUSINESS CLASSES

This department recognizes the professional status of the business executive. Scientific methods in analyzing business data, trained intelligence in handling the human relationships inherent in business, and a well-developed sense of moral responsibility will be the foundations of business effectiveness of the future. The training of prospective executives along these lines is more important than any detailed drill on special processes. At the same time there are those with definite interest in certain special fields who seek improvement and advancement, and to these the opportunity for scientific training and information is invaluable. The classes here offered aim to serve both classes of students; and those whom they serve are able, because of their daily employment in work related to their studies, to make the most advantageous use of their opportunity.

Candidates for Degrees.—With a few exceptions all of the classes offered in business carry credit toward a degree in the School of Business Administration. The classes which do not are specifically indicated in their description. It is necessary, however, for the students who are interested in degrees to secure their credits in two separate units. The first is the pre-business course, or the first two years which is administered in the College of Science, Literature, and the Arts. These requirements are modifications of those required for the Junior College certificate offered by the General Extension Division, and embrace a number of subjects other than those specifically concerned with either Economics or Business Administration. Theoretically this pre-business requirement should be completed before the work of the Senior College is done. In practice, however, most extension students do more of the work of the Senior College than of the work of the Junior College in working for their various certificates. Provision is made, however, for arranging an approved curriculum for all students, regardless of the order in which some of their work may have been done. A student desiring such a curriculum must apply to the dean of the School of Business Administration at least one year before he expects to be eligible for a degree, and complete at least 45 credit hours of the requirements for a degree under the supervision of the adviser appointed for him. The Students' Work Committee of the General Extension Division will be glad to assist the student in arranging for this advice.

CERTIFICATES

The General Extension Division certificate in business is awarded to students who have met the requirements listed below, as a recognition of their completion of a well-planned program of study. This program contains a basic core requirement which is a broad and general preparation for business life. In addition, it offers a number of specialized lines on which the student may concentrate as a specific preparation for his immediate vocation.

1. Each candidate must have completed 90 credits, including the following basic requirements:

	Credits
Principles of Economics I-II (6 and 7)	6
English, Composition IV, or Business English	3
Report Writing	3
Students whose work in these classes in English and Report Writing is not entirely satisfactory may be required to take other English classes.	
Business Law A, B, and C or D	9
Principles of Accounting, 20, 25, 26, or 25L, 26L	9
Mechanism of Exchange (Money and Banking)	3
Elements of Statistics	3
Advanced General Accounting (not required of accounting students) (Same as Interpretation of Financial Statements)	3
Corporation Finance	3
Business Cycles	3
Investments	3
Orientation I and II	6
Total	54

2. Each candidate must also have completed 18 credits in one of the following groups, selecting those credits from the classes listed herewith:

a. *Accounting:* Practice and Procedure A and B; Auditing A and B; Cost Accounting A, B, C, and D; Income Tax Accounting; Accounting Topics.

b. *Finance:* Advanced Money and Banking; Labor Problems; Securities Market; Economics of Public Utilities; Public Finance; Bank Administration; Finance Management; Advanced General Economics; Cost Accounting; Business Law D.
c. *General Business:* Business Policy; Geography 41, 51; Market Administration; Cost Accounting; Labor Problems.
d. *Insurance:* Psychology, 6 or 9 credits; Life Insurance; Fire and Marine Insurance; Casualty Insurance; Fidelity and Surety Bonding; Life Insurance Salesmanship; Mathematics.
e. *Advertising:* Psychology 1, 2, 56; Journalism 13, Reporting; Journalism 69, Special Articles; Elementary Advertising; Retail Advertising; Advanced Advertising and Typography; Commercial Drawing; Market Administration.
f. *Merchandising:* Retail Credits; Retail Store Management; Survey of Marketing; Psychology 1 and 56; Elementary and Retail Advertising; Market Administration; Transportation I and II.
g. *Transportation (Traffic):* Economics of Public Utilities; Geography 41, 51, 102; Transportation I, II, III, IV, V; Insurance—Property, Casualty, Fire, and Marine.

3. The remaining 18 credits, to make a total of 90, may be chosen from any classes offered in business subjects and any classes in Science, Literature, and the Arts or Engineering which may be approved. Classes in the following subjects will be acceptable, unless when offered they bear the indication that they are not acceptable: English Composition and Literature; Geography; History; Interior Decorating; Journalism; Mathematics; Parliamentary Law; Philosophy; Political Science; Psychology; Speech; Textiles; Sciences such as Anthropology, Chemistry, Geology, Zoology; Sociology.

4. Students who have completed 45 credits of the above certificate requirement and have had these credits approved by the Students' Work Committee will be granted a preliminary certificate. These preliminary certificates are for such use as students may find it possible to make of them and are to be issued informally.

5. Students who have already entered upon a program for the completion of the requirements for one of the 45-credit certificates, which are replaced by the above 90-credit certificate, will be protected until the completion of their work and the appropriate certificates will be issued informally.

All extension classes are open to registration by any person qualified by maturity and ability to profit by the study. In practically all cases only those who expect to qualify for a university degree will be expected to meet the requirements of prerequisites. PREREQUISITES ARE STATED FOR INFORMATION, NOT AS OBSTACLES.

DESCRIPTION AND PROGRAM OF CLASSES

GENERAL BUSINESS

B.A. 10ex Business of Today and Economic Problems. Non-credit. 8 meetings. $5.

A lecture discussion class for the layman or the business man, taking up a number of the questions which are prominent and even popular in the thinking and discussion of the day. Sessions adaptable to the discussion of emergency problems that may arise in the course of events. Suggested topics: Money and Standards; The Business Cycle; Tariffs; Taxation; Economic System—Capitalistic, Socialistic, etc.; Labor Problems; Unemployment Reserves (Insurance); Controls of Business. Meetings conducted by leading members of faculty of the School of Business Administration. Open to all without prerequisites. Ask for detailed schedule of meetings, ready about September 15.

FIRST SEMESTER

T 8:05 Campus Folwell 102
M 6:20 St. P. Nor. Pac. Bldg. 1110

ACCOUNTING

N.B.—Attention is called to the alternate sequences in which one may begin the study of accounting. Choice between the two sequences should be made in terms of the objectives for which the student is working. Either will furnish an adequate foundation for further study.

I. Beginning Accounting—general sequence. This combination of the following three classes (Ec. 20, 25, 26) is recommended for those who wish primarily to understand the principles of accounting and the interpretation of accounting statements. No laboratory practice is included but accounting problems are prepared outside the classroom. Three semesters are ordinarily required to complete the sequence except when a student, because of previous study or experience, is able to omit Ec. 20 (see note below).

Ec. 20 Elements of Accounting. 3 credits.

The principles underlying bookkeeping and accounting; sufficient practice in technical processes to serve as a background for more advanced work; specific preparation for Principles of Accounting A-B (Ec. 25-26). No prereq. Credit conditional upon completion of Ec. 25-26.

N.B.—Students who have had preparation in bookkeeping may, upon application to the instructor, be permitted to omit this class and go directly into Principles of Accounting 25.

FIRST SEMESTER	SECOND SEMESTER
M 6:20 Campus Sch. Bus. 302, Alm	(Repeated on demand)

Ec. 25-26† Principles of Accounting A-B. 3 credits each semester. Both required for credit.

The fundamentals of accounting: accounts, statements, valuations, depreciation, sinking funds, surplus, reserve accounts, capital accounts; lectures supplemented by textbook, without laboratory. Prereq., Ec. 20, or exemption from it.

FIRST SEMESTER	SECOND SEMESTER
26 W 6:20 Campus Sch. Bus. 302, Reighard	25 W 6:20 Campus Sch. Bus. 302, Reighard

II. Beginning Accounting—laboratory sequence. This, composed of the following two classes (Ec. 25L-26L), is recommended to those whose interest is primarily in preparing themselves to do actual accounting work and who wish to submit themselves to the discipline of working out actual cases under the guidance of an instructor. Full evening sessions are devoted partly to lecture and discussion, and partly to laboratory practice.

Ec. 25L-26L† Principles of Accounting and Accounting Laboratory A-B. 4½ credits each semester. $15 plus materials fee of $1. Both required for credit.

Lectures and discussions with working out of selected cases; compilation of accounting data; balance sheets, operating statements, accounting records, adjustment of accounts, accounting work sheets; the principles underlying the computation of profit and loss and the statement thereof. No prereq.

FIRST SEMESTER	SECOND SEMESTER
25L M 6:20 Campus Sch. Bus. 301, Smith	26L M 6:20 Campus Sch. Bus. 301, Smith
Th 6:20 Mpls. N. W. Bank Bldg. 603, Rotzel	Th 6:20 Mpls. N. W. Bank Bldg. 603, Rotzel
Th 6:20 St. P. Ext. Center 202, Blandin	Th 6:20 St. P. Ext. Center 202, Blandin
F 6:20 St. P. Ext. Center 202, LeBorious	F 6:20 St. P. Ext. Center 202, LeBorious

N.B.—The following Combined Course offers Accounting 25L the first eight weeks, 26L the second eight weeks. Fee, $15 each course, plus materials fee. Registration and fees accepted for Combined Course, or for one class at a time, either class.

SECOND SEMESTER
TTh 6:20 Campus Sch. Bus. 301, Smith
TF 6:20 St. P. Ext. Center 204(T) 206(F), Blandin

A.I.B. Survey of Accounting. No credit. Meets 1½ hours. $7.50 plus materials fee $1.

A beginning class in accounting, designed primarily for members of the American Institute of Banking, but not restricted to them. No prereq. Semester begins September 12 and ends correspondingly early.

FIRST SEMESTER
W 4:30 St. P. First National Bank, LeBorious

B.A. 137-138† Accounting Practice and Procedure A-B. 3 credits each semester. Both required for credit. $1 materials fee.

Practice in the peculiar accounting problems of business and the particular skills of the practicing accountant. Prereq., Ec. 26 or 26L, or equivalent.

FIRST SEMESTER	SECOND SEMESTER
137 T 6:20 Campus Sch. Bus. 302, Houston	138 T 6:20 Campus Sch. Bus. 302, Houston
M 6:20 St. P. Ext. Center 202, Blandin	M 6:20 St. P. Ext. Center 202, LeBorious
M 8:05 St. P. Ext. Center 202, Blandin	M 8:05 St. P. Ext. Center 202, LeBorious

B.A. 131-132† Cost Accounting. 3 credits each semester. Both required for credit.

Principles used to determine the profitableness of each branch of manufacturing, and basis for judging the relative efficiencies of operation; materials, labor, and burden; continuous process and production order costs; burden distribution methods, standard costs, etc. Prereq., Ec. 26 or 26L, or equivalent.

FIRST SEMESTER	SECOND SEMESTER
131 W 6:20 Campus Sch. Bus. 301, Rotzel	132 W 6:20 Campus Sch. Bus. 301, Rotzel
T 6:20 St. P. Ext. Center 202, Tuttle	T 6:20 St. P. Ext. Center 202, Tuttle

B.A. 135-136 Auditing A-B. 3 credits each semester.

N.B.—Students may register for either without the other.

First semester: the conduct of audits and investigations; setting up of accounts based upon audits; audit reports; all with reference to the work of the public accountant in making audits;

meeting requirements of the Securities Act. Second semester: the principles of internal check or audit; accounting systems; applications of machine accounting; introduction to budgetary control; the work of the comptroller. Prereq., B.A. 138.

FIRST SEMESTER
135 M 6:20 Campus Sch. Bus. 202, Reighard
F 6:20 St. P. Ext. Center 201, Rotzel

SECOND SEMESTER
136 M 6:20 Campus Sch. Bus. 202, Reighard

B.A. 139 Advanced General Accounting (Interpretation of Financial Statements). 3 credits.

Primarily for the general business student. Interpretation of balance sheets and statements, particularly as found in corporation and investment publications; preparation, analysis, and utilization of statements; use of budgets; accounting methods in different businesses. Prereq., Ec. 26 or 26L.

FIRST SEMESTER
W 8:05 Campus Sch. Bus. 209, Heilman

B.A. 134 Income Tax Accounting. 3 credits.

Application of federal income law to various business and business conditions; possible errors in preparation of income tax reports. Prereq., B.A. 138.

FIRST SEMESTER
T 8:05 Campus Sch. Bus. 209, Preston
M 8:05 St. P. Ext. Center 204, Connolly

SECOND SEMESTER
T 8:05 Campus Sch. Bus. 209, Connolly

B.A. 182A Accounting Topics—Auditors and Investigations. 3 credits.

Adjusting journal entries; financial condition; problems in inventory valuation, in property accounting; appraisals; "writing down" of assets, and depreciation; application of funds; balance sheet giving effect to financing; the auditor's "results from operation" statement; material facts; certificates and reports. Prereq., consent of instructor.

FIRST SEMESTER
W 8:05 Campus Sch. Bus. 301, Rotzel

SECOND SEMESTER
F 6:20 St. P. Ext. Center 201, Rotzel

B.A. 133 Cost Accounting Methods.

B.A. 181A Topics in Cost Accounting. Constituting Cost Accounting C and D. 3 credits each semester.

These established classes are given the titles and numbers of classes in the School of Business Administration to which they correspond. They constitute a detailed practical application to business situations of the principles of cost accounting, and the installation of cost systems; burdens and burden centers; pro forma journal entries; wage methods; change from job to process cost methods; by-product accounting; forms. Prereq., B.A. 132.

FIRST SEMESTER
133 T 8:05 St. P. Ext. Center 202, Tuttle

SECOND SEMESTER
181A T 8:05 St. P. Ext. Center 202, Tuttle

B.A. 180A Accounting Topics—Budgetary Control. 3 credits.

Budget systems in business, types and kinds; budgeting of every sort of item; budget administration, committees, etc.; budget reports and statements, form, content, and use; problem studies, solutions; recent developments in foundations for budgetary control. Prereq., see instructor.

FIRST SEMESTER
F 8:05 St. P. Ext. Center 201, Rotzel

ADVERTISING AND SALESMANSHIP

68ex Salesmanship. 3 credits toward certificate only.

Principles underlying salesmanship—buying motives, pre-approach, approach, the interview, meeting objections, closing the sale; demonstration sales. No prereq.

FIRST SEMESTER
Th 8:05 Campus Sch. Bus. 209, Faragher

SECOND SEMESTER
W 8:05 St. P. Ext. Center 202, Faragher

B.A. 88 Elementary Advertising. 3 credits.

Development of advertising; market analysis; principles of lay-out and arrangement; typography, illustrations, copy; selection of media; practice in lay-out and writing. Prereq., B.A. 77, Psychology 56.

FIRST SEMESTER
Th 6:20 Campus Sch. Bus. 209, Brooke
W 6:20 St. P. Ext. Center 200, Faragher

B.A. 87ex Retail Advertising. 3 credits toward certificate only.

Fundamentals of modern department and chain store advertising; organization of advertising department; relation to other departments; analysis of market; evaluation of media; sales planning, selection of merchandise and departments to be advertised. Laboratory practice in retail store lay-out and copy-writing stressing ready-to-wear, home furnishings, foods, drugs, fabrics, institutional, and bargain basement themes.

SECOND SEMESTER
T 6:20 Campus Sch. Bus. 6, Whitney
W 6:20 St. P. Ext. Center 202, Whitney

B.A. 194-195-196 Advanced Advertising Procedure. 3 credits.

Market research to determine advertising appropriations and schedules; preparation of copy and lay-out; the effective use of type and illustration. The problem or case method employed. Prereq., B.A. 88.

SECOND SEMESTER
M 8:05 Campus Sch. Bus. 6, Vaile, Olson

Direct Mail Advertising. 3 credits toward certificate only.

A practical class in this most modern form of advertising, conducted by a master practitioner. The psychology of direct mail advertising; its difference from other forms of advertising; the markets it fits, and those it does not; supplementing other forms; direct mail as salesmanship; the physical forms (from handwritten letters to bound books), how to prepare them, when to use them, how to use them, their respective costs of preparation and mailing. Open to all interested in this form of publicity.

FIRST SEMESTER
T 6:20 Campus Sch. Bus. 202, Gile

BANKING AND FINANCE

Ec. 3 Mechanism of Exchange (Finance A, Money and Banking). 3 credits.

The nature and functions of money; the function of credit; character and operations of various types of financial institutions; their relation to the economic structure. No prereq.

FIRST SEMESTER
M 6:20 Campus Sch. Bus. 209, Stehman
W 6:20 St. P. Ext. Center 202, Lunden

Ec. 141 Monetary and Banking Policy. 3 credits.

An advanced course in money and banking and theory of the value of money; control of reserves; providing a scientific currency; regulation of credit; fluctuations of the general price level, their causes and possible reduction. Prereq., Ec. 3, 6, and 7.

FIRST SEMESTER
T 6:20 Campus Sch. Bus. 301, Marget

B.A. 146A-146B Investments (Finance C-D). 3 credits each toward certificate; 146A toward degree, 146B toward certificate only.

Bonds, mortgages, stocks, and other investment securities; investment policy for the conservative investor; criteria of a good investment; stock exchange organization and operation. Prereq., 3 and 155 (Finance A and B).

FIRST SEMESTER			SECOND SEMESTER		
146A W	6:20	Campus Sch. Bus. 209, Fraine	146B W	6:20	Campus Sch. Bus. 209, Fraine
Th	6:20	St. P. Ext. Center 201, Finger	Th	6:20	St. P. Ext. Center 201, Finger

149 Business Cycles. 3 credits.

Analysis of factors involved in business fluctuation; comparison of theories of the cause of prosperity and depression; introduction to the statistical data and the methods of business forecasting. Prereq., 141 or equivalent.

SECOND SEMESTER
T 6:20 Campus Sch. Bus. 209, Marget

B.A. 155 Corporation Finance (Finance B). 3 credits.

Types of corporate securities and their uses; forms of corporate organization; marketing of securities; holding companies, mergers, consolidations, and reorganizations; testing of corporations, statistics and reports. Prereq., Ec. 3, 6, 7.

SECOND SEMESTER
M 6:20 Campus Sch. Bus. 209, Stehman
M 6:20 St. P. Ext. Center 204, Lunden

BUSINESS ADMINISTRATION

66ex Retail Credits. 3 credits toward certificate only.

Conducted jointly by the instructor and several experienced retail credit men of the Twin Cities. Economic and legal background of credit; relations of retail credit to other forms of credit; sources of retail credit information; work of credit bureau and credit department; collection methods; installment credit practice. No prereq.

FIRST SEMESTER
T 6:20 Campus Sch. Bus. 209, Heilman

B.A. 89 Production Management. 3 credits.

Location and layout of industrial plants; types of operating organization; shop personnel; standards of operation; purchasing and inventory control; routing, scheduling, and dispatching of product; scientific management; practical problems in production control. No prereq. (Same as Mech. Eng. 171.) Included in core group requirements for all candidates for a degree in business.

FIRST SEMESTER
T 6:20 Campus Mech. Eng. 202, Koepke

Production Management—Time and Motion Studies. See Industrial Engineering 174, p. 42, for description of this class.

BUSINESS ENGLISH

1ex Business English. 3 credits toward certificate; may be substituted for Composition 4 when followed by Composition 5 and 6.

A practical class for business people who recognize the value of good English in business and in general writing and conversation. The various kinds of business writing are studied with some attention to letter types; application of good grammar and correct forms in all business writing. No prereq.

FIRST SEMESTER
M 6:20 Campus Main Eng. 203, Mallam
F 6:20 Campus Main Eng. 203, Edmunds
W 6:20 St. P. Ext. Center 203, Haga

SECOND SEMESTER
M 6:20 Campus Main Eng. 215, Edmunds

2ex Business Correspondence. 3 credits toward certificate.

A continuation of Business English, with less emphasis on grammar and form, and more upon the general principles underlying successful letter writing; types of letters—adjustment, acknowledgment, recommendation, application, follow-up, sales, interdepartmental, etc. No prereq., but students will do well to complete Business English 1ex first.

SECOND SEMESTER
M 6:20 Campus Main Eng, 203, Mallam
W 6:20 St. P. Ext. Center 203, Haga

N.B.—For classes in English Composition see S. L. & A. Classes, page 13.

BUSINESS LAW

B.A. 51-52-53†-54ex Business Law A, B, C, D. 3 credits each semester; 51, 52, and 53 must be completed before credit is granted. Materials fee $1 each class; no textbook.

Comprehensive course in the fundamental principles of law for the business and professional man. Business Law A (B.A.51): Contracts—their formation, interpretation, operation, transfer, and discharge; Agency—the creation, nature, and terms of the relation, rights and liabilities of the parties. Business Law B (B.A.53): Personal property and transactions concerning it; law of sales, bailments, and of the Uniform Negotiable Instruments and Bills of Lading Acts. Business Law C (B.A.52): Organization, management, and responsibility of associations; business trusts; partnerships and corporations; laws relating to partnership and bankruptcy. Business Law D (B.A.54ex): Nature and classification of real estate; deeds and conveyances; landlord and tenant; recording and abstracting; Torrens titles; liens and mortgages; wills, the probating of estates, and duties of executors and administrators. No prerequisite, but Business Law A should precede other classes.

FIRST SEMESTER
A T 6:20 Campus Sch. Bus. 102, Jackman
M 6:20 St. P. Ext. Center 203, Jackman
B T 8:05 Campus Sch. Bus. 102, Jackman
C W 6:20 Campus Sch. Bus. 102, Jackman
M 8:05 St. P. Ext. Center 203, Jackman

SECOND SEMESTER
A T 8:05 Campus Sch. Bus. 102, Jackman
Th 8:05 St. P. Ext. Center 206, Jackman
B T 6:20 Campus Sch. Bus. 102, Jackman
M 6:20 St. P. Ext. Center 203, Jackman
D W 6:20 Campus Sch. Bus. 102, Jackman
M 8:05 St. P. Ext. Center 203, Jackman

ECONOMICS AND STATISTICS

Ec. 6-7† Principles of Economics 1-2. 3 credits each semester. Both required for credit.

Fundamental principles underlying the economic activities of society; utility and valuation; prices and the cost of production; the factors of production; division of labor and its relation to the development of industry; wages, rent, interest; capitalization, enterprise, business profits. Fundamental to the study of any business subject. No prereq.

FIRST SEMESTER
6 Th 8:05 Campus Sch. Bus. 102, Graves
T 8:05 St. P. Ext. Center 203, Myers

SECOND SEMESTER
6 Th 6:20 Campus Sch. Bus. 102, Graves
T 6:20 St. P. Ext. Center 203, Myers
7 Th 8:05 Campus Sch. Bus. 102 Graves
T 8:05 St. P. Ext. Center 203, Myers

Ec. 14 Elements of Statistics. 3 credits.

The principles of statistical methods applied to business; selection, tabulation, interpretation of statistical data; averages, ratios, errors, index numbers, graphs and charts. Prereq., Ec. 6-7.

FIRST SEMESTER
M 6:20 Campus Sch. Bus. 6, Graves
W 8:05 St. P. Ext. Center 202, Lunden

B.A. 77 Survey in Marketing. 3 credits.

Introductory course including description of: the marketing processes; produce exchanges and speculation on these exchanges; co-operative marketing institutions; marketing areas; operation of supply and demand in marketing; readings on the marketing of important commodities. No prereq. Substitutes for Ec. I B.

FIRST SEMESTER
W 8:05 Campus Sch. Bus. 202, Vaile

B.A. 165 The Economics of Public Utilities. 3 credits.

The economic aspect of government regulation of the finances, rates, and services of municipal public utilities; economic characteristics, legal position, regulation, valuation, and government ownership. Prereq., Ec. 3, 6 and 7.

FIRST SEMESTER

M 6:20 Campus Sch. Bus. 102, Schmidt

Ec. 161 Labor Problems and Trade Unionism. 3 credits.

Employment; hours; wages; extent and stronghold of unionism; open and closed shops; collective bargaining; industrial unrest; government regulation of labor disputes. Special emphasis on the current proposals for industrial recovery and the re-employment of labor. Prereq., Ec. 6-7.

FIRST SEMESTER

W 8:05 Campus Sch. Bus. 102, McCracken

Ec. 164 Labor Legislation and Social Insurance. 3 credits.

The economic aspects of labor legislation including minimum wage laws; hours legislation; factory acts; accident, health, old age, and employment insurance; mothers' pensions; collective bargaining and the N.R.A. Prereq., Ec. 161.

SECOND SEMESTER

M 6:20 Campus Sch. Bus. 102, Schmidt

Ec. 166 International Economic Problems. 3 credits.

Practical application of the principles of economics in the study of selected problems of the day; stabilization of prices; Federal Reserve rediscount policy, industrial fluctuations; international trade barriers; distribution of wealth and income. Prereq., Ec. 6-7.

FIRST SEMESTER

T 6:20 St. P. Ext. Center 203, Myers
T 8:05 Campus Sch. Bus. 202, Marget

INSURANCE

3ex General Insurance. 3 credits toward certificate only.

A basic course in the principles and practices involved in underwriting the various forms of insurance coverage, property and casualty in particular. Prerequisite to all other insurance classes. No prereq.

FIRST SEMESTER

T 6:20 Campus Sch. Bus. 6, Ware

Life Insurance Salesmanship. 3 credits toward certificate.

A practical class for those engaged in life insurance. Principles of selling, prospecting; the approach, selling processes, closing; the psychology of human reactions and its sales value.

FIRST SEMESTER

T 4:15 Mpls. N. W. Bank Bldg. 603, Pickhardt

B.A. 59 Life Insurance. 3 credits.

The economic significance of life insurance; types of policy and analysis of the policy contract; principles underlying the determination of premiums and reserves; industrial, fraternal, and group insurance. Prereq., Ec. 6-7.

SECOND SEMESTER

T 6:20 Campus Sch. Bus. 202, Graves

B.A. 60 Fire and Marine Insurance. Offered 1935-36.

B.A. 61 Casualty Insurance. Offered 1935-36.

TEXTILES

3 Textiles. 3 credits.

A course for the consumer, the merchant, the salesman. Woven fabrics of rayon, cotton, silk, wool, and linen; manufacturing and finishing processes; qualities, tests, uses, maintenance; knit fabrics and drapery and upholstery fabrics; explanation of technical terms and characteristics determining comparative value, and of substitution. No prereq.

FIRST SEMESTER

W 6:20 Campus Chemistry 115, Caplin

TRANSPORTATION (TRAFFIC)

B.A. 71-72 Transportation Services and Charges. 3 credits each semester. Materials fee $1 per semester.

The rail, water, and highway transportation facilities, services, rates, and laws, and their relation to business establishments; problems in handling freight, express, and rail shipments; scope, selection, and use of the facilities and services of common carriers; storage of express, freight, and mail; private ownership and transportation facilities. 71 prerequisite to 72. Prereq., Ec. 6-7.

FIRST SEMESTER

71 F 6:20 Campus Sch. Bus. 6, Mann

SECOND SEMESTER

72 F 6:20 Campus Sch. Bus. 6, Mann

ENGINEERING CLASSES

In this department two kinds of classes are offered for two rather distinct classes of students. Classes of regular college standing are offered for those who wish to accumulate as much of the work of the regular engineer's course of training as they can while regularly employed. For those whose requirements are less exacting and who wish practical rather than theoretical, scientific, or mathematical training some classes of subcollegiate level are offered. The student's own needs or desires are to determine which work is to be followed, and no disparaging distinctions are made between the two kinds.

Classes of the second kind are in the program indicated as without prerequisites and without credit. They are offered freely to all who have the appropriate interest, for such value as they may possess. Each such class is usually complete in itself. A few may carry credit when the student has met requirements set up by the College of Engineering. These courses, however, are not offered as equivalents for any of the work in the College of Engineering.

The regular collegiate courses offered correspond to those given to full time engineering students, and are based on the same prerequisites. Students taking these classes are those who wish to be thoroly prepared and do the maximum of work in each class. Students who do not meet the prerequisite requirements may be admitted to these classes, but only as auditors, and are not permitted to make extra demands upon the instruction which would tend to retard the progress of the prepared students.

All credits earned in classes in this department may carry credit toward an extension certificate. They may count toward a degree in the College of Engineering only after the successful completion of a comprehensive examination given by that college in the work of the course. These examinations, given at the time of formal entry into the College of Engineering, for the completion of the degree are without expense. Taken at other times, they entail a fee of $5 for each examination. The prerequisites for credit in all classes are stated primarily to show the proper order in which the classes should be taken. While it is possible to disregard these prerequisites in some cases, it is not recommended, for best results are obtained only when the proper sequence of classes is maintained. Such a strict regard for prerequisites is compulsory in classes in Mathematics and in Chemistry. Without prerequisites, it is impossible to do the work of those classes.

CERTIFICATES

The General Extension Division certificate in engineering is issued as an evidence of the completion of an organized program of study in engineering subjects. While not the equivalent of a degree in engineering, it represents a comprehensive yet concentrated training in several branches of engineering which will be found valuable in many phases of industry and activities which utilize engineering ability. The program embraces a core of fundamental subjects, including all the mathematics required for an engineering degree, and the opportunity for specialization in either of several engineering fields. The requirements are as follows:

1. Each candidate must complete a total of 90 credits in engineering subjects, of which the following are required:

	Credits
Mathematics:	
9 Higher Algebra	5
11 College Algebra	5
12 Trigonometry	5
13 Analytic Geometry	5
24 Differential Calculus	5
25 Integral Calculus	5
Mechanical Drawing 1-2	6
Advanced Applied Mechanics	5
Strength of Materials	5
Total	46

2. Each candidate will be required to complete additional classes totaling approximately 30 credits in one of the separate fields of Engineering—Aeronautical, Architectural, Chemical, Civil, Electrical, Mechanical.

3. The remaining credits, approximately 14, may be completed either in optional courses within the chosen field, or in approved elective courses in one of the allied fields.

Selection of classes in which to earn these credits should be made with the advice and approval of the Students' Work Committee.

4. Upon the completion of an approved 45 credits a preliminary certificate will be informally issued for such purposes as the candidate may wish to use it. The approval of classes which will yield these 45 credits must be had from the Students' Work Committee.

5. Students who have already entered upon a program for the completion of the requirements for one of the 45-credit certificates, which are replaced by the above 90-credit certificate, will be protected until the completion of their work and the appropriate certificates will be issued informally.

DESCRIPTION AND PROGRAM OF CLASSES

Extension classes in Engineering subjects are open to all who can profit by the study, without regard to previous classes or other education, except the preparation essential to the successful completion of the work attempted.

N.B.—An extension class in Engineering carries credit toward a degree in the College of Engineering and Architecture, or in the School of Chemistry, only when the student has successfully passed a comprehensive examination, given by the college, in the work of the class.

GENERAL ENGINEERING

Consultation Period. No fee.

A session for guidance purposes, open to all students registered in engineering classes; affords opportunity for consultation, discussion, or study, under direction, in all engineering subjects. An instructor will be present by appointment on Friday.

FIRST SEMESTER	SECOND SEMESTER
MTWThF 7:00 Campus Main Eng. 136	MTWThF 7:00 Campus Main Eng. 136

AERONAUTICAL ENGINEERING

2a-bex Aircraft Engines 1-2. 3 credits each semester.

Development of the airplane engine; present types; air cooled, radial, and in line; water cooled, V, W, and in line; principles of ignition, carburetion, combustion; modern magnetos and carburetors; fuels and detonation; the aircraft Diesel. Laboratory tests; engine performance. No prereq.

N.B.—Taught jointly with M.E. 50 Internal Combustion Engines. Students may enter either semester.

FIRST SEMESTER	SECOND SEMESTER
2aex W 7:30 Campus Exp. Eng. 110, Robertson	2bex W 7:30 Campus Exp. Eng. 110, Robertson

5a-bex Elementary Aeronautics and Airplane Construction I-II. 3 credits each semester.

Nomenclature; theory of lift and drag; wind tunnels; air-foil characteristics; types of airplanes; demonstration and inspection of airplane and its parts; materials and their properties; principles in propeller theory; navigation instruments; dead reckoning; maps and charts; laying out and checking course; radio use; magnetic compass and its use; the atmosphere and clouds; reading of weather map; principles of celestial navigation. Prereq., elementary mathematics.

FIRST SEMESTER	SECOND SEMESTER
M 7:30 Campus Exp. Eng. 110, Akerman and Barlow	M 7:30 Campus Exp. Eng. 110, Akerman and Barlow

AIR CONDITIONING

See Mechanical Engineering Classes, p. 43.

ARCHITECTURE

Classes in Architectural Design. Not offered 1934-35.

Building Cost Estimating. See Engineering Drawing, G.E. 81.

ART

1-2ex Commercial Drawing 1-2. 3 credits each semester, toward certificates only.

Elementary commercial art; lettering, lay-outs, posters, elementary design; pen, pencil, and color. No prereq.

FIRST SEMESTER	SECOND SEMESTER
1ex M 7:30 Campus Main Eng. 417, Doseff	2ex M 7:30 Campus Main Eng. 417, Doseff

24-25-26 Freehand Drawing I-II. 1½ credits each unit.

Freehand, perspective drawing in pencil, pen, charcoal, and wash from geometric solids and still life; architectural details, figure details, and antique. No prereq.

FIRST SEMESTER	SECOND SEMESTER
T 7:30 Campus Main Eng. 417, Doseff	T 7:30 Campus Main Eng. 417, Doseff

27-28-29ex Freehand Drawing III, IV, V, VI. 1½ credits each unit. Model fee $1 payable to instructor.

Life drawing; figure composition; pencil, pen, charcoal, oil, water colors; print making. Prereq., 26.

FIRST SEMESTER	SECOND SEMESTER
W 7:30 Campus Main Eng. 417, Burton	W 7:30 Campus Main Eng. 417, Burton

N.B.—All art classes scheduled for a given meeting will be taught simultaneously. Students may enter any unit listed, either semester. The beginning classes in Commercial and Freehand Drawing may, if registration is below minimum, be combined on one night.

See also Fine Arts (S. L. A. Classes, p. 15), and Art Education (p. 27).

CHEMISTRY

N.B.—All Chemistry classes meet for a minimum of one lecture, one recitation, and three hours' laboratory a week.

9ex‡ General Inorganic—Non-Metals. 5 credits. $17.

The common non-metallic elements and their principal compounds; the laws and theories of chemistry. No prereq.

FIRST SEMESTER
T 7:30 Campus Chem. 315, Geiger
Th 7:30 Campus Chem. 290, Geiger

12ex‡ General Inorganic and Qualitative Analysis. 5 credits. $17.

The common metallic elements and their principal compounds; the laws and theories involved; systematic qualitative analysis. Prereq., 9ex or its equivalent.

SECOND SEMESTER
T 7:30 Campus Chem. 315, Geiger
Th 7:30 Campus Chem. 290, Geiger

1ex‡ Quantitative Analysis—Gravimetric. 5 credits. $17.

Principles and methods of gravimetric analysis; typical problems and proper laboratory practice. Prereq., Qualitative Analysis.

FIRST SEMESTER
T 7:30 Campus Chem. 310, Geiger
Th 7:30 Campus Chem. 315, Geiger

2ex‡ Quantitative Analysis—Volumetric. 5 credits. $17.

General principles and methods of volumetric analysis. Prereq., Qualitative Analysis.

SECOND SEMESTER
T 7:30 Campus Chem. 310, Geiger
Th 7:30 Campus Chem. 315, Geiger

7ex‡ Quantitative Analysis—Pre-Medical. 5 credits. $17.

Introductory, covering principles and methods of gravimetric and volumetric quantitative analysis; typical problems and proper laboratory practice. (Given in connection with 2ex.) Prereq., Qualitative Analysis.

SECOND SEMESTER
T 7:30 Campus Chem. 310, Geiger
Th 7:30 Campus Chem. 315, Geiger

123-124ex‡ Advanced Quantitative Analysis. 123ex, 5 credits, $17; 124ex, 4 credits, $15.

Those desiring this class meet with class in Quantitative Analysis (1ex) in Room 310 first night. Prereq. for degree, 1-2ex or permission of instructor.

FIRST SEMESTER	SECOND SEMESTER
123ex T 7:30 Campus Chem. 310, Geiger	124ex T 7:30 Campus Chem. 310, Geiger
Th 7:30 Campus Chem. 315, Geiger	Th 7:30 Campus Chem. 315, Geiger

Textiles. See Business Classes, p. 37.

CIVIL ENGINEERING

11 Plane Surveying. 3 credits.

Field problems; use of chain, compass, transit; leveling; field notes and their computation and plotting; care, use, and adjustment of instruments. Prereq., trigonometry and drawing.

FIRST SEMESTER
T 7:30 Campus Main Eng. 215, Cutler

‡ All chemistry classes require a deposit of $5, payable at Chemistry Department, of which $2 is laboratory fee and the remainder for breakage. The unused portion is to be returned.

21 Curves and Earthwork. 3 credits.

Mathematics of simple, compound, and spiral curves; plotting and profiling; vertical curves; cross-sectioning and computation of earthwork volumes; computing overhaul; mass diagram. Prereq., 11.

SECOND SEMESTER
T 7:30 Campus Main Eng. 215, Cutler

51-52 Highways and Pavements I-II. 3 credits each semester.

Elementary economics, location, construction, and maintenance of highways and pavements; road building materials, and methods of testing with laboratory practice. Students may enter either semester. Prereq., Trigonometry.

N.B.—In the interest of those professionally engaged in road building and desirous of registering for these classes the following plan has been adopted: if class 51 does not have a sufficient enrolment at its first meeting its opening will be postponed to November 28; by meeting twice weekly thereafter the class will finish at the end of the first semester. Similarly class 52, by meeting twice weekly, will finish in time for the opening of the road building season.

FIRST SEMESTER	SECOND SEMESTER
51 W 7:30 Campus Exp. Eng. 215, Lang	52 W 7:30 Campus Exp. Eng. 215, Lang

M.&M. 129-130 Hydraulics. 3 credits each semester.

Elements of hydraulics including flow through tubes and pipes, conduits and rivers; principles of turbines and pumps; open channel flow. Prereq., Math. 26 or its equivalent.

FIRST SEMESTER	SECOND SEMESTER
129 T 6:20 Campus Main Eng. 107, Teeter	130 T 6:20 Campus Main Eng. 107, Teeter

141-142 Reinforced Concrete and Concrete Design. 3 credits each semester.

Principles of reinforced concrete; theory of beams, slabs, and columns, with application to ordinary structures; practical features of the design of buildings, bridges, retaining walls, etc. Prereq., consent of the instructor.

FIRST SEMESTER	SECOND SEMESTER
141 T 7:30 Campus Main Eng. 107, Teeter	142 T 7:30 Campus Main Eng. 107, Teeter

162-163ex Sanitary Engineering. 3 credits each semester.

Sanitation and public health; public water supplies and sewage disposal; technical, economic, and governmental elements. Lectures and problems. A continuous year course. Prereq., hydraulics or consent of instructor.

FIRST SEMESTER	SECOND SEMESTER
M 7:30 Campus Main Eng. 104, Bass	M 7:30 Campus Main Eng. 104, Bass

ELECTRICAL ENGINEERING

66-67ex Radio Communication 1-2. Open to all, without credit.

Theory and operation of radio transmitting and receiving circuits; various types of receiving sets now in use; economic status of radio communication.

FIRST SEMESTER	SECOND SEMESTER
66ex T 7:30 Campus Elec. Eng. 339, Swanson	67ex T 7:30 Campus Elec. Eng. 339, Swanson

Advanced Alternating Currents. Corresponds to E.E. 127-128-129. 3 credits each semester.

Study of electric circuits during sudden changes of condition; current and voltage curves in circuits containing resistance, inductance, and capacitance, and in machines under transient conditions; theory, selection, and application of oil circuit breakers; theory of lightning-traveling waves; effects of lightning on power systems, and methods of protection; theory and application of lightning arresters. Open to those who have completed Advanced Alternating Current Machinery (formerly 221-223ex) or its equivalent.

FIRST SEMESTER	SECOND SEMESTER
T 7:30 Campus Elec. Eng. 237, Johnson	T 7:30 Campus Elec. Eng. 237, Johnson

ENGINEERING DRAWING

1-2 Engineering Drawing. 3 credits each semester.

Elements of drafting, representation, geometry, sketching, lettering, working drawings, conventions, tracing. Auxiliary views, multiple projection, detail and assembly drawings. No prereq.

FIRST SEMESTER	SECOND SEMESTER
Th 7:30 Campus Main Eng. 201, French	Th 7:30 Campus Main Eng. 201, French
M 7:30 St. P, Mechanic Arts High, Dow	M 7:30 St. P, Mechanic Arts High, Dow

3 Descriptive Geometry. 3 credits.

Designed to give engineers a foundation for the graphic solution and representation of problems of points, lines, planes, and solids, and to enable them to visualize an object from a drawing of it. Solutions of engineering problems involving the use of descriptive geometry. Prereq., drawing.

FIRST SEMESTER
W 7:30 Campus Main Eng. 101, Levens

52 Alignment Charts. 3 credits.

Theory and construction of alignment charts for the solution of engineering formulae having three or more variables. Prereq., Algebra.

FIRST SEMESTER

W 7:30 Campus Main Eng. 101, Levens

57ex Use of Engineers' Slide Rule. Eight meetings, one hour each. No credit. $2.50.

A practical course for those who wish to use the slide rule in ordinary office computations. No prereq.

FIRST SEMESTER

Th 7:30 Campus Main Eng. 201, French

22-23 Structural Drafting. 3 credits for one semester; repeated second semester.

Details of fabrication of beams, girders, columns, trusses, etc.; concrete construction; material bills. Prereq., Drawing 1-2.

FIRST SEMESTER	SECOND SEMESTER
Th 7:30 Campus Main Eng. 201, French	Th 7:30 Campus Main Eng. 201, French

29 Advanced Mechanical Drawing. 3 credits one semester; repeated second semester.

Drafting of details of machine fastenings, pipe and pipe fastenings; bearings and journals, pulleys, gears, cams; assembly, diagrammatic and layout drawings. Prereq., Drawing 1-2.

FIRST SEMESTER	SECOND SEMESTER
W 7:30 Campus Main Eng. 201, Herrick	W 7:30 Campus Main Eng. 201, Herrick
M 7:30 St. P. Mechanic Arts High, Dow	M 7:30 St. P. Mechanic Arts High, Dow

G.E. 81 Cost Estimating. 3 credits. Material fee, $2; no textbook required.

Blueprint reading, quantity surveying, mensuration; estimates of concrete, brick, timber, and steel structures. Use of slide rule optional. No prereq.

FIRST SEMESTER	SECOND SEMESTER
F 7:30 Campus Main Eng. 201, French	F 7:30 Campus Main Eng. 201, French

INDUSTRIAL ENGINEERING

M.E. 171 Production Control. 3 credits.

Same as Bus. Adm. 89; for description see p. 35.

FIRST SEMESTER

T 6:20 Campus Mech. Eng. 202, Koepke

M.E. 174 Production Management—Time and Motion Studies. 3 credits.

Lectures and laboratory studies of various operations; the use, time, and photographic means of analysis; charting of micromotion results; study of fatigue; rate setting. Primarily for those in charge of production processes. Open to non-credit students without prerequisites.

SECOND SEMESTER

T 6:20 Campus Mech. Eng. 202, Koepke

MATHEMATICS

The numbers of these courses are those used by the College of Engineering and Architecture.

7-8ex Elementary Algebra. Credit toward entrance only. $10.

Elements of algebra, to quadratic equations. No prereq. Both semesters necessary.

FIRST SEMESTER	SECOND SEMESTER
M 7:30 Campus Main Eng. 106, Edwards	M 7:30 Campus Main Eng. 106, Edwards

Shop Mathematics I. No degree credit. $10. Material fee $1.

A beginning course in mathematics using arithmetical processes in connection with practical problems; prepares students to begin the study of algebra and furnishes foundation that makes all subsequent study in mathematics clearer and hence easier. No prereq.

SECOND SEMESTER

M 6:20 Campus Main Eng. 106, Edwards

5 Solid Geometry. Credit toward entrance only. $10.

Standard theorems and exercises; practice in special proofs and original exercises. Prereq., Plane Geometry.

FIRST SEMESTER

M 6:20 Campus Main Eng. 106, Edwards

9 Higher Algebra. 5 credits. $17.

A review and collegiate treatment of the topics of elementary algebra, which is prerequisite. Not open for credit to those who present higher algebra for entrance to college.

FIRST SEMESTER

T 7:00 Campus Main Eng. 106, Edwards

11 College Algebra. 5 credits. $17.

Quadratic equations; equations in the quadratic form; simultaneous quadratic equations; graphical representation; progressions; mathematical induction; binomial theorem; permutations; combinations; probability; determinants; theory of equations. Prereq., 9.

SECOND SEMESTER
T 7:00 Campus Main Eng. 106, Edwards
W 7:00 St. P. Ext. Center 201, Dow

12 Trigonometry. 5 credits. $17.

Logarithms and plane trigonometry. Prereq., 9.

FIRST SEMESTER
Th 7:00 Campus Main Eng. 107, Teeter
W 7:00 St. P. Ext. Center 201, Dow

13 Analytic Geometry, Plane and Solid. 5 credits. $17.

Elements of plane analytic geometry including conic sections; brief introduction to solid analytic geometry. Prereq., Trigonometry.

SECOND SEMESTER
Th 7:00 Campus Main Eng. 107, Teeter

24 Differential Calculus. 5 credits. $17.

Limit; derivative; simple applications of derivative; maxima and minima; differentials; rates; change of variables; radius of curvature; mean value; indeterminate forms; partial differentiation; series. Prereq., 13.

FIRST SEMESTER
W 7:00 Campus Main Eng. 106, Edwards

25 Integral Calculus. 5 credits. $17.

Expansion of function; Taylor's theorem; standard elementary forms; definite integral; rational fractions; integration by substitution, by parts; reduction formulas; integration of processes of summation; successive and partial integration; elementary ordinary differential equations. Prereq., 24.

SECOND SEMESTER
W 7:00 Campus Main Eng. 106, Edwards

151-152ex Differential Equations. Not offered 1934-35.

MECHANICAL ENGINEERING

Machine Design. Not offered 1934-35.

Air Conditioning. 3 credits each semester, toward certificate.

Especially designed for those engaged in selling, installing or recommending the modern types of appliances for heating, cooling, humidifying or otherwise conditioning the air of houses and other buildings. Deals with the wants of the human body; the laws of temperature, pressure, humidity, etc.; the methods of heating, cooling, cleaning and distributing air and the peculiarities of each; testing and measuring pressure, humidity, etc., and the instruments used; critical evaluation of the results of processes. Both semesters required to complete the matter outlined, or to receive credit. No prereq.

FIRST SEMESTER
W 7:30 Campus Exp. Eng. 110, Algren

SECOND SEMESTER
W 7:30 Campus Exp. Eng. 110, Algren

50a-b Internal Combustion Engines. 3 credits each semester.

A practical course in theory, construction, testing of gasoline, semi-Diesel and Diesel engines; fuels; combustion; lubrication; cooling and electric systems; carburetors; theoretical and practical engine cycles; use of instruments for determining horsepower, mechanical, and thermal losses in engine operation; laboratory tests. No prereq.

N.B.—Taught jointly with Aero. 2, Aircraft Engines. Students may enter either semester.

FIRST SEMESTER
50a W 7:30 Campus Exp. Eng. 110, Robertson

SECOND SEMESTER
50b W 7:30 Campus Exp. Eng. 110, Robertson

M.&M. 26, 127 Technical Mechanics. 5 credits each semester. $17.

First semester, statics—characteristics of a force, parallelogram law, moments, resultants, equilibrium, friction, etc.; second semester, dynamics—mass, acceleration, governors, work, power, momentum, etc. Prereq., Math. 25.

FIRST SEMESTER
26 M 7:00 Campus Main Eng. 107, Teeter

SECOND SEMESTER
127 M 7:00 Campus Main Eng. 107, Teeter

Diesel Engines (Theory, Construction, and Operation).

Development of the modern Diesel engine, air injection equipment, mechanical injection pumps, fuel spray nozzles, combustion chamber construction, Diesel power generating plants, high speed Diesels for rail cars, busses, tractors, and aircraft; Diesel fuels and the chemistry of combustion; operating equipment and care. A course for operating engineers and others interested in a broad technical study of the Diesel engine.

FIRST SEMESTER
Th 7:30 Campus Exp. Eng. 110, Robertson

METALLOGRAPHY

1-2ex Metallography and Heat Treatment of Iron and Steel. 3 credits each semester, toward certificate only.

A beginning course suitable for those engaged in practical heat treatment, in writing specifications, purchasing or selling iron or steel; lectures, demonstrations and laboratory work in pyrometry, thermal analysis, preparation of alloys, microscopic examination of metal alloys, preparation of photomicrographs; the theory of heat treating, its relation to practice.

FIRST SEMESTER	SECOND SEMESTER
1ex M 7:30 Campus Sch. Mines 306, Dowdell	2ex M 7:30 Campus Sch. Mines 306, Dowdell

PETROLEUM PRODUCTS

106ex Petroleum and Petroleum Products. Open to all, without credit.

Particularly designed for those engaged in the oil industries. The topics covered, with variation to suit class needs, will be: the origin of petroleum; its chemistry; refining, including various processes of cracking; nature and properties of the various products and their application; methods of test and their significance. (Students desiring credit must have completed Quantitative Analysis.)

FIRST SEMESTER
T 7:30 Campus Exp. Eng. 215, Peterson

107ex Testing of Petroleum Products. Open to all without credit. $10, plus laboratory deposit, $5, payable at registration.

A laboratory class in testing gasoline, kerosene, gas oil, lubricating oil, road oil, and asphalt. Includes interpretation of all test results. Unused portion of laboratory deposit to be refunded. For best results should be preceded by 106ex, above.

SECOND SEMESTER
T 7:30 Campus Exp. Eng. 210, Peterson

GENERAL EXTENSION DIVISION FACULTY

Lotus D. Coffman, Ph.D., LL.D., President
Richard Rees Price, M.A., Ed.D., Director of University Extension
Mildred Boie,* M.A., Instructor in English
Charles H. Dow, C.E., Assistant Professor of Civil Engineering
Oliver C. Edwards, B.S., M.E., Assistant Professor of Mechanical Engineering
Haldor B. Gislason, B.A., LL.B., Assistant Professor of Speech
Jerome Jackman, B.A., LL.B., Instructor in Business Law
Irving W. Jones, Ph.B., Assistant Professor, Chairman of Students' Work Committee
Edward M. Kane, M.A., Instructor in History
Ella Litchfield, M.A., Instructor in English
Helen P. Mudgett, M.A., Instructor in History
John W. Powell, B.A., D.D., Lecturer in English
Clare L. Rotzel, B.C.S., C.P.A., Associate Professor of Accounting
Herbert Sorenson, Ph.D., Assistant Professor of Educational Psychology
Algernon H. Speer, B.A., Head of Correspondence Study Department
Thomas A. H. Teeter, B.S.(C.E.), Associate Professor of Engineering
Wendell White, Ph.D., Assistant Professor of Psychology

Helen G. Acker, M.A., Instructor in English
John D. Akerman, B.S.(Aero.E.), Professor of Aeronautical Engineering
Axel B. Algren, M.S. in M.E., Assistant Professor of Mechanical Engineering
Ingvald W. Alm, B.S., Instructor in Accounting and Economics
Leo Armstrong, Instructor in Golf
Stan Asch, Instructor in Cartooning
Gertrude Baker, M.A., Assistant Professor of Physical Education
Howard W. Barlow, B.S.(M.E.), Instructor in Aeronautical Engineering
Frederic H. Bass, B.S., Professor of Municipal and Sanitary Engineering
Herbert C. Behm, M.A., Instructor in English
Adolph A. Blandin, B.S., Instructor in Accounting
Ruth E. Boynton, M.D., Associate Professor of Preventive Medicine and Public Health
Emmert M. Brackney, M.A., Instructor in Romance Languages
Harold E. Briggs, M.A., Instructor in English
Truman G. Brooke, Instructor in Elementary Advertising
Ralph H. Brown, Ph.D., Assistant Professor of Geography
Bryng Bryngelson, Ph.D., Assistant Professor of Speech
Gerald H. Burgess, Instructor in Philately
S. Chatwood Burton, M.A., Professor of Fine Arts
Eula B. Butzerin, R.N., M.A., Assistant Professor of Preventive Medicine and Public Health
Jessie Caplin, M.S., Instructor in Textiles
Alburey Castell, Ph.D., Instructor in Philosophy
Grace Christensen, B.S., Instructor in Physical Education
Ruth Christie, M.A., Instructor in English
Herbert E. Clefton, Ph.D., Professorial Lecturer in Romance Languages
George P. Conger, Ph.D., Associate Professor of Philosophy
John L. Connolly, LL.B., Instructor in Income Tax Problems
Pearl T. Cummings. B.S., Instructor and Extension Worker in Child Welfare
Alvin S. Cutler, C.E., Professor of Railway Engineering
James Davies, Ph.D., Assistant Professor of German
Darrell H. Davis, Ph.D., Professor of Geography
Katharine J. Densford, M.A., R.N., Professor of Nursing
Samuel N. Dicken, Ph.D., Instructor in Geography
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Ivan Doseff, B.S., Instructor in Drawing and Painting
Ralph L. Dowdell, Met.E., Ph.D., Professor of Metallography
Lynwood G. Downs, Ph.D., Instructor in German
Carl E. Dutton, Ph.D., Instructor in Geology and Mineralogy
James M. Edmunds, M.A., Instructor in English
Charles A. Erdmann, Phm.G., M.D., Associate Professor of Anatomy
Henry A. Erikson, Ph.D., Professor of Physics
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Anne L. Fenlason, M.A., Assistant Professor of Sociology
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Gladys E. C. Gibbens, Ph.D., Assistant Professor of Mathematics
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H. Phoebe Gordon, M.S., Instructor in Nursing
Adah G. Grandy, B.L., Instructor in English
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Raymond L. Grismer, Ph.D., Assistant Professor of Romance Languages
John W. Gruner, Ph.D., Associate Professor of Geology

* Absent on leave, 1934-35.

Marguerite Guinotte, M.A., Certificat d'Aptitude Pedagogique, Instructor in Romance Languages
Millard F. Gunderson, Ph.D., Instructor in Bacteriology
Ledru O. Guthrie, M.A., Instructor in English
Clifford I. Haga, B.A., Instructor in English
Richard Hartshorne, Ph.D., Assistant Professor of Geography
Bridget T. Hayes, M.A., Instructor in English for Every Day
Aldred A. Heckman, Ph.B., Instructor in Sociology
Ernest A. Heilman, Ph.D., Associate Professor of Accounting
Carl A. Herrick, M.E., Associate Professor of Mathematics and Mechanics
L. Burtron Hessler, Ph.D., Assistant Professor of English
Kate Hevner, Ph.D., Assistant Professor of Psychology
G. Sidney Houston, Instructor in Accounting
Ned L. Huff, M.A., Assistant Professor of Botany
Melba F. Hurd, M.A., Instructor in Speech
Albert E. Jenks, Ph.D., D.Sc., Professor of Anthropology
Elmer W. Johnson, E.E., M.E., Assistant Professor of Electric Power Engineering
Mabel C. Johnson, M.A., Instructor in Romance Languages
Gladys Kaercher, Instructor in Swimming
Elizabeth M. Kerr, M.A., Instructor in English
Clifford Kirkpatrick, Ph.D., Associate Professor of Sociology
May S. Kissock, M.A., Assistant Professor of Physical Education
Franklin H. Knower, Ph.D., Instructor in Speech
Charles A. Koepke, M.S.(M.E.), Associate Professor of Industrial Engineering
Mary S. Kuypers, Ph.D., Instructor in Orientation
Geraldine F. Lamb, Instructor in Sociology
Fred C. Lang, C.E., Professor of Highway Engineering
Alice M. Leahy, M.A., Lecturer in Sociology
William LeBorious, Instructor in Accounting
Mildred R. Lee, B.S., Instructor in Physical Education
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Leah M. Lewis, B.S., Instructor in Art Education
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Hyman S. Lippman, M.D., M.A., Assistant Professor of Pediatrics
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Gustave A. Lundquist, Ph.D., Assistant Professor of Rural Sociology
George F. Lussky, Ph.D., Associate Professor of German
Willem J. Luyten, Ph.D., Assistant Professor of Astronomy
Harlan L. McCracken, Ph.D., Lecturer in Economics
G. Tremaine McDowell, Ph.D., Associate Professor of English
Jesse M. McFadyen, Ph.D., Instructor in English
Esther McGinnis, Ph.D., Professor and Director of Extension in Institute of Child Welfare
Thorvald B. Madsen, M.A., Instructor in Scandinavian
Mary Malcolm, B.S., Assistant in Music
Edward D. Mallam, M.A., Instructor in English
J. George Mann, Instructor in Transportation
Arthur W. Marget, Ph.D., Professor of Economics and Banking
Paul A. Minault, M.A., Lecturer in Romance Languages
Elio D. Monachesi, Ph.D., Assistant Professor of Sociology
J. Arthur Myers, Ph.D., M.D., F.A.C.P., Professor of Preventive Medicine
Walter R. Myers, Ph.D., Assistant Professor of Finance
Charles W. Nichols, Ph.D., Assistant Professor of English
Sven Nilson, Ph.D., Instructor in Philosophy
Julius M. Nolte, B.A., Instructor in English
Kenneth E. Olson, M.A., Professor of Journalism
Abe Pepinsky, M.A., Assistant Professor of Public School Music
Marshall A. Peterson, Ch.E., Instructor in Petroleum and Petroleum Products
Lucile Petry, R.N., M.A., Assistant Professor of Nursing
Frederick L. Pfeiffer, Ph.D., Assistant Professor of German
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Edwin L. Pickhardt, Instructor in Insurance
Julia Power, M.A., Instructor in Subfreshman English
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A. Dale Riley, M.A., Assistant Professor of Speech
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Emerson P. Schmidt, M.A., Assistant Professor of Economics
Rupert Sircom, Instructor in Music
Edward H. Sirich, Ph.D., Professor of Romance Languages
Arthur V. Smith, C.P.A., Instructor in Accounting
Catherine Snell, B.S., Instructor in Physical Education
Helen Starr, B.S., Instructor in Swimming
Joseph R. Starr, Ph.D., Assistant Professor of Political Science

J. Warren Stehman, Ph.D., Professor of Finance
Thomas E. Steward, B.A., Assistant Professor of Journalism
Andrew A. Stomberg, M.S., Professor of Scandinavian Languages and Literature
Carl E. Swanson, B.S.(E.E.), Instructor in Electrical Engineering
Gustav A. Swanson, M.A., Assistant in Zoology and in the Museum of Natural History
George A. Thiel, Ph.D., Associate Professor of Geology
Niels Thorpe, Instructor in Swimming
Robert H. Tuttle, Instructor in Accounting
Everard M. Upjohn, M.Arch., Assistant Professor of Fine Arts
Roland S. Vaile, M.A., Professor of Marketing
Joseph Valasek, Ph.D., Associate Professor of Physics
Marvin J. Van Wagenen, Ph.D., Assistant Professor of Educational Psychology
George B. Vold, Ph.D., Associate Professor of Sociology
Gina O. Wangsness, M.A., Instructor in German
Pascal H. Ware, Lecturer in Insurance
Florence M. Warnock, M.A., Assistant Professor of Physical Education for Women
Howard D. Whitney, B.S., Instructor in Retail Advertising
Edmund G. Williamson, Ph.D., Assistant Professor of Psychology
Jerry E. Wodsedalek, Ph.D., Professor of Zoology
Jeremiah S. Young, Ph.D., Professor of Political Science
Anthony Zeleny, Ph.D., Professor of Physics

INDEX

WHERE EXTENSION CLASSES MEET

MINNEAPOLIS:

University of Minnesota Campus:

Burton Hall — Westbrook Hall
Folwell Hall — Chemistry Building
Jones Hall — Mines Building
Willard Hall — Music Building
Pillsbury Hall — Physics Building

University of Minnesota Hospitals:

Electrical Engineering Building
Experimental Engineering Building
Main Engineering Building
Mechanical Engineering Building
School of Business Administration

Downtown:

Northwestern Bank Building, Second Floor

ST. PAUL:

University Extension Center
[illegible] Robert Street, [illegible] Building

Machinists' Auxiliary [illegible]
Post Standard [illegible]
Brothers [illegible]
Public Library [illegible]
Wilson Elementary [illegible]

FOR YOUR SERVICE

The Bulletin *of the* University *of* Minnesota

Division of Library Instruction Announcement for the Year 1934-1935

Vol. XXXVII No. 19 April 19 1934

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Minneapolis, Minnesota
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OFFICERS AND FACULTY

Lotus Delta Coffman, Ph.D., LL.D., President

Frank K. Walter, M.A., M.L.S., University Librarian, Director of the Division of Library Instruction, and Professor of Library Methods

Rodney M. West, B.A., Registrar

Lura C. Hutchinson, B.A., Assistant Professor of Cataloging, Classification, Reference, and Selection of Books

Harold Russell, B.A., B.L.S., Reference Librarian, University Library, Assistant Professor of Library Methods and Bibliography

Miriam E. Carey (Univ. of Ill. certificate), Instructor in Classification

Thomas P. Fleming, B.S. in L.S., M.A., Head of Order and Binding Department, University Library, Instructor in Bibliography and Library Methods

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Della McGregor, B.A., Chief, Juvenile Department, St. Paul Public Library, Instructor in Work with Children

Clara F. Baldwin, B.A., Director of Libraries, Minnesota State Education Department, Lecturer on Public Library Administration

Harriet A. Wood, B.A., Assistant Director of Libraries and Supervisor of School Libraries, Minnesota State Education Department, Lecturer on School Library Administration

Etta Claire Hirschfield, B.S., Lecturer on Use of Books and Libraries

Blanche Moen, B.A., Reference Assistant, University of Minnesota Library, Lecturer on Use of Books and Libraries

Helen M. Smith, B.A., Head, Circulation Department, University of Minnesota Library, Lecturer on Circulation Work

GENERAL INFORMATION

The Division of Library Instruction of the University of Minnesota was established by the regents of the University in April, 1928. It unites for instructional and administrative purposes all the facilities of the University for training librarians for service in libraries of varied types. It submits to the different schools, colleges, or other units of the University interested in such training, curricula or programs suitable for the different types of work desired. It maintains an instructional staff to carry on such courses or curricula as may be approved for credit by these university units.

Credits for such courses are given by the school or college approving them for inclusion in its curriculum. Students who offer these courses in library training as a partial requirement for a degree must comply in every particular with the requirements of the school or college from which the degree is desired. These specific requirements are included in the regular announcements of the various schools and colleges of the University. These announcements may be obtained on application to the registrar of the University.

The professional courses in library instruction are for Senior College students. At least two full years of approved college work are required as prerequisite for regular admission to any of these courses and at least three years of approved preliminary college work, in addition to a year in library instruction, are required for a degree. The College of Science, Literature, and the Arts accepts only library training students in senior standing. The College of Education will credit a minor of library training during the junior year. (See pages 7-8.) School of Business Administration students desiring library instruction credits must be in senior standing. Students in the College of Agriculture, Forestry, and Home Economics may also receive credit by special arrangement. Persons not eligible for regular registration may be admitted as unclassed students only by complying with such college regulations or by passing such tests as may be required from such students.

As in many other vocations at present, the number of persons trained for library work exceeds the number of positions available. This in turn has stimulated a demand from library boards for broader education, acceptable personality, and higher professional standards on the part of candidates for positions. For these reasons, prospective students of mediocre scholastic standing, unsuitable personality, and without intelligent, active interest in people and books are not advised to register. Under present employment conditions there are very few beginning opportunities for employment in libraries for those who have failed in other vocations, those unwilling or unable to obtain adequate training, and those over thirty-five years old.

Library instruction implies a good educational background. Students in full senior standing are eligible for admission. Those who are able to complete a full college course before admission to this division will find it much to their advantage to do so. Many in each year's class have a Bachelor's degree before entering this division. Admission to the second (or graduate) year of library schools offering advanced work is usually conditioned on at least five years' preparation (including four full years of college work).

Every effort is made to assist students obtain positions but no promise of employment can be made. This division can neither create positions nor require employers to accept candidates. The number of library positions available depends in very large degree on the amount of unemployment in other professions.

Registration.—All students, whether full time or part time, or auditors must be regularly registered. Full information concerning registration is given in the general information bulletin, which may be obtained on application to the registrar of the University.

Fees and expenses.—The tuition fees in library training are, for full time students, $40 per quarter for residents of Minnesota and $45 per quarter for nonresidents. Unclassed students, auditors, and others carrying less than full work in library instruction (15 credits per quarter) pay a tuition fee of $3 per credit per hour for all courses under the supervision of the Division of Library Instruction (except Library Methods 1), irrespective of their registration in courses in other subjects, or service on the university staff. The incidental, penalty, and other general fees are listed in the general information bulletin, in which information concerning the cost of board and room and other estimated expenses may also be found.

COURSES OF STUDY

Two programs, one of one year in the College of Science, Literature, and the Arts, and the other in the College of Education, leading to the degree of bachelor of science are offered. Each requires for its completion four full years of work, including a full year of professional training (45 quarter credits) in library methods, in the college in which the student is registered. All regulations of the college from which the degree is desired must be complied with before the degree will be granted. Credit for certain courses in library instruction will also be given in the School of Business Administration and the College of Agriculture, Forestry, and Home Economics. Permission for such credit must be obtained from the deans of these colleges.

Credits from other approved library training schools of equivalent grade may be accepted as prerequisites to advanced courses in the same fields but cannot be used to shorten the year of resident work required in the Division of Library Instruction. Resident credit will be given for the satisfactory completion of summer quarter courses given under the direction of the division.

DESCRIPTION OF COURSES

COURSE NUMBERING

A course is designated by a department name, a number, and a letter. It has the same number in whatever quarter it is offered. The quarter is indicated by the letter (f, fall; w, winter; s, spring; su, summer), e.g.:

1f-2w, a two-quarter course given in the fall and winter.

1w-2s, the same course given in the winter and spring.

3f,w,s, a one-quarter course given each quarter.

Senior College courses are numbered as follows: courses primarily for juniors and seniors, from 50 to 99; for juniors, seniors, and graduates, from 100 to 199; for graduates only, from 200 up. This system is not uniformly followed by departments in other colleges than Science, Literature, and the Arts. (See also pp. 5-7.) The hours of recitation are numbered by roman numerals, the day by the appropriate initial, the room by an arabic numeral, and the building by an abbreviation. For example, (MWF III, 5Lib.) means that the class meets Monday, Wednesday, and Friday, the third recitation hour, in Room 5, Library.

FRESHMAN AND SOPHOMORE NON-PROFESSIONAL COURSE

Lib.Meth. 1. Use of Books and Libraries. Study of reference material for personal study and research. No credit toward a degree in library instruction, but general credit is given in the College of Science, Literature, and the Arts, and in such other schools and colleges as may, by special arrangement, desire their students to be registered in the course. (2 cred.; Sec. 1, MW II, 3Lib.; Sec. 2, MW IV, 3Lib.; Sec. 3, MW VI, 5Lib.) Mr. Russell, Miss Hirschfield, Miss Moen.

PROFESSIONAL COURSES

For the courses below, aggregating a full year of college work, credit is given only to students who have met all the requirements for admission to the Senior College courses in the colleges specified above, except as specified on pages 5-7. Courses 102, 104, 111, and 112 are required of all candidates for a degree.

Lib.Meth. 101f. Bibliography. Trade and national bibliography of the United States, Great Britain, and Europe; book ordering methods. (3 cred.; MWF III; 5Lib.) Mr. Fleming.

Lib.Meth. 102f. Cataloging. Elements of dictionary cataloging. Lecture, problems, and practice. Required of all candidates for a degree in library methods. (3 cred.; Sec. 1, MWF I, education students; Sec. 2, MWF IV.) Miss Hutchinson.

Lib.Meth. 103w. Cataloging. Continuation of Cataloging 102, with special attention to difficult books and administrative aspects of a catalog department. (3 cred.; prereq., Lib.Meth. 102; MWF IV; 5Lib.) Miss Hutchinson.

Lib.Meth. 104f. Classification. Classification by the Dewey Decimal System, subject headings, author numbers, shelf and accession records. Required of all candidates for a degree. (3 cred.; TThS II; 5Lib.) Miss Hutchinson.

Lib.Meth. 105w. Classification. Continuation of Lib.Meth. 104. Library of Congress and other classifications; classed catalogs; special adaptations of classification. (3 cred.; prereq., Lib.Meth. 104; TThS II; 5Lib.) Miss Carey.

Lib.Meth. 107s. School Library Administration. Administrative methods and problems of school libraries. (3 cred.; prereq., 9 cred. in library methods; WFS IV; 3Lib.) Miss Greer.

Lib.Meth. 108s. Public Library Administration. Administration, equipment, finance, and extension work of public libraries. (3 cred.; prereq., 9 cred. in library methods; TThS I; 5Lib.) Miss Baldwin, Miss Wood, and others.

Lib.Meth. 110f. Library Binding. Economics of library binding. Materials, processes, records, book repair. (1 cred.; T III; 5Lib.) Mr. Walter.

Lib.Meth. 111f,w,s. Library Practice. Practice, under supervision, in Minneapolis and St. Paul libraries. The time and character of the practice will be individually arranged to suit student aptitudes, usually in the second and third quarters. Required of all candidates for a degree in library methods. (3 cred.; prereq., 15 cred. in library methods.) Mr. Walter.

Lib.Meth. 112w. Reference. Reference books and other material with emphasis on methods of search and adaptation of material to needs of users. Required of all candidates for a degree in library methods. (3 cred.; MWF III; 5Lib.) Miss Hutchinson.

Lib.Meth. 113s. Reference—Continued. Specialized reference material, public documents, and periodicals. Reference lists and reports on special problems. (3 cred.; prereq., Lib.Meth. 112; MWF III; 5Lib.) Miss Hutchinson.

Lib.Meth. 114s. Selection of Books for Adolescents. Principles of selection and criticism of representative books. Study and preparation of book lists for adolescents in school and public libraries. (3 cred.; prereq., 9 credits in library methods; MWF II; 5Lib.) Miss McGregor.

Lib.Meth. 117w. Library Printing. Preparation of copy, editing, proof reading, layout of library publications. Criticism of typical printed material. (1 cred.; T III; 5Lib.) Mr. Walter.

Lib.Meth. 118s. Library Publicity. Preparation and use of print in library publicity. Library exhibits, etc. (1 cred.; prereq., 9 cred. in library methods; T III; 5Lib.) Mr. Walter.

Lib.Meth. 119f. Current Library Problems. Discussion of typical problems and conditions in American libraries. (3 cred.; prereq., 9 cred. in library methods or simultaneously with Lib.Meth. 101, 102, 104; MWF II; 5Lib.) Mr. Walter.

Lib.Meth. 120w. Current Library Problems. Further discussion of typical library problems, college and university libraries, library buildings, library surveys, etc. (3 cred.; prereq., Lib.Meth. 119; MWF II; 5Lib.) Mr. Walter.

Lib.Meth. 121w. Library Work with Children. Administration of children's rooms and book selection. (3 cred.; prereq., 9 cred. in library methods or 6 cred. and one three-credit course in library training simultaneously with 121; MWF I; 5Lib.) Miss McGregor.

Lib.Meth. 122s. Library Work with Children. Further discussion of administration of children's rooms and book selection. (3 cred.; prereq., Lib.Meth. 121; MWF I; 5Lib.) Miss McGregor.

Lib.Meth. 123f. Selection of Books for Adults. Principles of selection and criticism of representative books. Criticism and preparation of book lists. (2 cred.; ThS III; 5Lib.) Miss Hutchinson.

Lib.Meth. 124w. Selection of Books for Adults. Further discussion of books and aids to book selection. (2 cred.; prereq., Lib.Meth. 123; ThS III; 5Lib.) Miss Hutchinson.

Lib.Meth. 125s. Selection of Books for Adults. (2 cred.; prereq., Lib.Meth. 124; ThS III; 5Lib.) Miss Hutchinson.

Lib.Meth. 126s. Subject Bibliography. National and subject bibliographies of important countries. Special emphasis on works of research value and research methods. (Prereq., sr. or graduate standing, reading knowledge of French or German and some experience in research or bibliographic study or projects; MWF I; 3Lib.)

A special fifth year course in Hospital Library Training is noted on page 8.

CURRICULUM IN THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

The successful completion of three years of work in the general course of the College of Science, Literature, and the Arts in addition to not less than 45 credits of courses listed on pages 5-7 will entitle the student to the degree of bachelor of science. The specific requirements for the three years of preliminary work may be found in the bulletin of the College of Science, Literature, and the Arts.

During the four years, the student must secure 180 credits and 180 honor points. For each five honor points in excess of one honor point per credit, the required number of credits will be diminished by one.

Students from other institutions desiring a degree in library training must meet the same specific requirements which students of the University of Minnesota must meet.

COLLEGE OF EDUCATION

SPECIALIZED CURRICULUM FOR SCHOOL LIBRARIAN

The successful completion of the following four-year curriculum will entitle the student to the degree of bachelor of science. Students also qualify for the Minnesota high school general certificate for teaching academic subjects in junior and senior high schools by completing one teaching major or two teaching minors. It will usually be wisest to choose these majors and minors in the fields of English and history. Students who complete eighteen credits selected from Courses 102, 104, 107, 108, 112, 114, 121, and 122 will satisfy the requirements for a minor in library training. (See pp. 5-7 for description of courses.)

This special curriculum has been established by the College of Education for students registered in that college. Changes in it can be made only with the approval of the dean of the College of Education or his designated representatives.

Freshman Year

Fall	Credits	Winter	Credits	Spring	Credits
English	5	English	5	English	5
Modern World	5	Modern World	5	History	5
Language	5	Language	5	Language	5
	15		15		15

Sophomore Year

Fall	Credits	Winter	Credits	Spring	Credits
Science	5	Science	5	Elective	5
Language	5	Elective[1]	7	Elective	5
Psychology	3	Psychology	3	Elective	5
Elective	2				
	15		15		15

Junior Year

Fall	Credits	Winter	Credits	Spring	Credits
102 Cataloging	3	112 Reference	3	(6 credits selected from 107, 108, 114)	
103 Classification	3	121 Library Work with Children	3	107 Library Administration	3
55 Ed. Psy.	3	Ed. Ad. 65 The High School	3	108 Library Administration	3
Continuation of required elective academic courses	6	Continuation of required elective academic courses	6	114 Book Selections for Adolescents	3
	15		15	T. 15 Technique of H. S. Instruction	3
				Continuation of required elective academic courses	6
				From above, select total of	15

Senior Year

Fall	Credits	Winter	Credits	Spring	Credits
Special Methods and Practice Teaching	3	Special Methods and Practice Teaching	3	Special Methods and Practice Teaching	3

Completion of academic requirements—fall, winter, spring.
Library courses—27 credits—fall, winter, spring (see pp. 5-7).
Elective[1]—9 credits.

ADVANCED COURSE IN HOSPITAL LIBRARY SERVICE

This course is no longer regularly offered. Arrangements may be made for it if applications from no less than ten qualified applicants are received before June 1 of the academic year preceding that in which the course is desired. Admission to it requires no less than four years of college work, including at least one full college year of library training (see pp. 5-7) and the satisfactory completion of not less than three years of English, foreign languages, science, sociology, and psychology. The fifth (or Hospital Library year) will include courses in preventive medicine, medical social science, sociology, and special library methods. Supervised observation and practice in the University of Minnesota Hospitals and hospitals of Minneapolis and St. Paul are required. The degree bachelor of science will be granted for satisfactory completion of the course.

Fuller details may be obtained from the director, Division of Library Instruction, University of Minnesota, Minneapolis, Minn.

[1] Electives should be chosen to meet the requirements of one teaching major or two teaching minors. See College of Education bulletin.

The bulletin of the University of Minnesota

General College of the University 1933-1934

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1933

JULY

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1934

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OCTOBER

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NOVEMBER

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DECEMBER

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UNIVERSITY CALENDAR

1933-34

Fall Quarter

1933			
September	21	Thursday	Payment of fees closes, except for new students[3]
September	25	Monday	Entrance tests
September	25-26		Registration for Freshman Week for all new students entering the freshman class
September	25-29		Physical examinations
September	27-30		Freshman Week
September	28-29		Registration days[1] for all colleges not included above except the College of Engineering and Architecture and the School of Chemistry
September	29	Friday	Payment of fees for new students closes[3] at 4:30 p.m.
October	2	Monday	Fall quarter classes begin 8:30 a.m.[2]
October	19	Thursday	Senate meeting, 4:30 p.m.
October	21	Saturday	Dad's Day
October	28	Saturday	Homecoming Day
November	8	Wednesday	Mid-quarter grades due
November	11	Saturday	Armistice Day Convocation
November	30	Thursday	Thanksgiving Day; a holiday
December	7	Thursday	State Day Convocation
December	21	Thursday	Commencement Convocation Senate meeting, 4:30 p.m.
December	18-23		Final examination period
December	23	Saturday	Fall quarter ends, 6:00 p.m.

Winter Quarter

December	30	Saturday	Payment of fees closes at 12 m. for all students in residence fall quarter[3]
1934			
January	5	Friday	Entrance tests
January	5-6		Registration[1] and payment of fees[3] for new students in all colleges except the College of Engineering and Architecture and the School of Chemistry Registration and payment of fees close at 12 m. on January 6

See footnotes on page 4.

January	8	Monday	Winter quarter classes begin 8:30 a.m.[2]
February	12	Monday	Lincoln's Birthday; a holiday
February	13	Tuesday	Mid-quarter grades due
February	15	Thursday	Charter Day Convocation
			Senate meeting, 4:30 p.m.
February	22	Thursday	Washington's Birthday; a holiday (except for extension)
March	19-24		Final examination period
March	22	Thursday	Commencement Convocation
			Payment of fees closes for all students[3] in residence winter quarter
March	24	Saturday	Winter quarter ends 6:00 p.m.

Spring Quarter

March	29	Thursday	Entrance tests
March	30	Friday	Good Friday; a holiday
March	31	Saturday	Registration[1] and payment of fees[3] for new students in all colleges
			Registration and payment of fees close at 3:00 p.m.
April	2	Monday	Spring quarter classes begin, 8:30 a.m.[2]
May	9	Wednesday	Mid-quarter grades due
May	10	Thursday	Cap and Gown Day Convocation
May	12	Saturday	Mother's Day
May	17	Thursday	Senate meeting, 4:30 p.m.
May	30	Wednesday	Memorial Day; a holiday
June	8, 9 & 11-15		Final examination period
June	17	Sunday	Baccalaureate service
June	18	Monday	Sixty-second annual commencement

Summer Quarter

June	18-19		Registration, first term
June	20	Wednesday	Summer quarter classes begin, 8:00 a.m.
July	4	Wednesday	Independence Day; a holiday
July	26	Thursday	Commencement Convocation
July	28	Saturday	Registration and payment of fees for second term closes at 12 m.
July	30	Monday	Second term classes begin, 8:00 a.m.
September	1	Saturday	Second term closes

[1] Registration subsequent to the date specified will necessitate the approval of the college concerned. See also penalty fees for late registration, general information bulletin, page 52. No student will be allowed to register in the University after one week from the beginning of the quarter excepting in unusual cases wherein special circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

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

[3] New students must pay fees on dates announced for registration.

GENERAL COLLEGE OF THE UNIVERSITY

ADMINISTRATION

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Roy C. Jones, M.S.(Arch.), Professor of Architectural Design
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Marion Weller, B.A., Associate Professor of Textiles
Edgar B. Wesley, Ph.D., Assistant Professor of Education
Edmund G. Williamson, Ph.D., Director of the University Testing Bureau
Jerry E. Wodsedalek, Ph.D., Professor of Zoology

GENERAL STATEMENT

The General College of the University is designed primarily to provide broadened intellectual training to that large body of students who seek an overview of modern life and of man's activities rather than specialized study. Its courses are synthetic, not specific, as a reading of the descriptions in this bulletin will show. It is desirable for students who cannot spend the full four or more years in college—a group much larger than is popularly recognized—to devote their limited time to such a complete and rounded program instead of to a fragment of a longer and specialized process. These new courses tend to build in the mind of the intelligent student a background of understanding of the present world. They give him the vital comprehension of *what* other men and women do. They teach him also *why* and *how* things are done. They should, therefore, serve to satisfy his intellectual curiosity, and to prepare him for enlightened living in his public and private relations.

The University General College courses are open to any student admitted to the University. They are provided especially for the following classes of students:

1. Those who desire to pursue courses or curricula not offered in other colleges. General College courses are newly designed to satisfy the needs stated above. They do not duplicate or rival but supplement the specialized study of other colleges.

2. Those who, for financial or other reasons, have only a limited time to give to college training. Nearly half of all students who enter the University drop out before the beginning of the junior year. There are many causes. Some find themselves unable to secure work or financial support for prolonged training but are, nevertheless, able to have a year or more. Others, through illness, are forced to leave. Others find and prefer to accept the challenge of a job instead of continuing study. Others marry. Others need only two years of general training before undertaking work in special fields and schools outside the University. Others find themselves unable or unwilling to acquire the attitudes of mind and the techniques of study necessary to carry on into professional work.

3. Those who need and wish general orientation in the choice of, and general preparation for, a vocation. Many students are not aware of the variety of vocations which may fit their desires, interests, and abilities until they have surveyed such fields of activity as are dealt with in the courses in the General College of the University. Moreover, general training is usually profitable as preparation for a specific vocation.

4. Those who do not satisfactorily meet the entrance requirements of the other colleges because of lack of training in specific subjects. The College of Engineering, the School of Architecture, and the School of Chemistry, for example, have specific requirements in high school mathematics and chemistry which some high school graduates have failed to meet. These students may enter the General College, work off the requirements, acquire

background training, and transfer to the college of their choice for their professional course. For such specific requirements see the bulletin of the college of your choice.

5. Those who transfer from other institutions who do not meet the standards for advanced standing of the college to which they apply.

6. Those who are transferred by mutual agreement of the General College of the University and the college in which they propose to register or are registered. Some students in other colleges, having entered a specific course and having found it not what they thought it, want to transfer to the General College for further survey study before making another vocational choice.

7. Those who might not be accepted by existing colleges because of a lack of preparation to pursue their curricula. Some applicants for entrance into other colleges will be advised to enter the General College because their high school record and entrance test results indicate mediocre or poor studentship in the past. The General College offers these students an opportunity through its guidance program, and How To Study and other courses, to prove themselves, to develop drive towards serious objectives, and to make up for past errors.

Since nearly half of the students who have entered the University in the past have come within one or more of the above classifications, it is believed that the General College will serve the needs of these students in the future more fully and with greater economies to themselves and to the state than has previously been possible. Under a variety of conditions, two or three years of college work is enough for the individual since he may get his special training, except for the professions, on the job.

The faculty of the General College is composed entirely of men and women now on the teaching staffs of the other schools and colleges of the University. They bring to these overview courses the results of their years of study and training in the fields of their specialties, to summarize for General College students the latest discoveries and developments of their own and other scholars in special departments of knowledge. They weave these materials into a comprehensive, realistic, vivid picture of the modern world.

From the foregoing, it is obvious that the General College of the University is by no means intended to replace or rival any other unit in the University or any existing two-year college in the state. It is neither a preparatory nor a vocational training school. It is not a college for the lazy and incompetent, but it is, as President Coffman declares, "A new experiment, an adventure in the field of higher education. It is intended to provide a superior intellectual opportunity for a body of university students whose needs cannot now be adequately met by the existing organization of the University. It will succeed or fail in terms of its service to students. Its courses should be open to the most gifted student in the University. Any student should be privileged to elect membership in the General College."

FOREWORD TO STUDENTS

The General College of the University is your college. It has been built to try to satisfy your desires, to fulfill your needs. In its planning, the colleges and departments of the entire University have co-operated to make its courses attractive and valuable. But your growth and success in this college depend not upon it but upon you. You start on a job, on an adventure in education based upon principles that have long been tested and found good. Upon what you do now, the right things and the wrong things, the mistakes and the triumphs, is dependent, in a way you can only vaguely guess at, the successes and failures of your future at work, at home, and at play. I am asking you, therefore, from the first day of Freshman Week to make the organization and development of your education your first business.

All education is self-education. We offer you courses and instructors but you must take them. No course is complete in itself. It serves merely as a guidebook and opens up for you fields to explore by study, observation, reading, and conversation. Some students take courses as some people read guidebooks—in an easy chair. Others tighten their belts, take the guidebook in hand, and go to find out. To the latter, no courses are easy because there is no end to what can be found out and looked at. To them no courses are uninteresting because each is the beginning of an adventure in the discovery of new things.

Making yourselves at home.—Your first and continuous job at Minnesota is to make yourselves at home. You come here to a strange student city of thousands housed in many buildings on two campuses. Your satisfactions from, and efficiency in, getting the most out of your college life will come from knowing your way around, from getting acquainted with your fellow students, with the faculty who teach you, with the organizations in athletics, music, dramatics, debating, literary, and social fields which you may join for your pleasure and profit. And you should know your buildings and classrooms, your library, health service, study halls. For information on fellowships, scholarships, loans, organizations, and publications see pages 64-87 in the general information bulletin.

Finding a room.—When you first arrive you will want to find room and board. These matters are important to your health, comfort, and efficiency in college. In selecting a room you should consider heating, lighting, quiet, and cleanliness, its convenience to the campus or car lines, its furnishings, especially the bed. You spend nearly a third of your life in bed, and it pays you to get a good one. You should not hesitate to look at several rooms until you find just what you want. At first, you should board at the Minnesota Union, Shevlin Hall, or nearby restaurants until you have found your room and are ready to choose a permanent place to eat. Then pick carefully. If you are away from home for the first time you will be wise to give attention to the regularity and adequacy of your diet. This is a matter of importance to your health. A list of

approved boarding and rooming houses may be secured at the Housing Bureau, Shevlin Hall. For further information on dormitories, rooms, and boarding places, and the rules governing them refer to the general information bulletin, pages 53-56.

Taking part in Freshman Week.—Full and active participation in Freshman Week will help you to wear away the preliminary strangeness and give you the first sense of freedom that comes from familiarity with this place where you are to live for several years. During this first period it will pay to keep your wits about you, to remember things you see and hear rather than to look upon it wholly as a big reception and a good time. A word of warning. Wherever humans congregate, there is gossip and misunderstanding. Many times these lead students to fear and misery. In order to avoid such trouble find out the facts. Find them out by going directly to headquarters. Ask your professors, your dean, or whoever may be responsible and authoritative. Don't, once again, take rumor for fact.

Planning your course.—The next problem that confronts you is the planning of your course in this college and your registration. In this you will have help, for there will be made available to you time in Freshman Week for conferences with the faculty and administrative staff in this college. Before these conferences read the descriptions of the courses set forth in this bulletin and shape up in your mind the combination you would like to take. This will give you something definite to carry to your first conference. Also before you meet your adviser it would be sensible to appraise yourself, your motives in coming to college, your needs and desires for various kinds of information and knowledge. Such frank self-examination is the best of all bases for planning anything you do.

Beware of narrow interests.—Some of you will have special interests, for example: business. You will be inclined, in making your course, to select for your program subjects which center about business. You will probably write down as your courses, first, Our Economic Life; second, the Mathematics of Business; third, English, because you will have noticed it includes business forms; fourth, How To Study, because that has usefulness; and fifth, Vocations, because that, too, sounds practical. With these and required military training and perhaps physical education your program is full—and narrow. I should urge you to avoid this narrowness. You should not make the mistake of putting a tight practical limitation on what you study. In such a course as that outlined you have neglected the whole field of physical science, engineering, art, history, agriculture, euthenics, and psychology. None of these can you really afford to miss if you consider the long future and what may contribute to your human appreciation and happiness.

Learning new fields.—Some of you will have no special interest and should, therefore, take as widely varied a course as possible in order to sample the fields of knowledge, to satisfy your curiosity, and to test your interests and abilities. By such a survey you should, in time, find the fields that most keenly interest you and be able to plan an intelligent future

course of study and recreation. It might be wise in selecting such a diverse program to pick out fields you know little about rather than those in which you know something or much. Thus, if you know little of land economics and the contribution of plant and animal life to human welfare, take Basic Wealth. Many women students will profit by the course in technology, many men students, by courses in art and music—both by Euthenics.

Courses in the arts.—In sketching, painting, sculpture, and handicrafts, in music, and in dramatics the General College has no courses other than the appreciation course. Other colleges, however, do offer training courses in these subjects. They co-operate with this college so that students in the General College may take combination programs made up of two or three General College courses and one or more in these special fields. Students who have a liking for and some experience in one of these fields are urged to continue such training, not necessarily with the idea of making it a life job, but at least with the aim of making it a life hobby. Many of our richest satisfactions in living come from amateur creation or interpretation of music, art, and dramatics in our leisure hours. These and other combination programs must be approved at the office.

Other combination programs.—Some students in attempting to make a choice of a life vocation find themselves torn between two desires as, for example, forestry and engineering. It is quite possible for such students to take two or three General College courses, with the course in General Forestry and an introductory course in engineering shop practice or drawing. If you will state to your adviser your need of such a combination it can be arranged for you through the office.

Working for support, and reduced programs.—Still others may, because they are working to support themselves, wish to make up reduced programs in the General College courses. For the planning of such programs you should consult with the director or his associates in order to determine before you begin, the best probable arrangement. Such plans are not usual but every effort will be made to work them out on a practicable basis. See page 56 in the general information bulletin, for information about the Employment Bureau.

Registering for the year.—After you have made out the program for the year and checked it for conflicts or errors with the chart on page 15 of this bulletin, you are ready to register. This process will be explained fully during Freshman Week, and ample assistance given you on registration days. It is highly advisable to make out your program and *register for the year* since it saves you considerable time and effort each quarter if this is done. With the payment of fees for the current quarter, which you will find listed in the general information bulletin, the first step is completed. You are then ready to enter into the full activities of college study, exercise, recreation, and social contact.

Adjusting to college classes.—When you enter your first classes, you will find a considerable adjustment to make. In high school you usually had small classes and discussion groups. Here you will be on your own responsibility in large classes taught by lectures and demonstra-

tions. Under such a change you must be wary lest you slip into bad habits of just half listening or watching instead of being constantly alert and active in the taking of notes and getting the full meaning of the materials as they come from the lecturer. The lectures, demonstrations, syllabi and reading lists, and library facilities are furnished by the University as tools with which to do your own work. You are working for yourself, to educate yourself. The responsibility lies with you, not with us nor your parents. You should, therefore, constantly guard also against falling behind in your work, in your reading, note taking, preparation of papers and reports. Many student failures are the result of such habits.

Establishing a routine.—Back work is much more difficult than work ahead. Day by day established routine of habit is the only thing that brings satisfactory results. Only by such a process can you possibly prepare for the comprehensive examinations that are given at the end of each year and preliminary quizzes and quarter examinations that precede them. In these matters you are your own master—control your own academic fate. The University has, however, for your aid in making these adjustments, established certain agencies.

Learning how to study—budgeting time.—First of these is the How To Study course which deals with practical matters of adjustment to college study and college life; with methods of listening to lectures, taking notes, reading habits; with the budgeting or programing of all your time so that by sensible distribution you may spend it effectively not only upon study but upon campus and social activities, reading for pleasure, and various other recreations. Other courses that have specific bearing upon your adjustment to college life are those in Human Development and Personal Adjustment and Euthenics. You have actually two problems. One is to adjust yourself quickly to college in order to get the fullest benefits from your stay here. The other is to look to the future of after-college years when you will be confronted in your job, your home, and your recreation with problems which can be better solved if you have built here habits of seeing, analyzing, and solving college problems. Living and education are not separate things. They are all of a piece. You spend today preparing for tomorrow, and tomorrow for the day after.

Your counseling service.—The second agency is the counseling and guidance service. Altho University General College courses are to be taught in large classes, we recognize fully the importance of considering each student as a unique individual with regard to personal ambitions, vocational possibilities, and personality development. This individualization of mass education is one of the principles upon which this college is founded. To achieve this objective each student registered will have available for his counseling and guidance in personal, vocational, and educational matters all of what are commonly called personnel agencies on the campus. The director of the college and his associates invite conferences regarding student problems. Moreover, co-operative relations with the University Testing Bureau have been made. You will be asked to make appointments through the director's office for vocational counseling and testing, on the

basis of which you may discover your strength and weaknesses and formulate reasonable long-time plans for your training and future development. The instructors in your courses are available to you and you must not be reluctant to consult with them and ask their advice and help.

Your speech clinic.—Third is the Speech Clinic. Since one of the most important causes of student and adult failure lies in defective speaking habits, the Speech Clinic has been made available to University General College students. Acute defects such as nasality, faulty accent, wrong pitch, and lisping interfere sometimes fatally not only with college studies but with successful vocational work after graduation. Disabilities in reading, writing, and spelling are sometimes closely linked with faulty speech habits. These may be diagnosed and treated. The earlier the treatment begins the more certain the result. Students in this college who are aware of, or who suspect they may have, speech defects are requested to make appointments with the Speech Clinic within the first few weeks of the college year. These should be made through the director's office. Upon recommendation of the clinic, we will permit students under treatment to carry a reduced program of studies.

Your health service.—Some student failure is caused by ill health. When your physical machine slows up or breaks down temporarily study is also slowed or broken. Eyes, ears, and teeth need watching. Common colds especially should not be neglected. To care for these things, the Health Service, described in the general information bulletin, pages 27-28, is at your disposal. Make use of it whenever there is need or even suspected need.

Auditing.—Students from other colleges, who have the permission of their college, and adult auditors are welcome to take one or more courses in this college, the accrediting of the courses for the former resting with the college in which they take their specialized work.

Comprehensive examinations, degree, and transfers.—Because, in the General College, we work on the principle that education is a process of mastering fields of knowledge rather than accumulating course credits, we have set up a series of comprehensive examinations. Altho course quizzes, examinations, and grades of Fail, Pass, or Honors will be given for course work, you will be required to pass five major comprehensive examinations to take the degree of Associate in Arts from this college. In order to transfer at any time to other colleges you must secure the recommendation of the General College. This recommendation will be granted only to you who do a high standard of work and who show qualities of studentship necessary to carry on specialized and professional studies.

The comprehensive examinations deal with divisional groups of courses. These groupings should be considered in planning your program. You should design it by groups, keeping constantly in mind your preparation for the five comprehensives. They are as follows:

1. Euthenics Group	Euthenics Human Development and Personal Adjustment
2. Psychology Group	Practical Applications of Psychology How To Study Biography
3. History and Government Group	Backg ound of Modern World American Citizen and His Government Functions of Government World Politics Biography
4. Current Affairs Group	Current Affairs Formation of Public Opinion University Lectures
5. Economic Group	Our Economic Life Basic Wealth Earth and Man Biography
6. English Group	Literature Current Reading Composition Biography } Writing Laboratory
7. Physical Sciences Group	Chemistry and Physics Technology Astronomy Biography
8. Biological Sciences Group	Human Biology Physical Education Biography
9. Arts Group	Appreciation of the Fine Arts Special Courses in Arts, Music, and Dramatics Biography

Your attitude and behavior.—I close as I began. The General College of the University is your college. In matters of behavior you must live in this college community on the assumption that your fellow students are decent people to live with; that each tends to his business and to the business of the college to the best of his ability; that what is expected of you is what is expected of acceptable members of society; that class meetings, quizzes, and other scheduled engagements are appointments to be met except in cases of emergency; that much of your college experience will be to your profit or waste in proportion to the generous, kindly, and courteous general spirit you show. Psychologists know that childhood behavior carried over into college life in such forms as cheating, whispering, and rowdyism is dangerous since it prolongs bad habits and interferes with the progress of others. If one cheats, he cheats only himself. If, since class attendance is voluntary, he is inattentive or noisy he robs himself and others of instruction. Such behavior is not tolerated. Apart from these suggestions, no compulsion is made. The responsibility is yours.

MALCOLM S. MACLEAN, *Director*

STUDENTS ARE ADVISED TO CUT THIS CHART OUT AND PASTE IT IN THEIR NOTEBOOKS

UNIVERSITY GENERAL COLLEGE SCHEDULE OF COURSES, 1933-34[1]

HOUR	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
I	G.C.12f,13w,14s Chemistry and Physics G.C.48f,49w,50s Earth and Man	G.C.77w,78s Education in Modern Society G.C.28f,29w,30s Background of the Modern World[2] G.C.54f,55w,56s Relations of Sound to Music	G.C.12f,13w,14s Chemistry and Physics G.C.48f,49w,50s Earth and Man	G.C.77w,78s Education in Modern Society G.C.28f,29w,30s Background of the Modern World[2] G.C.54f,55w,56s Relations of Sound to Music	G.C.12f,13w,14s Chemistry and Physics G.C.48f,49w,50s Earth and Man	G.C.77w,78s Education in Modern Society G.C.28f,29w,30s Background of the Modern World[2] G.C.54f,55w,56s Relations of Sound to Music
II	G.C.2f,3w,4s Basic Wealth G.C.51f,52w,53s English Literature	G.C.9f,10w,11s Our Economic Life	G.C.2f,3w,4s Basic Wealth G.C.51f,52w,53s English Literature	G.C.9f,10w,11s Our Economic Life	G.C.2f,3w,4s Basic Wealth G.C.51f,52w,53s English Literature	
III	G.C.31f,32w,33s Formation of Public Opinion G.C.60s Introduction to Philosophy G.C.38w American Citizen & His Government	G.C.15f,16w,17s Technology G.C.40f,41w Human Development and Personal Adjustment	G.C.31f,32w,33s Formation of Public Opinion G.C.60s Introduction to Philosophy G.C.38w American Citizen & His Government	G.C.15f,16w,17s Technology G.C.40f,41w Human Development and Personal Adjustment	G.C.31f,32w,33s Formation of Public Opinion G.C.60s Introduction to Philosophy G.C.38w American Citizen & His Government	G.C.15f,16w,17s Technology G.C.40f,41w Human Development and Personal Adjustment
IV	G.C.21f,22w,23s Euthenics G.C.1f,w How To Study G.C.39s World Politics	G.C.45f,46w,47s Vocations	G.C.21f,22w,23s Euthenics G.C.1f,w How To Study G.C.39s World Politics		G.C.21f,22w,23s Euthenics G.C.1f,w How To Study G.C.39s World Politics	
V						
VI	G.C.34f,35w,36s Introduction to Mathematics of Business and Current Affairs G. C. 43f, 44w, 43-44s[4] Practical Applications of Psychology G.C.5w Descriptive Astronomy	G.C.61f,62w,63s Current English Reading[3]	G.C.34f,35w,36s Introduction to Mathematics of business and Current Affairs G. C. 43f, 44w, 43-44s[4] Practical Applications of Psychology G.C.5w Descriptive Astronomy	G.C.61f,62w,63s Current English Reading[3]	G.C.34f,35w,36s Introduction to Mathematics of business and Current Affairs G. C. 43f, 44w, 43-44s[4] Practical Applications of Psychology G.C.5w Descriptive Astronomy	
VII	G.C.6f,7w,8s Human Biology	G.C.57f,58w,59s Biography	G.C.6f,7w,8s Human Biology	G.C.57f,58w,59s Biography	G.C.6f,7w,8s Human Biology	
VIII	G.C.24f,25w,26s Appreciation of Fine Arts	G.C.64f,65w,66s University Lectures Course	G.C.24f,25w,26s Appreciation of Fine Arts		G.C.24f,25w,26s Appreciation of Fine Arts	

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[1] For room schedule see the *Official Daily Bulletin.* For physical education and military training schedules see pp. 46-52.

[2] Discussion hours to be arranged.

[3] Writing laboratory hours to be arranged.

[4] Practical Applications of Psychology spring quarter begins at 1:00 p.m. and closes at 2:20 p.m.

DESCRIPTION OF COURSES

Courses in the General College of the University are, with the exception of Military Science and Physical Education, elective and without prerequisites to all students.

G.C.1f,w—Fall, winter quarters—HOW TO STUDY

A most urgent problem faces every college student. He must master quickly and effectively the fields of knowledge which challenge his curiosity and learning ability. Few graduates of preparatory schools have been trained to explore, analyze, and reconstruct class assignments by means which add liveliness and meaning to the process of studying. Students know that special training in ways of doing things is desirable for success in the fields of mechanics, medicine, and even of sport. What then of study? Is it possible that a hit-and-miss process produces the best results? Or is it not more likely that specific training in study methods will enable an earnest and diligent student to understand the content of his various courses and thus enrich and heighten the value of his university experience? At the outset of a college career it is important to become the master of methods which have been found to contribute directly to success as a student. One point the beginning student can be sure of, is that altho instructors offer materials *for* study, students get full value from these materials only by thoroness *of* study.

The How To Study course is particularly designed to help a student meet successfully the challenge of his college program. It offers suggestions for the most practical use of time, a matter which when neglected results in disastrous waste; and, through practical examples and experiments, it seeks to stimulate a student to study efficiently. More specifically, the course affords training in making lecture and textbook notes; it introduces a variety of methods of outlining, each of which has value for particular fields of knowledge. These aids are supplemented by others designed to help in mastering special terms and in developing vocabularies which are indispensable for thinking and remembering correctly about specific subjects. Through directed practice the student learns to apply his skill to the writing of reports, essays, and examinations. Individual attention is given to those whose study performance is likely to suffer because of reading disabilities. Such questions as, "How can I learn to concentrate and avoid daydreaming? How can I best prepare for essay or objective examinations? How can I make useful notes in a lecture course where the instructor does not present an outline?"—these questions and many others will be answered through establishing effective habits. The aims of the How To Study course will be brought to students by lectures and demonstration, but the realization of these aims demands study in actual situations. MWF IV. Mr. Bird.

G.C.2f,3w,4s—BASIC WEALTH

Mankind is vitally concerned in gaining knowledge about the earth as a place in which to live and as a base for procuring the necessities for life and sustenance. Fortunately, nature is prolific and the earth abounds in materials that can be utilized to give comfort, pleasure, and satisfaction to man. But these natural resources must be intelligently used and conserved if future generations are likewise to enjoy an abundance of material things and wholesome living conditions.

Mankind is also deeply concerned with, and to a large extent dependent upon, plant and animal life both as it exists in nature and in the forms it has taken under domestication. A knowledge of the natural resources and of the laws governing plant and animal life is one of the elements of sound education.

With a view to acquainting students with the nature of these resources and with the interrelationships between them and human life and welfare this course is devised. It will be offered in three parts, each covering one quarter.

G.C.2f—Part A, fall quarter. NATURAL RESOURCES: THEIR ECONOMIC UTILIZATION AND CONSERVATION.

Most people recognize the sun as a source of heat and energy. They also know that the earth's form and motions result in changing seasons and in varying temperatures and humidity. Few appreciate, however, the effect of temperature, continental climates, and oceans upon the civilization of the human race and upon plant and animal life. To illustrate these and other important natural phenomena is in part the aim in giving this course. There are resources upon the surface and within the earth which form the basis of economic welfare. These have to do with land areas and their utilization; with forests and mines; with water for power and irrigation purposes and social needs. Wood, coal, and oil are the principal heat producing materials of the present age. Will there be a supply of these resources for our descendants or must they go cold? How long will the great iron and copper mines remain productive? That depends upon the wisdom with which these and other resources are guarded and used. To picture these great natural resources in their true perspective and to teach the principles of conservation and economic utilization is the primary function of Part A. MWF II. Mr. Andrew Boss and associates.

G.C.3w—Part B, winter quarter. PLANT LIFE AND ITS ECONOMIC UTILIZATION.

Nature has covered the earth's surface with plant life. But not all plants are alike. It is a far reach from the algae and mosses to the giant forest trees. What are the differences between the higher and lower forms of plant life? Some plants thrive in one environment and fail in others. Why? What is the nature and origin of plant life? What are the fundamental facts concerning the processes of growth and reproduction? and the

influence of plants upon their environment? To answer these questions and others relating to the uses man makes of plants for food, clothing, and shelter; for feed and forage and for industrial and economic purposes and to demonstrate methods of plant protection and improvement through scientific procedure is the purpose of Part B. MWF II. Mr. Schmitz and associates.

G.C.4s—Part C, spring quarter. ANIMAL LIFE AND ITS ECONOMIC UTILIZATION.

When did domestication of animals begin? By what processes has differentiation in form and function been brought about? What contributions did their domestication make to modes of living? To opening new land for settlement? To extending the power of nations? To diversifying and intensifying the industrial activities of advanced countries? What are the present trends in animal production, and what are the fundamental causes underlying them? These questions indicate the great importance of animals in present day civilization and industry. So intimately is the welfare of the human race associated with, and dependent upon, animal life that every citizen should be informed as to its major contributions to mankind through agriculture and other important industries. MWF II. Dean Coffey and associates.

G.C.5w—Winter quarter. DESCRIPTIVE ASTRONOMY

Descriptive astronomy aims to acquaint students with the principal features of the heavens, to make them aware of the fact that the earth and even our solar system are not alone in space, to give them a better realization of the place of man in the material cosmos. There will be brief and simple explanations of phenomena of everyday occurrence and importance. Why are there seasons? Why does the moon show phases? Why do we see different stars in summer than in winter? What is the midnight sun? What are eclipses? What are shooting stars? Why is the evening star not a star? There will also be presented the latest information available upon such questions as always have interested and always will interest mankind. Can there be life on Mars or on Venus? What will be the ultimate fate of our earth? Are there other planetary systems besides our own?

The course will be preceded by a brief outline of the historical development of the science of astronomy, by an elementary summary of our knowledge of the earth, and by a simple explanation of astronomical instruments, principally the telescope. A description of the sun and the moon will then lead to a consideration of the solar system as a whole and of the more important planets individually. Comets and meteors will be explained and the modern ideas on how the solar system came into being will form the conclusion of the first part.

The second part will deal with the realm of the stars, the origin of the constellations, and a summary description of the more important of these, as well as of some individual stars in detail. The vastness of interstellar space, the scale upon which the stellar universe is built, the distances between

the stars, their motions, and certain physical characteristics that are easily understood, as e.g., their temperature, size, mass, and age will be described. This will lead to some discussion of double stars and variable stars, of star-groups, clusters, and nebulae, and finally to a description of "island universes." The course will close with some general reflections and comparisons to illustrate the immensity of the cosmos. Lantern slides and mechanical models will demonstrate the actual happenings in space. If weather and opportunity offer, students will be given some chance to observe through the university telescope. MWF VI. Mr. Luyten.

G.C.6f,7w,8s—HUMAN BIOLOGY

Everything that is known concerning the differences between living and non-living—the forms of life, the laws of life, the causes and effects of life—is biology. That part of biology which relates to man is human biology.

Biology is intensely interesting and also broadly practical. Agriculture is applied biology. Efforts to improve animals and plants can only be successful in so far as they accord with biological law. Medicine is also applied biology, and everything the doctor, dentist, or nurse does to relieve suffering is founded on biological principles. The preservation of health, proper rearing of children, prevention of disease—indeed the whole basis of rational adjustment between man and his environment—involve applications of biological knowledge.

This course will consist of three parts, each comprising three class exercises a week through one quarter. In addition illustrative material and demonstrations will be set up each week and may be studied at convenient times by those registered for this work. Parts A, B, C of this course are recommended to be taken in the order here set down, but such sequence will not be enforced. Students may register for one or more parts as convenient or adapted to their needs.

G.C.6f—Part A, fall quarter. General Biological Concepts in Relation to Mankind.

Characteristics of living matter compared with non-living. The unit structure of protoplasm—the cell. The cell's growth and division. Differentiation of cells into tissues. Elaboration of organs and systems in the ascending scale of animal types including man. Relation of harmful, and of beneficial, animals to human welfare. Some animal parasites of man. The general subject of reproduction. Maturation of both male and female reproductive cells. Fertilization. Development of the body. The relation of these and other facts to the mechanism of inheritance. The inheritance of sex; sex-linked inheritance. The Mendelian laws of heredity. The application of our knowledge of heredity to the improvement of domestic animals and plants. Especial attention to the application of the same knowledge to the betterment of the human race. Discussion of such subjects as the inheritance of acquired traits, prenatal influences, and related topics. The evolution of man. The student's self-appraisal in view of a better understanding of his heritage. A richer mental as well as physical life based on a scientific, biological viewpoint. MWF VII. Mr. Wodsedalek.

G.C.7w—Part B, winter quarter. THE HUMAN BODY, ITS STRUCTURE AND OPERATION.

The materials of the body. The tissues, organs, and systems. The strongholds of health or disease such as the brain, heart, lungs, digestive tract, reproductive organs, glands, liver. All man's activities as they affect others and the world are based on motion, that is the action of nerves and muscles. This is controlled toward useful ends through the action of the senses and nervous system. New material or food is brought to the body, prepared or digested, distributed through the circulation, and used for repair or as a source of energy for doing the body's work. The respiratory organs supply oxygen to the living body just as the stove draft does to the fire. The blood is the distributing agent for all the materials needed by the body. Waste must be gotten rid of. The temperature must be regulated. One part of the body influences distant parts through substances (hormones) sent into the blood. The body changes, grows, deteriorates, dies. New generations come on through the reproductive process. These and other topics will be considered. MWF VII. Dean Lyon and associates.

G.C.8s.—Part C, spring quarter. PERSONAL AND COMMUNITY HEALTH.

Man's concern for his health. Awakened public curiosity about health examinations, care of teeth, medical discoveries, anti-tuberculosis drives, sanitation, inoculation. Early superstitions regarding disease, evil spirits, charms, conjuring, black and white magic cures. The relation of these to modern medical science. Present quarantine versus ancient custom of driving diseased out of their homes. Discovery of germs, infection. Practical applications of this discovery to sanitation, medicine, surgery. Vital statistics and the "bookkeeping of humanity." Their application to the fight against yellow fever, black plague, tuberculosis, typhoid, and other epidemic diseases. The current scene and its attempt to breed a healthier human race. The control of health factors in the home, city, state. The development, present and future, of leaders, organizations, and funds to fight and to prevent epidemics and such diseases as pneumonia, diphtheria, cancer. MWF VII. Dr. O'Brien.

G.C.9f,10w,11s—OUR ECONOMIC LIFE

The individual in our modern society comes in almost daily contact with various business organizations and enterprises. These institutions influence his conduct not only through the prices that have to be paid but also by the method of organization through which they operate. This course attempts to answer some of the questions raised by these relations and to explain how business enterprise functions. It is not intended to be a training course for business, but to give an understanding of this system and of the relations it bears to the individual members of society.

G.C.9f—Part A, fall quarter. PROBLEMS OF CONSUMPTION AND DISTRIBUTION OF GOODS.

With this object in mind consideration will be given to such matters as the production and marketing of goods. How and where are these goods grown or manufactured? Through whose hands do they pass before they are bought by the retailer? What type of organizations do these middlemen have? How do they secure their profits? How does the retailer determine what goods to buy, how does he pay for them, and what price does he charge? What attitude should the consumer take toward advertising? Why do we have department stores, mail-order companies, chain stores, and small unit stores operating side by side? TTh II. Mr. Vaile and associates.

G.C.10w—Part B, winter quarter. PROBLEMS OF PRODUCTION, FINANCE, AND CREDIT.

Goods purchased must be paid for. From what sources does the buyer secure money and credit with which to make these purchases? What determines his wages or salary and the amount he can earn on his investments? What various institutions are willing to pay him interest for the use of savings and how can they afford to pay it? What part do the banks play in this system? What is a national bank? a branch bank? a chain bank system? In what way may other financial institutions serve him? TTh II. Mr. Stehman and associates.

G.C.11s—Part C, spring quarter. PROBLEMS OF GOVERNMENT AND BUSINESS RELATIONS.

The relation of government to business and the consumer will also be considered. Why do we have governmental supervision of public utility companies and how does it operate? Why does the Federal Government regulate the railroads and leave to cities and states the regulation of most public utility companies? What sort of regulation do we have over the so-called trusts and, in general, what is the work of the Federal Trade Commission?

Also, in this course, questions will be raised on other matters of general economic significance. For example, where and how does the government get its funds and how does it spend them? What are the gold standard, inflation and deflation, the Federal Reserve? Why do we have tariff duties; what do we gain by them and what do we lose? What is meant by the labor problem and in what sense is it a problem? What determines the values of land and real estate? What causes prices to rise and fall? TTh II. Mr. Stehman and associates.

G.C.12f,13w,14s—CHEMISTRY AND PHYSICS

G.C.12f—Part A, fall quarter. ENERGY AND MATTER. The physics of sound, heat, light, and motion.

When we look at the complex world about us and see its magically simple phenomena we take it all for granted unless our curiosity leads us to ask why the sunset is red, how electricity drives the washing machine,

why do some of us wear glasses, how can music and the voice be sent thousands of miles through the air and be reproduced in our homes at the turn of a dial? Still more remarkable is the fact that everything in the universe is built up of only 92 different kinds of atoms, these atoms in turn being built up entirely of electrons and protons. In other words all physical properties are functions of the properties of electrons and protons or groups of electrons and protons. Here is the most fascinating study outside of life itself and no student is so intellectually stagnant that he has never searched for nor asked for an explanation of some physical phenomenon. No matter what your position in life is, a knowledge of scientific method, an appreciation of scientific philosophy, and a scientific attitude towards all things is necessary for the mentally well-balanced man.

The main topics for study, fall quarter, will be the development of the atomic theory and the birth of modern science; the nature of energy and its relationship to matter; heat and molecular motion; how matter emits the radiation we know as light; the physics of sound; and the laws of energy and motion explained in simple mathematical language. MWF I. Mr. Hovde.

G.C.13w—Part B, winter quarter. THE NATURE OF CHEMISTRY.

The make-up of material objects which we now regard as necessities has changed so remarkably during the past thirty years through the development of the science of chemistry as to be almost unbelievable. This science has raised the standard of living, has given beauty and usefulness to our homes and the clothes we wear, has provided new weapons in man's fight against disease, has given us the means to refertilize our rapidly wearing out land, has given us new and interesting materials for all purposes. To show how these effects have been brought about is our objective.

The lecture topics for study, winter quarter, will be the development of the fundamental concepts of chemistry, why and how chemical changes take place—such as oxidation and reduction; the inorganic chemistry of water, iron and steel, gases, fuels, and other common things; the organic chemistry of foods, dyes, lumber, straw, clothing materials, explosives, photographic film and other materials built out of our most useful and important atoms, carbon, oxygen, hydrogen, and nitrogen. MWF I. Mr. Hovde.

G.C.14s—Part C, spring quarter. MODERN DEVELOPMENTS AND APPLICATIONS OF THE PHYSICAL SCIENCES.

Some of the recent theories on the structure of matter and energy, radiation, radioctivity, atomic numbers, and isotopes, will be discussed in lectures designed to give the student a glimpse of the progress of modern science, its problems, the value of research, and what we may expect in the future. The fundamental rôle of electricity and its varied useful applications in modern life will form one unit of the spring quarter's work.

Special topics such as the colloid chemistry of soils, rubber, ceramics, and leather, as well as some of the applications of physics and chemistry

in mineralogy and geology, will be briefly discussed. Explanations will of necessity be brief but will introduce the student to further reading and study in the fascinating fields of science.

Our approach to the study of the physical sciences is not that of the professional scientist but that of the man who desires a knowledge and an appreciation of scientific method and attitude and wants it as a necessary part of his own cultural pattern. MWF I. Mr. Hovde.

G.C.15f,16w,17s—TECHNOLOGY

Man's achievements and his rise in the social structure depend upon the use he makes of the sources of energy available around him and his development of machines to lighten the more arduous tasks or to make them safer. One has but to compare the standard of living in the United States or the more highly developed countries of Western Europe with those of the Far East or with Africa to realize how much we depend upon the use of machinery or of services made available by the use of machines.

Better housing facilities, the design and erection of tall buildings, bridges, other structures; health and sanitation, rapid transportation and easy communication by land, water, and air have been brought about by inventions and discoveries of applied science. The indirect result of this has been the production of great wealth, the raising of the standard of living, the changing of national and international relations, and the better understanding between the nations.

All of these features of modern life are the outgrowth of the work of the engineer and the architect in the field of technology. This development will be discussed and illustrated by a free use of lantern slides, motion picture films, and demonstrations. Distant structures, manufacturing plants, mining and power plants, machines, agricultural developments, and the conquest of the air will be brought to the lecture room and discussed by men directly in touch with this work.

G.C.15f—Fall quarter. RAW MATERIALS AND THEIR MANUFACTURE.

The application of the basic sciences of mathematics, physics, and chemistry to the adapting of our natural resources and forces to the satisfaction of human wants. The occurrence, discovery, and procurement of materials of nature for use as food and clothing, housing and transportation, such minerals as coal, iron, copper, gold and silver, lead, mica, asbestos, salts, gems, oxygen, hydrogen, helium, natural gas, and petroleum. Reduction of these raw materials to commercial forms such as iron, steel, tungsten, radium. The combination and chemical treatment into explosives, rayon, soap, paints and varnishes, alloys, paper, clay products, cement, etc. The harnessing of the natural forces for meeting human needs in the home, on the farm, and for use in industry, resulting in the bettering of human living conditions and in a multiplication of production by labor. The machinery for the manufacture of clothing, the processes of the production of lumber, wood pulp and paper products, steel shapes and parts for buildings and other structures, farm machinery, steam turbines, aircraft, electrical machinery,

etc., will be used to illustrate modern production methods. TThS III. Mr. Comstock, Mr. Montillon, and associates.

G.C.16w—Winter quarter. BUILDING, TRANSPORTATION, AND COMMUNICATION.

The design and erection of buildings and other structures on farms, commercial buildings, factories, public buildings, bridges, dams, highways, and other public works will be used as examples of the application of the products and forces of nature by mechanical methods in the modern world as contrasted with methods used in other countries. The history and development of transportation by water, land, and air for passengers, freight, express, and mail will illustrate the dependence of every country on these services.

The great inventions in the field of communication by telegraph, telephone, and radio have nearly all been made in recent years. The history of this development will be traced and the most modern advances in this field, including broadcasting, television, and international communication systems, will be fully illustrated. Sources of energy and power will be studied, together with modern methods of their transformation from one form to another, their transmission to distant markets, and their distribution to the homes, the factories, and the transportation systems of the country. TThS III. Mr. Akerman, Mr. Bryant, Mr. Cutler, Mr. R. C. Jones, Mr. Martenis, and Mr. Roe.

G.C.17s—Spring quarter. TECHNOLOGIC AGENCIES AND THEIR SERVICE.

The economic and sociologic aspects of technology will be illustrated by the results of great inventions, such as those of the steam engine, the locomotive, the telegraph, the telephone, the sewing machine, the cotton gin, modern farm machinery, and many others which have influenced the rapid development of the modern world.

A study also will be made of the technological services rendered by the national, state, municipal, and private agencies. These will cover land, water, and aerial surveying and mapping, reclamation, research and development by the Bureau of Standards and other federal bureaus, and state engineering and agricultural experiment stations, sanitation and public health agencies, flood control, and public utility services in water supply, electric power, motor vehicle transportation, the railroads, natural and artificial gas, and communication. TThS III. Mr. Akerman, Mr. Bryant, Mr. Cutler, Mr. R. C. Jones, Mr. Martenis, and Mr. Roe.

G.C.21f,22w,23s—EUTHENICS

Euthenics is "the science and art of improving the human race by securing the best external influences and environmental conditions for the physical, mental and moral development of the individual and for the maintenance of his health and vigor." It is a field that may be profitably studied by both men and women. The course outlined below is designed for both.

Every individual is daily faced with the need of making certain choices or selections to satisfy his needs and desires. The amount of information which he can bring to bear in making these selections will determine the satisfactions and pleasures he will derive from them. A knowledge of the relation of food and nutrition to health and efficient, active living makes certain a wise selection of the daily diet. Information on textiles and clothing gives returns in added physical comfort, improved personal appearance, and in economical buying. An appreciation of the principles of art results in becoming dress and increased beauty in surroundings. A knowledge and appreciation of the use of the income, whether of money, time, or energy, increases the measure of satisfaction for the individual and the family, and promotes better relationships. Finally, in his home—its design, location, and equipment—rests much of the individual's happiness. The course will consist of lectures which will be illustrated by lantern slides and often with the actual materials in the various fields.

G.C.21f—Part A, fall quarter. 1. THE MANAGEMENT OF THE HOME.

The part that efficient management plays in increasing the satisfactions, both economic and social, in family life will be presented by showing that while homes make men and women, men and women are the makers of homes. Homemakers as managers determine the goal of their homemaking enterprise, the financial policy of the family, the use of the family income, the management of the time and labor involved both in household and leisure time activities. Personal as well as family budgeting and accounting will be considered. What constitutes a livable, well-managed home will be illustrated by case studies of real families. MWF IV. Miss Studley.

2. HOUSE PLANNING AND FURNISHING.

The unit in house planning and furnishing aims to familiarize the student with fundamental art knowledge which will help him to appreciate beauty in many of its aspects, and will assist him to select a suitable home and make it attractive. The course will include a brief survey of the principles of design and color as they are applied in familiar objects. The houses of today will be studied from the point of view of the beauty and sincerity of their design, and of their place within the community. Personality in design will be discussed so that a particular family may choose the type of house and house furnishing that suits it best. There will be a brief study of the architectural styles which have influenced American houses and a discussion of the impressions which they create. Exterior designs will be analyzed for the quality of their design and color. Interiors will be studied in relation to exteriors in order to appreciate the need for consistency throughout the house. Since a house may be well designed yet not seem homelike, there will be suggestions for making a house comfortable, inviting, and livable. Typical floor plans will be examined to show their relationship to exterior and interior design, and to give an understanding of the influence of the house plan upon the design of the exterior and the placing of the furnishings in the rooms. MWF IV. Miss Goldstein.

G.C.22w—Part B, winter quarter. 1. TEXTILES.

This unit will include a discussion of the textile fibers and fabrics used for men's and women's clothing and for household purposes. The following topics will be considered: fabrics—the relation of quality to the fundamental processes of construction; textile fibers, their properties and simple methods of identification; yarns, weaves, and finishing processes—what they have to do with quality of fabrics—how designs in fabrics are obtained; uses for wool, cotton, silk, rayon, and linen fabrics; methods of adulteration against which the consumer needs to guard; what the purchaser should demand in the way of protection against deception; cost of clothing and factors which influence the purchase price. MWF IV. Miss Weller.

2. FOOD AND NUTRITION.

This unit includes a survey of the nutritional factors which make for optimal health. The subject is discussed from the standpoint of the needs of the members of the campus group and the discussion amplified to apply the information to the needs of the other members of the family. The factors which influence the individual requirements, such as action, activity, size, age, etc. will be considered as well as the individual "food principles" necessary to meet those needs. This will be followed by a discussion of the nutritive value of different foods; combinations of foods, which are appetizing and which supplement each other; relative meal costs and value received when food is bought in restaurants, stores, or markets; food fads, fallacies and faulty advertising; dietetic aids in the management of certain diseases. MWF IV. Miss Hunt.

G.C.23s—Part C, spring quarter. THE DESIGN, BUILDING, AND FINANCING OF THE HOME.

This quarter's work by the Department of Architecture is to round out the course in Euthenics. It will deal with the home as a physical plant; its location, design, construction, equipment, and financing. The following problems will be discussed; the location; a house in the country, on the edge of the city, or in the more congested areas; the availability of transportation; the present tax rate in that neighborhood; the probable future tax rate; the availability of sewer and gas mains, water supply, telephone, and electric lights.

Practical and esthetic considerations in the design of the home will be taken up. These will include those not already covered in the earlier part of the course. They will have to do with types of design necessary to meet conditions of family life, family income, etc.; the suiting of the type of home to the climate of the locality; the proper arrangement of rooms in various types of houses in both their practical and historical aspects.

A series of lectures will be given over to the discussion of good and bad methods of construction; the problems of materials now available; and those probably available in the near future; the values of wood, stone, brick, stucco, frame, and steel construction under varied conditions.

The cost of materials, supervision, and labor in the construction of the home leads to the discussion of financing, and to the consideration of such problems as renting versus ownership, the relation of cost to income and to the various methods and plans of financing home buildings. Financing involves likewise another problem, that of multiple or apartment versus individual housing arrangements, the relative benefits and economies of different methods of heating, ventilating, insulating, lighting; and of the labor saving devices with which the home may be equipped. MWF IV. Mr. Mann, Mr. Robert Jones, Mr. Roy Jones.

G.C.24f,25w,26s—APPRECIATION OF THE FINE ARTS

The fine arts are the best reflection of civilization. In this course an attempt will be made to show how the fine arts of the motion pictures, and the theater, sculpture, architecture, painting, etching, and other graphic arts and music are as a whole related to contemporary, and especially to immediate, American life. Do the arts of today display the same force that underlies present achievements in science? Why do some artists hark back to the primitive for their inspiration? Modern life has many new developments but its roots lie in the past; so, too, with recent developments in art. The heritage of ages may be traced back generation by generation with changes but also with traditions.

G.C.24f—Part A, fall quarter. APPRECIATION OF MOTION PICTURES AND THE THEATER.

The object of this course is to give the student some standard of judgment of motion picture and theatrical productions and some background upon which to base his criticisms and opinions.

It will consist of two lecture and one picture period each week. The lectures will be illustrated by slides, and motion pictures will show various phases of the theater arts. The lecturers will be supplemented by professional critics and theatrical managers and artists from the Twin Cities who will talk on such subjects as: "The business end of the theater," "What I look for in a play," "What I look for in a motion picture," "My method of memorizing lines," "What I do to 'get into' a part," and readings from some of the great plays.

There will be a brief, preliminary survey of the history of the theater, from the beginnings of drama among primitive tribes, its development in Greece and Rome, its rebirth in the church, its flowering in the Romantic period, its progress through classicism, sentimentality, and realism to the era of experimentation in the theater at the present time. These lectures will be chronological, illustrated travelogs of the theater.

This brief survey will be followed by a treatment of the costumes of the different periods, illustrated by slides and such well-known motion pictures as "Intolerance," "Monsieur Beaucaire," "The Birth of a Nation."

This will be followed by another series on scene design and stage illumination from early simplicity to the extravagant methods of constructivism and expressionism in the radical Russian theater of today. The

modern tendencies in playwriting, acting, directing, stage costuming, and stage setting will be dwelt upon. The different types of theater will be noticed. That remarkable outgrowth of the modern theater, the motion picture, will be traced back to its beginnings when the Egyptian Pharaohs used to ride in their chariots along rows of great pylons upon which human figures were drawn in such a way that they seemed to move as the columns sped by. These talks will be illustrated by slides and by motion pictures from the earliest crude "train coming" and "fire run" type, to the most finished "talkies" of the present day. Where it is advisable, current productions will be commented upon, and the problems involved in productions of the University Theatre will be explained before each performance and reasons for the selections stated. MWF VIII. Mr. Riley, Mr. Kissack, and associates.

G.C.25w—Part B, winter quarter. APPRECIATION OF THE SPATIAL AND GRAPHIC ARTS

The life of the American student is surrounded and influenced on every side by the spatial and graphic arts. The bed in which he sleeps, the house in which he lives, the automobile which he drives, and the comic paper which he reads are all common examples. Their commonplace rôles in our lives frequently lead us to overlook anything beyond their utilitarian values. The object of this course is first to make the student aware of what he sees, and then to gain a better understanding of it by various means. Actual contact with the art in its original form is necessary to become conscious of all of the factors which combine to make it important. For this reason the art in the Twin Cities will be used as much as possible, and the local examples will be supplemented by photographs. In addition to lectures and discussions the student will be given an opportunity actually to work with the various mediums of art expression in periods set aside for participation. During these periods first hand contacts will be established as an aid to better understanding.

All of the subject-matter in the course will be chosen with the idea of helping the student better to understand the art which he will see. Examples distant in time, space, or meaning will be discussed only when they will aid the understanding of contemporary work. The course will consist of lectures, demonstrations, field trips designed to acquaint the student with the principles of spatial and graphic arts which the student may sometimes use in the building and decoration of his home. The pottery, metal work, furniture, newspapers, and magazines which are used in the home will be discussed as the Graphic and Industrial Arts. Architecture other than domestic will be analyzed from the viewpoints of both use and beauty. Sculpture and painting will be treated as expressions of contemporary experience.

The course is designed as a basic and fundamental study of the principles of art with emphasis on the unity of the arts and the unity of art and life. Lectures, discussions, and participation periods will be supplemented by assigned readings. MWF VIII. Mr. Faulkner, Mr. Hilpert.

G.C.26s—Part C, spring quarter. APPRECIATION OF MUSIC.

This course will enable students both to understand and to enjoy the wide variety of music that pours in daily over their radios with its mixture of classic and jazz, of opera and symphony, of martial and religious compositions. It will add also to their appreciation and understanding of opera on the stage and symphony in the auditorium. Music of today touches life at every turn, and a cross section of such music will be explained in terms of the movements that have resulted in symphony and opera. Jazz and other popular music and its orchestral contribution to more serious modern composition will be discussed and illustrated as will modern tendencies in various fields. Some of the music used as material for this course will be heard through the radio, phonograph records, and in four-hand piano compositions. Likewise, the various orchestral instruments will be heard in characteristic pieces singly and in combination. Moreover, both light and grand opera will be illustrated by competent singers in person as well as by records. MWF VIII. Mr. Scott, Mr. Killeen.

G.C.28f,29w,30s—THE BACKGROUND OF THE MODERN WORLD

It is of the utmost importance that the citizens of each country understand the problems and difficulties of other races and nations. Only upon such intelligent comprehension can satisfactory international relations be based. The twentieth century is teeming with complexities which may be made understandable by a study of their origin in the remote past and their evolution through the modern era. Italian fascism, Russian communism, England's abandonment of the gold standard and free trade, America's unavoidable entanglement in the major affairs of world politics, Germany's plight, and the intense nationalism of France—all these and many more such topics are not the outcome of the World War alone but have their roots far back in the Middle Ages. It will be the purpose of this course to try to see how the modern world with its complicated interrelations came to be.

G.C.28f—Part A, fall quarter. DEVELOPMENT OF THE GREAT STATES OF MODERN EUROPE.

The first quarter will cover the history of Europe from the Reformation to about 1715, showing the rise of nationalism, the dynastic rivalries, and the development of the great states of modern Europe. The intellectual awakening known as the Renaissance which affected all the interests and activities of man belongs in part to this period. Not art and letters alone, but religion, science, commerce, exploration were stimulated and changed by the quickening of this period in which the medieval era came to an end and the modern world began. Every opportunity will be grasped to connect the world of today with the earlier age in which are its roots. TThS I. Discussion section hours to be arranged. Mrs. Tyler.

G.C.29w—Part B, winter quarter. REVOLUTIONS, POLITICAL AND INDUSTRIAL.

The work of the second quarter will carry the account to 1848. The balance of power, the colonial rivalries of England and France, the foundation of the British Empire, and the rise of the United States will be considered. The problems which brought about the French Revolution and the effect of that revolution and of the even more important industrial revolution upon the world of today are questions of great interest. The ideals of the French Revolution set Europe afire and the industrial revolution is yet in operation, modifying life for everyone from day to day. The career of Napoleon and the reconstruction of Europe may well be compared with the situation of the world during and after the Great War of the twentieth century. TThS I. Discussion section hours to be arranged. Mrs. Tyler.

G.C.30s—Part C, spring quarter. THE CHALLENGE OF THE TWENTIETH CENTURY.

In the third quarter the story of the nineteenth century will merge with that of the twentieth. The unification of Italy and Germany and the creation of the new states in southeastern Europe began a new adjustment of international relations and alliances which were to lead to war. Imperialism of the modern economic variety caused the partition of Africa and the problems of the Near and Far East. The World War brought catastrophic changes to victors as well as vanquished. The years since the war have been full of interesting developments—the League of Nations, the formation of new republics, and startling experiments in Italy and Russia. A study of the past makes the twentieth century a fascinating and challenging prospect. TThS I. Discussion sections and hours to be arranged. Mrs. Tyler.

G.C.31f,32w,33s—FORMATION OF PUBLIC OPINION

This course deals with the present day newspaper and other media of mass impression. The printed word and pictorial display of the press, magazines, and books, the spoken word of the teacher, minister, or lecturer on the platform or by radio, and the visual and auditory impressions conveyed in the talking pictures, all have their influence on the thinking, attitudes, and behavior of every man and woman. As a consequence, a knowledge of the methods and sources of power of these institutions with an explanation of the traditions, procedures, and mechanisms by which they operate and play upon their audiences, is important and significant.

G.C.31f—Part A, fall quarter. SHAPING PUBLIC THINKING.

This quarter's work will offer information about institutions and instruments for shaping public thinking. A brief historical background of the press. A survey of the evolution of the newspaper, the great influences in its development. The revolution of production and distribution, the rise of democracy, the urbanization of the population, and the development of communication. Mechanical invention, mass production, standardization,

and chain distribution give point to this study. The democratization of government, society, education, and other phases. Their deep effect upon the press. Special reference will be made throughout to the interrelation of the newspaper and the public of today. MWF III. Mr. Casey, Mr. Olson.

G.C.32w—Part B, winter quarter. THE NEWSPAPER, PERIODICAL, AND THEIR FUNCTION.

Students will here be initiated as "insiders" into modern techniques that serve through press, radio, and moving pictures to fix attitudes, create social values, and exercise leadership. Such questions will be answered as: What is news? What is involved in news selection? Does all news fall into the same pattern? Is news a matter-of-fact recital? Is the emotional element in the news built up to create reader interest? What part do struggle, romance, and mystery play in the effect of news? Can emotional interest in significant things be created through the news? Does the reader imagine himself an actor in a news story situation? Does the tabloid's selection of news differ from that of the standard paper? Does the newspaper have unlimited right to print all the news? What is implied by the slogan, "All the news that's fit to print"? Does the newspaper overplay crime news? Has the development of the telegraphic news agencies standardized the news? Why does the present day newspaper pay increasing attention to foreign news and sports? Should the newspaper give the reader what he wants or what the editor thinks he should have? Is it a function of the newspaper to amuse and divert the reader as well as to inform and counsel him? To what extent is there coloring, suppression, and censorship of the news? What are the chief causes of inaccuracy in news stories? How much time does the reader devote to newspaper or periodical? Is the motion picture or radio a competitor of the press? MWF II. Mr. Casey.

G.C.33s—Part C, spring quarter. PROPAGANDA CAMPAIGNS.

Great campaigns to sway public opinion are launched on a united front using all agencies in times of disaster, in times of war. Others are built up to sway mass opinion for religious purposes and in politics. These crusades are variously centered. It is the purpose of this third quarter to discover their organization and effect, to analyze the various agencies participating. Press agency and its propaganda will have an important place in the course. Types of propaganda technique in war and peace time will be observed to reveal how groups in society contrive to obtain certain objectives and how they manipulate to fix or change attitudes and opinion. The following questions will be discussed: Does advertising in the press and over the radio result in social change? How does it affect per capita production and consumption? Standards of living? Social values? Public taste? Do people read editorials? Does the newspaper really exercise leadership? Should a newspaper conduct crusades and campaigns? How partisan is the present day newspaper? The radio? The motion pictures? Certain magazines? Is a publicly-owned newspaper or other propaganda agency possible

or desirable? An endowed one? Are newspaper changes imposed by so-called great editors? What imprint have such significant figures as Greeley, Bennett, Pulitzer, Hearst, and Scripps left on journalism? Are there now any men of this stature who mould and stamp national or group thought in any of the opinion forming fields? MWF III. Mr. Casey.

G.C.34f,35w,36s—INTRODUCTION TO THE MATHEMATICS OF BUSINESS AND CURRENT AFFAIRS

It is common knowledge that mathematics of an advanced nature plays an essential rôle in science, engineering, and other specialized fields. On the other hand, the most elementary processes of mathmatics, such as simple arithmetic, are continually used by all men and women. Between the two extremes, on the one hand the technical applications and on the other the most elementary uses of mathematics, we find a large body of applications which are of extreme importance to the average educated man and woman. Fortunately, the applications in this intermediate field involve the use of only relatively elementary mathematics. A large and important part of the exceedingly practical fields called statistics, and the mathematics of finance and insurance, can be cultivated with the aid of merely elementary algebra and arithmetic. This course, called an Introduction to the Mathematics of Business and Current Affairs, will present selected topics from statistics, finance, and life insurance which are of interest and value to any intelligent citizen. The mathematical basis which is necessary for the consideration of these topics will be completely developed in the course. In particular, the student will meet a review of certain parts of elementary algebra, and a treatment of logarithms, progressions, and probability. Appropriate parts of the history of mathematics will be introduced. A student registering for this course should have had a year of ninth grade mathematics.

The extent of the course can be inferred from the following sample problems.

G.C.34f—Part A, fall quarter. ALGEBRAIC METHODS, STATISTICS, AND INTEREST.

By use of data from Statistical Abstract of the United States, express the monthly production of bituminous coal for each month of 1930 as a percentage of the production in the corresponding month of 1929; plot the resulting percentages. Determine the trend line of wheat production in the United States graphically, by use of data for the years 1890 to 1930. If you borrow $1,000 for ninety days from a bank which charges 6 per cent interest, payable in advance, at what rate do you actually pay simple interest? Suppose that you buy $1,000 worth of merchandise and that the terms of payment specified by the seller are net cash in 60 days, or 4 per cent discount for cash in 15 days; what is the highest interest rate at which you could afford to borrow money in order to take advantage of the discount offered to you? Compute the arithmetic mean, and also the geometric mean of the hourly readings of the temperature yesterday in Minneapolis,

using logarithms for the computation of the geometric mean. How long will it take money to double itself if it is invested (1) at 5 per cent, compounded quarterly, and (2) at 5 per cent simple interest? MWF VI. Mr. Hart.

G.C.35w—Part B, winter quarter. ANNUITIES AND THEIR APPLICATION TO PROBLEMS INVOLVING THE DISCHARGE OF DEBTS BY PERIODIC INSTALLMENTS, DEPRECIATION, AND BONDS.

Compute the annual rate of depreciation on a motor truck which costs $1,250 and is worth only $250 at the end of three years; find the depreciation during each year. How much money in hand today would be sufficient to provide you with $50 per month for two years, if you were able to invest money at 6 per cent, compounded monthly? In return for a loan of $1,000 you agree to make equal payments at the end of each three months for four years; if these payments include all interest at the rate of 8 per cent, payable quarterly, find the size of the payments. What rates of interest, compounded annually, are equivalent to the interest charges specified by a Morris Plan bank, for its various types of loans? Suppose that you bought a $1,000, 7 per cent bond of the Great Northern Railroad at the highest price for which such a bond was sold yesterday on the New York Stock Exchange. What interest rate does this investment yield, assuming that you will hold the bond until its maturity date? MWF VI. Mr. Hart.

G.C.36s—Part C, spring quarter. PROBABILITY AND LIFE INSURANCE.

If the odds are one to three that you will win a certain game whenever you play, what is the probability that you will win exactly four games if you play five times? Compute the smallest possible annual premium which an insurance company could afford to charge, if it had no overhead expense, in case you should buy an ordinary $1,000 life insurance policy today. What sum of money, in hand when a man is of age 65, would be sufficient for him to buy a pension of $100 per month for the rest of his life, under the usual conditions specified by insurance companies? MWF VI. Mr. Hart.

G.C.38w—Winter quarter. THE AMERICAN CITIZEN AND HIS GOVERNMENT

Popular government rests upon the principle that it is every citizen's business to see that his community is well governed. But, as Lord Bryce pointed out, what is everybody's business is likely to be nobody's business, for most people hesitate to assume the responsibility. It has therefore been typical of American life to find the affairs of government managed by a relatively small part of the community, motivated often by self-interest. Those who should have been the leaders in politics have been especially slow to interest themselves directly in public affairs, whereas, they ought to be in the forefront. Too many people in the United States have regarded politics as a business to be avoided by those wishing to be thought respectable. The fact is that the functions and activities of government have now expanded

to such an extent that politics touches every one of us directly, deeply, intimately, inescapably. It will be increasingly difficult for Americans who have gone to college to remain indifferent to politics, and at the same time many will be anxious to assume the increasing responsibilities which democracy places upon them.

This course is designed to equip the future citizen for assuming the responsibilities of his position as an intelligent member of a democratic state and in making his participation in politics more effective. The American system of local, state, and national government will be described with particular attention to the ways in which the activities of governmental agencies touch the daily affairs of the average citizen. The various ways in which the citizen can take part in public affairs will be analyzed carefully. To this end the functioning of the political party will be studied. The opportunities for employment in the civil service will be explained. Most citizens will have to be content with merely voting in primaries and elections as their share in government, but to point out the wider possibilities of planned political economy will be the main purpose of this course. MWF III. Mr. Starr.

G.C.39s—Spring quarter. WORLD POLITICS

The informed citizen needs to know the problems not only of his own country, but also those of other nations, and of the world on which America so much depends. Finance and business, science and education, have become international, and nations have become increasingly interdependent. To survey this field the department offers this course in "World Politics."

The lectures will deal with the international problems of the principal nations of Europe and the Far East, and with their internal affairs where these affect the international situation. The emphasis will be placed upon the post-war period, but attention will be drawn to pre-war events where this is necessary for elucidating the present situation, e.g., France's policy toward Germany. The first part of the course will deal with the salient features of the foreign policies of the principal powers. Outstanding problems will then be discussed, e.g., the Polish question, reparations and inter-allied debts, and Soviet internal and foreign policy. Attention will be drawn to the significance of these questions as illustrations of such general principles as nationalism and imperialism. The efficacy of the League of Nations, disarmament conferences, and the Kellogg Pact will be considered in the light of the previous discussions of specific problems. The above schedule of lectures will be altered in order to explain any outstanding current developments, whether in internal or in foreign affairs. MWF IV. Mr. Mills.

G.C.40f, 41w—HUMAN DEVELOPMENT AND PERSONAL ADJUSTMENT

In recent years, college students have more and more demanded courses teaching them to know and understand themselves. As expert studies in biology have been brought to bear on the human body, so have the testing and research of many trained men and women focused on the human mind.

A large portion of these have been centered on problems of personal adjustment and mental hygiene. Through the study of the development of normal and problem children, the analysis of the behavior of delinquents, inquiries into the causes and nature of mental peculiarities and abnormalities, and the study of family life, much knowledge has been obtained of social and family relations. Not only does this assist the student in meeting his own life problems but it also gives insight into the motives and behavior of others and prepares for the coming responsibilities of family life. It is the aim of this course to make such material available not with the idea of developing psychologists, but to aid in the solution of the difficulties facing every young man and woman and every adult and to prepare for meeting the practical problems of marriage, child rearing, and homemaking. The course will be divided into two parts each covering one quarter. Questions such as the following will be considered.

G.C.40f—Part A, fall quarter. CHILD DEVELOPMENT and FAMILY LIFE.

What happens to the child before it is born? Can babies be "marked"? Why are two children in the same family so different? Are children born shy, nervous, bashful, or are parents responsible? What traits have you acquired through living with your parents? Are "only children" always spoiled? How do children learn? Are geniuses stupid as children? Do precocious children turn out badly? What is the relation between play, work, and drudgery? Can the child's curiosity and manipulation be guided into useful channels? Can "creative imagination" be developed? Can we measure the intelligence of babies? Why do children remember baseball scores and forget their arithmetic? How much do children know about sex? What should they know? Should a child be whipped? What is the effect of punishment? What causes temper tantrums? How do food prejudices arise? How is facility in the use of language developed? How is "pathological lying" related to childhood yarns?

How do the personal relations of husband and wife, father and son, mother and daughter, and one child and another affect the lives and adjustments of the members of the family? Do children educate their parents? What is the effect upon the children of divorced parents? What is a "broken home"? What family traditions should be preserved? How do "neurotic" mothers affect children? What traits do children admire in their parents? Should the family be done away with and the state take over the care of children? TThS III. Mr. Anderson.

G.C.41w—Part B, winter quarter. PERSONAL ADJUSTMENT.

How do fears of examinations, of snakes, and of other people arise? How may they be reconditioned? Why do you act as you do when angry? How may anger be controlled? How do prejudices arise? What is "wishful" thinking? How can bad habits be broken? Why do children "go wrong," run away from home, become bullies, steal, etc.? What causes stuttering, jealousy, envy, etc.? What is the effect of physical inferiority or handicaps on development? How can bashfulness and nervousness be

overcome? What can be done with the seclusive, the sensitive, the moody, the shy? Is daydreaming dangerous? Whence come feelings of inferiority? What is the relation of peculiarities and insanity to experiences of childhood and youth? How may desires be sublimated?

Is there an adolescent "upset"? Should college youth be repressed? Is the younger generation "going to the dogs"? What is the effect of the machine age on the life of young people? How do young people adjust to their fellows, to their elders, to college life? How may social adjustment be improved? What is the relation of personality to success in studies, in a profession, in social life? How does participation in extra-curricular activities affect adjustment? What are the advantages and disadvantages of being a "good mixer"? How should one choose a wife or husband? Who should have children? What is the relation of personal adjustment to family adjustment? TThS III. Mr. Anderson.

G.C.43f, 44w, 43-44s—THE PRACTICAL APPLICATIONS OF PSYCHOLOGY

Psychology is concerned with human activity. Because every person is influenced by the behavior of other people, it is wise to study this behavior for its practical significance.

The aim of this course is to present a picture of the ways in which the human being meets the problems of his environment and develops the many traits which are called personality. It seeks to answer the question, "Why do we behave as we do?"

G.C.43f—Part A, fall quarter. INDIVIDUAL DIFFERENCES.

This part of the course will consider why college students and others differ one from another? Such questions will be discussed as: What is mind? Are all men created free and equal? What is intelligence? What is an I. Q.? How is intelligence measured? Is there more than one kind of intelligence? Can we improve intelligence? Are women smarter than men? Is it true that women never reason? Why are different races of people different? What part does age play in individual differences? Are two people ever exactly alike? Can intelligence be ascertained by the shape of the head and face? Do the stars influence our behavior? Can we read people's minds? Can behavior be predicted from handwriting? Are all blondes fickle? And is there anything to numerology?

In what ways do differences come about? How are all of our various traits developed? The part played by the nervous system in behavior: how we hear, see, taste, smell, and the like; what traits we are born with and what we acquire; what causes emotion; whether emotions are always bad; the way in which advertisers and salesmen play upon our emotions in selling us their products; how we can build up sales resistance; why we fight, become angry, and fall in love; the part played by the glands in emotional behavior, also the influence they exert in our physical development. MWF VI. Mr. Longstaff.

G.C.44w—Part B, winter quarter. LEARNING, HABIT, AND PERSONALITY.

The second quarter's work will help to form a more complete picture of the individual. It will deal with questions of how we learn; how we improve our memories; how we break bad habits and build up good ones; how age influences learning; how other people shape our behavior; what is hypnotism; what is mob behavior; what gives rise to new things such as inventions; what is personality; whether it is possible to have two entirely different personalities; how personality is measured; how we can learn to get along with other people; the kind of work we are best fitted for and how we can develop healthy, normal, and pleasing personalities.

Having seen how people differ, how these differences come about, and how our traits are combined into personality, the discussion will finally center upon how personality breaks down; what happens when we go crazy; why drunkards see snakes; whether insanity can be cured; how to reduce insanity; the characteristics which make people "peculiar"; if a genius is insane in some respects; what is a complex; what is psychoanalysis; if insanity is hereditary; what happens when people see visions; what is an introvert, an extravert; why we sometimes think everyone is looking at us or talking about us; what happens when we have the "blues"; why some people think they have every disease they hear of; why we sometimes think the world "has it in for us" and at other times we feel that life is perfect.

Throughout the course stress will be laid upon the practical aspects of psychology rather than the attempt to train the student to become a specialist in the field of human behavior. MWF VI. Mr. Longstaff.

G.C.43-44s—Part A and B, spring quarter. MWF 1:00-2:20 p.m. Mr. Longstaff.

G.C.45f, 46w, 47s—Fall, winter, and spring quarters. VOCATIONS

The General College of the University would fail to fulfill one of its functions if we neglected to offer a realistic study of the occupations of men and women in a wide variety of fields. At present many human failures, many late starts, much wasted time, effort, and money are the direct result of student ignorance of the factors involved in any given occupation. Many people hold fanciful illusions about other callings than their own. Some believe that all doctors and lawyers receive large incomes; that a college degree in engineering, education, business administration, nursing, agriculture, and other curricula is a guarantee of a job and of success; that the white collar clerkship is always better than a job in the engine room, at the bench, or behind the plow; that somehow it is more genteel and profitable for a woman to teach school than to sell goods or make them.

It is the purpose of this course to examine the basis of these notions in the light of as accurate knowledge as can be obtained. This will consist of the analysis of the occupation itself, its disadvantages and advantages, its obstacles, griefs, dangers. This will be followed by a summary of the various ranks or steps in advancement and the salaries or wages that accompany them. There will be information then offered, first, on the type of per-

sonality and basic skills needed for particular occupations and, second, the kind and amount of training necessary to the successful holding of, and advancement within, the job.

Instruction will be given on how a student can follow up the information given in the lectures with further study of the occupations in which he is interested. He may see how the worth of any given career changes from year to year; how as society changes, as new machines are invented, the good job of yesterday becomes worthless today or entirely disappears; how new types of interesting and profitable work arise; and how men and women, by becoming aware of these things, must be constantly ready to shift, adjust, and retrain themselves to profit by change.

These matters are to be discussed by men and women from the University and the Twin Cities whose experience and training give them ample authority to speak directly and fully on their own vocation. All students in the General College of the University are advised to elect this course throughout the year not alone for the value of focusing attention on their own vocational problem but because contact with successful men and women in various fields may stimulate them and the lectures will add to their understanding of the work of the world. T IV. Mr. Williamson.

G.C.48f, 49w, 50s—EARTH AND MAN

From the time of the early Greeks the study of earth and man, or environment and man, has been a fascinating pastime as well as a profitable subject of study. A geographic study of environment includes a consideration of climate, relief, soil, natural vegetation, etc., and their importance for human life. A geographic study of peoples includes a consideration of the distribution of population, the primary production of goods, and the racial, political, and cultural groupings of the human family.

G.C.48f—Part A, fall quarter. THE NATURAL ENVIRONMENT.

The first quarter of the course deals especially with those features of the natural environment which are important in shaping or guiding man's activities. It is a matter of common knowledge that the natural environment is important to man in many ways; not as a force driving him to do certain things in certain ways but as a condition making certain activities undesirable if not impossible, whereas in other activities man may find a more favorable adjustment to his surroundings. Why is man so unequally distributed over the earth? Is it true that all parts of the world have today their maximum human population? What is meant by over-population? These questions cannot be answered without careful consideration of the natural environment. MWF I. Mr. Brown.

G.C.49w—Part B, winter quarter. PRIMARY PRODUCTION.

What are the sources of the thousands of articles on display in the shops of our modern cities? Many commodities are produced near the market but for others the dealers or their agents have ransacked the farthest corners of the earth. Whence come the iron and aluminum, copper, silver,

platinum, gold, diamonds, and other minerals so important in our arts and crafts? Under what conditions are they produced? A study of the products of hunting, grazing, lumbering, fishing, and agriculture leads us to many lands; from small farm to plantation; from tropical forests to the frozen north; from the sardine industry in the Mediterranean to the whaling fleet in the Antarctic. A study of the primary production of the earth frequently reveals the meaning of remote regions in the daily life of our people. MWF I. Mr. Dicken.

G.C.50s—Part C, spring quarter. PROBLEMS IN POLITICAL GEOGRAPHY.

International relations are constantly disturbed by problems of conflicting economic interests in which the most disinterested and fair court could not pronounce absolute justice. Many of these problems arise from the irregular distribution over the earth of different peoples and their resources for livelihood and state development, i.e., from geographic conditions. Who are the inhabitants of the Polish Corridor? What effect does the Corridor actually have on the economic life of Germany? What is meant by the revision of frontiers and how should they be revised? When is a boundary a natural boundary? What states are "national" states and which are "nationality" states? Where does "the Ukrainian minority" live? What is the Flemish problem? Of many states of the world a mere handful are called "the Great Powers." What are the resources necessary for a Great Power? What do "American interests" in the Caribbean include? What will we "give up" if the Philippines go free? Which is more important in British trade, India or the United States? MWF I. Mr. Hartshorne.

ENGLISH GROUP

The English group includes the three following courses. Each of these may be taken independently or together. They, moreover, may be repeated from year to year since in no three consecutive years will they deal with the same materials.

All students read magazines, newspapers, books, plays, and occasionally poetry. In these they find expression of the day in which they live. Likewise life demands often that they put their ideas on paper. Everyone does read; everyone must write. Students in daily social intercourse and in the formal pursuit of education, constantly feel the need to write notes to friends, letters home, petitions, requests, and reports for courses. After leaving college this need becomes more acute. Often success in getting a job and holding it depends on ability to write things clearly. Skill in these everyday usable types of writing results from intelligent current and continuous reading, taking notes, organizing materials, and finally expressing the results.

Students who feel themselves weak in the fundamentals of grammar and elementary composition should register for Sub-freshman English in the Extension Division.

G.C.51f,52w,53s—English Literature

The course in literature will concern itself primarily with a study of contemporary writing, using as texts collections of contemporary essays, plays, stories, and poems. Whenever subjects from earlier periods are studied, they will be considered because of the modernity of their appeal or because of the necessary background they offer for the study of contemporary literature. In addition to the material discussed in the lectures, students will choose, according to their interests, collateral reading from a wide range of subjects. Every effort will be made to guide the students to an intelligent and pleasurable understanding of literature. Current Reading, drawing materials from current publications, will supplement this course.

In conjunction with the study of literature, a writing laboratory will provide analysis of each student's writing needs and directions for satisfying those needs. As stated under Current Reading, the proper work of the writing laboratory will be to aid the student in keeping lecture and reading notes, in writing personal and business letters, and in solving such writing problems as he may face in other courses of study. MWF II. Mr. Appel.

G.C.61f, 62w, 63s—Current English Reading.

Throughout the year this course will deal with current publications primarily in the magazine and newspaper field. A wide variety of these will be listed, and many of them commented upon in the lectures. From these listings students will choose their weekly readings of articles, features, and editorials. They will be required to do this reading by purchase of the magazines or by study in the periodical room of the University Library. From such general reading, everyone absorbs useful and interesting information which is stored away and drawn upon when needed.

Such information is, however, often too diffuse and too unorganized to be fully usable. Students will, therefore, work in the writing laboratory two or more periods a week, reviewing and summarizing and building cumulative notebooks on their fields of special interest. These fields of special interests will, in many cases, comprise the work in one or more other courses taken in this college. Hence the reading and the writing laboratory will serve as definite aids to study towards mastery of fields of knowledge and preparation for the comprehensive examinations. TTh VI. Mr. MacLean.

G.C.71f, 72w, 73s—Composition.

Individual instruction will be given in advanced composition to those few students who have adequate preparation and who have special interests in experimenting with various types of writing. Each student will determine what his own work is to be, the instructor serving merely as a guide to methods of expression. Limited to twenty students. Hours and credits to be arranged. Mr. Appel.

G.C.54f,55w,56s—Fall, winter, and spring quarters. THE RELATIONS OF SOUND TO MUSIC

The primary purpose of music is to make an appeal to the senses and the imagination. On many, however, music has the same effect as a warm bath—a pleasant sensation. They listen in repose, and if asked for an opinion of a piece of music, they reply: "Oh yes, I liked it well enough," or "I don't know—it was all right I guess," or again, "I know what I like." Robert Schumann admitted that music means something different to each of us. "Men in different stages of life take such different views of the impressions they derive from artistic fancies, and the youth of eighteen often discovers in a symphony the echo of some world-wide event, where the mature man sees but a local matter, whereas the musician has never thought of either the one or the other, and has merely poured forth from his heart the very best he could give." To the musician has been popularly attributed some divine talent, and he has been clever enough to admit it. But the stuff out of which music is made, the raw material, can be closely examined, and the effects produced upon us better appreciated and understood. We should, therefore, learn how music is made and of what music is made.

Therefore, this course will be a study of the relation of sound to music, Just like a zoologist when he finds a strange bug, we will take the sound-wave into the laboratory, dissect it, and see what it is like. We can learn something about it from observing the effects of its activity. Delicate machines have been invented which show us how the sound-wave behaves. We can determine which characteristics make for noise and which lead to music. We can study the very structure of the tone wave, its pitch, its loudness. Then we can look into a horn or other musical instrument and see what happens in re-enforcing and building-up an insignificant sound-source; how one length of tube can make many notes; how man's skill has improved on nature's production of music. We will discuss tone quality, or tone color which enables us to hear the difference between one instrument and another, one voice and another even when a note is played or sung or spoken in the same pitch. Finally, we will analyze these things in their practical applications to singing, speaking, playing, and to opera in English as compared with that in German, French, or Italian by seeing how the sounded words are made to fit the lines of musical melody. TThS I. Mr. Pepinsky.

G.C.57f,58w,59s—Fall, winter, and spring quarters—BIOGRAPHY

A study of human character as revealed in the lives of distinguished men and women. About fifty individuals will be treated in lectures and through selected readings. In each case the lectures will be given by a member of the university faculty particularly conversant with the life and times of the individual studied. The treatment will reveal the background of environmental conditions out of which the individual rose to achievement, the problems he faced, and his individual contribution to their solution. Selection will be made from the following fields of human activity; govern-

ment and politics, science, business, industry, religion, medicine, education, engineering, music, painting, drama, philosophy, agriculture, literature, invention, and adventure. The point of view will be primarily psychological: each subject will be treated so as to reveal his individual qualities of mind and character. Persons will be chosen from many countries and from many periods of history. Generous recognition will be given to persons who have played their rôles in modern times. Recent years have produced a wealth of biographical writing that will be freely drawn upon for suggested readings. Each student will select a limited number of biographies and read widely beyond the scope of the formal lectures. TTh VII. University faculty.

G.C.60s—Spring quarter. INTRODUCTION TO PHILOSOPHY.

Most men think only sporadically and disjointedly, under the pressure of special circumstances. Conclusions resulting from such thinking are rarely unified, or sufficiently assimilated to one another to give a comprehensive view; they are often mutually contradictory, or clothed in so haphazard a terminology as to make the appearance of contradiction inevitable.

Moreover, the various systematic attempts to secure a unified view of things within a given restricted field, as in the sciences, are often so highly specialized as to ignore the problems arising from the existence of other sciences and the need for thinking them together; and what is still more important, omitting to consider the relation between the whole realm of knowledge and the total human life, of which science is but a single expression. Art and morals, religion and science, are cultural expressions of the human spirit, whose relations to one another cannot be ignored in any rational survey of life.

Philosophy is the persistent attempt, by way of consecutive reflection, to organize the various scattered fields of thought and knowledge in a comprehensive view. So far as possible it tries to remove the inconsistencies of partial views, and that which lives in the consciousness of the unphilosophical as scattered and disjointed observations, is in the philosophic consciousness attempted to be brought together, assimilated, harmonized, and organized.

Philosophy, as reflection upon life, naturally also seeks to find some systematic solution for its practical contradictions: the frustration of human hopes, the precariousness of human values, the blindness of fate, the erratic favors of fortune, suffering and despair, the demand that life should yield a good that is good for all. The serious and consecutive thought of representative members of the race in relation to these questions and others of the same kind, it is the task of philosophy to communicate and to interpret, to examine, develop, supplement, and revise.

The course here offered will be a very brief introduction to a part of what accumulated human wisdom has to offer on these subjects. There will be included a survey of the outstanding problems in each of the subordinate philosophical disciplines: logic, or the attempt to understand the structure of knowledge, and its fundamental values of truth, consistency, and system-

atic form; ethics, or the analysis of the good and the justifiable in human life; esthetics, or the study of such values as the beautiful, the sublime, the tragic, and the comic, together with their realization in the arts. Metaphysics will be representatively studied through the detailed discussion of some problem like that of the relations between body and mind, chiefly to furnish an illustration of philosophical procedure.

Through assigned readings in a selected list of philosophical classics, the student will be introduced to first hand contact with some of the great thinkers of all time. MWF III. Mr. Swanson.

G.C.64f,65w,66s—Fall, winter, and spring quarters. UNIVERSITY LECTURES COURSE

The University, the colleges, and their many departments bring world celebrities and personalities to talk to university students. Eminent scientists, authors, internationalists, theologians, economists, engineers, doctors, and educators bring to our campus a wealth of ideas and new viewpoints and describe the latest developments in the sciences and the liberal arts. They give us an intimate personal contact with the world's progress. In addition, the Visual Education Department gives showings of many American and foreign films. Many students in the past have failed to take advantage of these opportunities and, in the ordinary course of student life, these lectures pass by unnoticed.

In consequence, the General College will give credit towards graduation to those students who register for this course. It will consist of attendance at a selected and posted list of these university lectures each week; attendance at a discussion class with the course supervisor once each week; and the passing of the comprehensive examination in Current Affairs at the end of the academic year. This comprehensive examination will include many questions covering this and other courses. Those students who are interested in acquiring breadth and completeness of information should take advantage of the University Lectures Course. Discussion hour T VIII.

G.C.77w, 78s—EDUCATION IN MODERN SOCIETY

Man tries to control physical and social forces. His chief instrument for effecting this control is that deliberate, systematic modification of his behavior which he calls *education.*

The goals of modern education are not fixed matters. They are relative always to a changing society. They are not static and final, but dynamic and tentative goals. They do not stand still. They move, and the direction in which they move is determined, consciously or unconsciously, by society. First and always, education is a social phenomenon.

To appreciate the significance of this phenomenon, to understand the motives which drive men forth on this adventure, and to have the ability to criticize their methods of attack are marks of the competent member of modern society. To give students a chance to acquire these abilities to appreciate, understand, and criticize education is the aim of this course.

The course will be offered in two parts, each covering one quarter. Students may register for either or both parts according to their needs and interests.

G.C.77w—Part A, winter quarter. THE SYSTEM.

Who shall be educated? Who shall control the educational system? How shall the schools and other means of education be supported? How shall education be organized and administered?

Questions like these arise in every society. Dominant individuals, inquiring thinkers, and powerful social groups in various times and places have offered a variety of answers to these questions. The materials and the design of the shifting, varied, multi-colored weave of our contemporary educational systems have come from many sources. Students, parents, teachers, taxpayers, political parties, patriotic societies, youth organizations, religious bodies, and many special "pressure groups" play a part in determining what our educational systems shall be. Very often, moreover, these determining factors extend their influence on education far beyond the limits of their own times. The Athenian philosopher of the Periclean Age as well as Mustapha Kemal Pasha, the tonsured representative of the medieval church as well as Pius XI, the belaced Cavalier and the long-faced Puritan of the seventeenth century as well as Mussolini and Lenin, Jean Jacques Rousseau as well as John Dewey, all help to make the pattern of modern education.

To examine this pattern critically is the object of Part A. TThS I. Mr. Benjamin, Mr. Wesley.

G.C.78s—Part B, spring quarter. THE PROCESS.

For what particular purposes shall education be given? What shall be taught? How shall the teaching materials be selected and organized? What are the best ways to learn and teach? How can we find better ways? How can we measure the results of teaching and learning?

Problems like these are met by city and county officials, school board members, parents, taxpayers, and many other citizens, as well as by professional students of education. The teacher or school administrator needs to study the technical details of these problems, both during his preliminary training and thereafter throughout his professional career. The citizen who wishes to take an intelligent part in the direction and criticism of education is not so much concerned with the technical details as with the whys and wherefores of the process.

To furnish practice in the critical evaluation of educational methods and curricula is the aim of Part B. TThS I. Mr. Benjamin, Mr. Wesley.

EXPLANATIONS

Course numbering.—A course is designated by a department name, a number, and a letter. It has the same number in whatever quarter it is offered. The quarter is indicated by the letter (f, fall; w, winter; s, spring; su, summer).

Examples:

1f-2w, a two-quarter course given in the fall and winter.
1w-2s, the same course given in the winter and spring.
3f,w,s, a one-quarter course given each quarter.

Buildings.—A, Armory; Adm, Administration; Ad(F), Administration, University Farm; B, Business Administration; Bot, Botany; Bu, Burton Hall; C, Chemistry; CWI, Child Welfare Institute; D, Dentistry; E, Engineering; EE, Electrical Engineering; F, Folwell; G, Greenhouse; HE, Home Economics, University Farm; HH, Haecker Hall, University Farm; HS, Health Service; J, Jones Hall; Lib, Library; ME, Mechanical Engineering; MH, Millard Hall; Mu, Music; P, Pillsbury; Ph, Physics; Psy, Psychology; Pt, Pattee Hall; S, Stadium; SBH, State Board of Health; WeH, Wesbrook Hall; WGm, Women's Gymnasium; Z, Zoology.

OTHER ABBREVIATIONS AND SYMBOLS

I, II, III, etc.	First hour (8:30 to 9:20), second hour (9:30 to 10:20), third hour (10:30 to 11:20), fourth hour (11:30 to 12:20), fifth hour (12:30 to 1:20), sixth hour (1:30 to 2:20), seventh hour (2:30 to 3:20), eighth hour (3:30 to 4:20), ninth hour (4:30 to 5:20). (At the University Farm, first hour, 8:15 to 9:05; second hour, 9:15 to 10:05, etc., to 1:05; sixth hour, 1:30 to 2:20 etc.)
Ar.	To be arranged or assigned.
Aud.	Auditorium.
Cred.	Credits
Lab.	Laboratory.
Lect.	Lecture.
MTWThFS	Monday, Tuesday, etc.
Prereq.	Prerequisite.

PROGRAM

MILITARY SCIENCE AND TACTICS

The University requires that every physically fit male student shall take two years of military training. For exemptions, postponement, and electives see bulletin of general information, pages 28-30.

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w*	First Year Basic Course.....				
	(No cred.; fr.; no prereq.)				
	Sec. 1	II	TThS	A	Ar
	2	III	TThS	A	Ar
	3	IV	MWF	A	Ar
	4	V	MWF	A	Ar
	5	VI	MWF	A	Ar
	6	VII	MWF	A	Ar
	7	VIII	MWF	A	Ar
3s*	First Year Basic Course.....				
	(No cred.; fr.; no prereq.)				
	Sec. 1	IV	MW & IX T	A	Ar
	2	V	MW & IX T	A	Ar
	3	VI	MW & IX T	A	Ar
	4	VII	MW & IX W	A	Ar
	5	VIII	MW & IX W	A	Ar
	6	II	TTh & IX W	A	Ar
	7	III	TTh & IX W	A	Ar
4f-5w*	Second Year Basic Course.....				
	(No cred.; soph.; prereq., 1-2-3)				
	Sec. 1	II	MWF	A	Ar
	2	III	MWF	A	Ar
	3	IV	MWF	A	Ar
	4	V	MWF	A	Ar
	5	VI	MWF	A	Ar
	6	VII	MWF	A	Ar
	7	VIII	MWF	A	Ar
6s*	Second Year Basic Course.....				
	(No cred.; soph.; prereq., 4-5)				
	Sec. 1	IV	MW & IX T	A	Ar
	2	V	MW & IX T	A	Ar
	3	VI	MW & IX T	A	Ar
	4	VII	MW & IX W	A	Ar
	5	VIII	MW & IX W	A	Ar
	6	II	TTh & IX W	A	Ar
	7	III	TTh & IX W	A	Ar
51f-52w*	First Year Advanced Course.....	Total of five hours to be taken as follows:			
	(6 cred.; prereq., 4-5-6)	One of the two-hour sections:			
	Sec. 1	II	TTh	A	Ar
	2	III	TTh	A	Ar
		One of the three-hour sections:			
	Sec. 1	II	MWF	A	Ar
	2	III	MWF	A	Ar
	3	VI	MWF	A	Ar
53s*	First Year Advanced Course.....	Total of five hours to be taken as follows:			
	(3 cred.; prereq., 4-5-6)	One of the four-hour sections:			
	Sec. 1	II	MTWTh	A	Ar
	2	III	MTWTh	A	Ar
		One of the drill sections:			
		IX	T or W	A	Ar

* Offered on the Minneapolis campus.

No.	Title	Hour	Day	Bldg.	Instructor
54f-55w*	Second Year Advanced Course....	Total of five hours to be taken as follows:			
	(6 cred.; prereq., 4-5-6)	One of the two-hour sections:			
	Sec. 1	II	TTh	A	Ar
	2	III	TTh	A	Ar
		One of the three-hour sections:			
	Sec. 1	II	MWF	A	Ar
	2	III	MWF	A	Ar
	3	VI	MWF	A	Ar
56s*	Second Year Advanced Course....	Total of five hours to be taken as follows:			
	(3 cred. prereq., 4-5-6)	One of the two-hour sections:			
	Sec. 1	II	MW	A	Ar
	2	III	MW	A	Ar
	3	II	TTh	A	Ar
	4	III	TTh	A	Ar
		One of the drill sections:			
	Sec. 1	IV	MW & IX T	A	Ar
	2	V	MW & IX T	A	Ar
	3	VI	MW & IX T	A	Ar
	4	VII	MW & IX W	A	Ar
	5	VIII	MW & IX W	A	Ar
	6	II	TTh & IX W	A	Ar
	7	III	TTh & IX W	A	Ar

PHYSICAL EDUCATION FOR MEN

Courses 1, 2, and 3 are prescribed for all freshmen and must be taken in the first year of residence. Students entering in the winter and spring quarters will register for Courses 2 and 3, respectively, but must complete the entire sequence, 1f, 2w, 3s. Exemptions from physical education will be made only with permission of the General College office.

For a special four-year professional course in physical education and athletics coaching, see bulletin of the Combined Schedule of Classes. Students interested in this course should consult Mr. Piper before registering.

Statement of fees.—For all courses, except 7, 8, 9, $1.00 per quarter. Maximum fee $1.00 per quarter.

No.	Title		Hour	Day	Bldg.	Instructor
1f	Sports Education—Tennis, Handball, and Squash Rackets.....					
	Beginning	Sec. 1	II	TThS		
		2	III	TThS		
	Advanced	Sec. 1	VI	MWF	Field House	Ar
		2	VII	MWF		
1f	Sports Education—Golf					
	Beginning	Sec. 1	VI	MWF	202S	
		2	VII	MWF		
	Advanced		III	TThS		
1f	Sports Education—Touch Football..					
		Sec. 1	II	MWF	202S	
		2	III	MWF		
		3	IV	MWF		

* Offered on the Minneapolis campus.

No.	Title	Hour	Day	Bldg.	Instructor
1f	Sports Education—Swimming				
	Beginning Sec. 1	II	MWF	7A	
	2	III	MWF		
	3	II	TThS		
	Life Saving	VI	MWF		
	Advanced	III	TThS		
1f	Sports Education—Boxing				
	Sec. 1	VII	MWF	206S	
	2	VIII	MWF		
1f	Sports Education—Basket-Ball.....	VII	MWF	Field House	
1f	Sports Education—Freshman Team Practice in—	Report to		108A	
	Football				
	Gymnastics				
	Wrestling				
	Swimming				
2w	Sports Education—Handball and Squash Rackets				
	Sec. 1	III	MWF	202S	
	2	IV	MWF		
	3	VI	MWF		
2w	Sports Education—Boxing				
	Sec. 1	VII	MWF	206S	
	2	VIII	MWF		
2w	Sports Education—Basket-Ball and Volley Ball				
	Sec. 1	II	TThS	Field House	
	2	III	TThS		
	3	VI	MWF		
2w	Sports Education—Gymnastics	VIII	MWF	SoWingA	
2w	Sports Education—Swimming				
	Beginning Sec. 1	II	TThS	7A	
	2	III	TThS		
	Intermediate	II	MWF		
	Advanced	III	MWF		
	Life Saving	VI	MWF		
2w	Sports Education—Team Practice...		Report to	108A	
	Basket-Ball				
	Swimming				
	Wrestling				
	Hockey				
	Gymnastics				
	Indoor Track				
3s	Sports Education—Diamond Ball...				
	Sec. 1	II	TThS	202S	
	2	III	TThS		
	3	VII	MWF		
3s	Sports Education—Tennis				
	Beginning Sec. 1	III	MWF	202S	
	2	IV	MWF		
	Advanced	VI	MWF		
3s	Sports Education—Golf				
	Beginning Sec. 1	III	MWF	206S	
	2	IV	MWF		
	Advanced	III	TThS		

No.	Title	Hour	Day	Bldg.	Instructor
3s	Sports Education—Swimming.....				
	Beginning	II	MWF	7A	
	Intermediate	III	MWF		
	Advanced	III	TThS		
	Diving	IV	MWF		
	Life Saving	VI	MWF		
3s	Sports Education—Team Practice..		Report to	108A	
	Baseball				
	Track				
	Golf				
	Tennis				
	Football				
	Basket-Ball				

NOTE.—A student may elect the same activity for only two quarters. Freshman team practices may be substituted two quarters only, except that students who can pass proficiency examinations in a sufficient number of recreational games will be allowed to substitute a third quarter. Mr. McCormick will be in charge of the above courses.

7f,8w,9s	Advanced Leaders, see below.				
13f,14w,15s	Individual Activities ..... (3 cred.)				
	Sec. 1	II	TThS	264S	Mr. Osell
	2	III	TThS		
16f,17w,18s	Individual Activities (drill substitution) ..... (No cred. By petition only.)				
	Sec. 1	II	MWF	264S	Mr. Osell
	2	III	MWF		
	3	IV	MWF		
	4	VII	MWF		

PHYSICAL EDUCATION FOR WOMEN

When a student is away from her familiar environment it may be very difficult to get enough exercise; the pressure of studies, social demands, and the complications to be overcome in finding companions at the desired time combine to interfere with carrying out many good resolutions concerning a program of regular exercise. The classes in physical education are planned to assist in solving this problem and to round out the repertory of motor skills with which one enters the University. Tests at entrance are designed to show where the student's experience needs strengthening.

Everyone wants to make a good appearance at social gatherings, and we realize that poise may make the difference between success and failure in business or a profession. Physical education makes a definite contribution to personality and poise by training for control of the mechanics of the body and by developing standards by which to measure posture and harmony of movement in one's self and in others. Muscles in good tone, which respond readily to the will and contribute to general endurance, are one source of a happy, even disposition and of a feeling of well-being and ambition.

Sometimes a lack of knowledge of a popular sport like swimming, tennis, or golf may prevent chances for social companionship that are natural and desirable. These sports and others are taught, such as basket-ball for the vigorous girl, archery for both the vigorous and the less strong, and field hockey for those who like a vigorous outdoor autumn game which may be carried on in field hockey clubs. For those who like the suggestion of the natural forms of outdoor recreation there are horseback riding on the

Fair Grounds and winter sports on the University Recreation Field. The desire for harmony of movement in rhythm can be satisfied with the accompaniment of beautiful music in interpretive dancing or with music of a simpler kind in tap dancing. Those who like general developmental exercise in groups may choose classes in gymnastics.

The course in fundamentals of exercise emphasizes principles which apply to all sports and daily life activities. It aims to develop such useful habits as are necessary to the ability to move skillfully and surely in the many activities of daily life, for example, lifting heavy windows or pulling out refractory drawers. It makes use of rhythm to reduce effort as in the golf swing or to secure accuracy in striking a ball, as in tennis or baseball.

Lectures on the health relations of physical education give a basis for making one's own decisions regarding many health matters. Classes in remedial gymnastics deal with individual problems and the student gains valuable information regarding her possibilities and limitations.

The Women's Athletic Association which sponsors a varied program of activities in the late afternoon and certain evenings is responsible for the formation of many lasting friendships.

Physical education is required for six quarters. Following certain tests taken at entrance, students are advised concerning choice of courses. In general it is probably desirable to learn new skills rather than to confine one's self to improving those already possessed.

No.	Title	Hour	Day	Bldg.	Instructor
1f	Freshman Physical Education.... (All; no prereq. Includes hockey, soccer, volley ball, horseback riding, golf, basket-ball, archery, tennis, swimming)				
	Lect. Sec. 1	I	W	201WGm	Ar
	2	II	T	201WGm	Ar
	3	IV	M	201WGm	Ar
	4	VI	Th	201WGm	Ar
	Lab. Sec. 1	II	MWF	3,151,153WGm	Ar
	2	III	TThS	3,151,153WGm	Ar
	3	IV	MWF	3,151,153WGm	Ar
	4	VI	MWF	3,151,153WGm	Ar
2w,3s*	Freshman Physical Education .... (See 1f)				
	Lab. Sec. 1	II	MWF	3,151,153WGm	Ar
	2	III	TThS	3,151,153WGm	Ar
	3	IV	MWF	3,151,153WGm	Ar
	4	VI	MWF	3,151,153WGm	Ar
7f,8w*	Recreational Gymnastics and Games	IV	TS	153WGm	Ar
9s	Archery				
	Sec. 1	II	TTh	151WGm	Ar
	2	VII	WF		Ar
10f,11w*‖	Orthopedic and Individual Gymnastics	III	TTh	3WGm	Dr. Tolg
13f,s-14w†	Dancing	II	TTh	151WGm	Ar
16f,17w*	Games and Folk Dancing.....	I	WF	151WGm	Miss Dickson

* Students may enter any quarter.

† The winter quarter is not open to students who have not had the fall quarter.

‖ No student may register for this course without the permission of Dr. Tolg.

No.	Title	Hour	Day	Bldg.	Instructor
18s‡‡	Tennis				
	(Soph.; prereq., 1-2-3)				
	Sec. 1	I	TTh	151WGm	Ar
	2	VII	WF	151WGm	Ar
	3	VIII	TTh	151WGm	Ar
19f	Hockey	VI	MW	151WGm	Ar
20w	Basket-Ball				
	Sec. 1	III	TTh	151WGm	Ar
	2	VII	WF	151WGm	Ar
21s	Baseball	VI	MW	151WGm	Ar
22f-23w§	Swimming				
	(For students with no knowledge of swimming)				
	Sec. 1	II	MW	51WGm	Miss Starr and others
	2	II	TTh	51WGm	Ar
	3	IV	TS	51WGm	Ar
	4	IV	MW	51WGm	Ar
	5	VII	TTh	51WGm	Ar
	6	VII (fall only)	WF	51WGm	Ar
	7	VIII	TTh	51WGm	Ar
22As§	Elem. Swimming, Intensive.....	Hours as for 22f-23w			
	(For students with some knowledge of swimming)				
22w-23s§	Elem. Swimming	VII	WF	51WGm	Ar
	(See 22f-23w)				
24f,s‡	Horseback Riding	IX	TTh	Ar	Miss Starr
25f,s-26w§	Intermediate and Advanced Swimming				
	(Prereq., elementary swim. test)				
	Sec. 1	III	TTh	51WGm	Ar
	2	VI	MW	51WGm	Ar
	3	VIII	MW	51WGm	Ar
27s¶	Golf—Elementary				
	Sec. 1	I	TTh	151WGm	Ar
	2	II	TTh	151WGm	Ar
	3	III	MW	151WGm	Ar
	4	VII	TTh		
28f¶	Golf—Intermediate				
	Sec. 1	III	TTh		
	2	VI	TTh		
30s	Life Saving and Water Sports....				
	(Prereq., adv. swim. test)				
	Sec. 1	II	MW	51WGm	Miss Starr
	2	IX	MW		

‡ Students registering for this course will pay for riding lessons at about $1 per lesson, but not the regular physical education fee. Attendance at class hour is required for credit. Class meetings will be one hour in length. Groups will be arranged according to riding ability.

‡‡ Students registering for tennis must pay $1 for a tennis permit.

§ No student may register for more than two quarters of swimming without permission. Course 22 is never closed for senior registration. Course 23 is not open to students who have not had 22. Course 26 is not open to students who have not had 25f.

¶ Students must supply their own golf equipment.

No.	Title	Hour	Day	Bldg.	Instructor
31w‖	Winter Sports				
	(Soph.; prereq., 1-2-3)				
	Sec. 1	VII	WF		Ar
	2	II	TTh		

Activities for Which No Registration Is Required

Elective Sports§	IX	MTWTh	51WGm
(Fall)—field hockey, volley ball, swimming; (Winter)—basket-ball, ice hockey; (Spring)—track, baseball, swimming, tennis			
General Swimming	IV	MTWF	151WGm
Tap Dancing	IX	TTh	153WGm

§ With permission of director.
‖ Class meetings will be fifty minutes in length.

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Elting H. Comstock, M.S., Chairman of Students' Work and Advanced Standing Committees

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Mathematics and Mechanics

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Mechanical Engineering

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MILITARY SCIENCE AND TACTICS

Professor John H. Hester, Major, Infantry; Assistant Professors William G. Guthrie, Major, Medical Corps, Willis Shippam, Major, Coast Artillery Corps, Theron G. Methven, Major, Infantry, William C. Webb, Jr., Major, Dental Corps, William A. Ellis, Captain, Infantry, Porter P. Wiggins, Captain, Infantry, Hammond D. Birks, Captain, Infantry, Murray T. Davenport, Captain, Infantry, Emil Krause, Captain, Infantry, Rex W. Minckler, Captain, Signal Corps, Richard A. Ericson, 1st Lieutenant, Coast Artillery Corps, Vincent J. Conrad, 1st Lieutenant, Infantry, Hewitt W. Richmond, 1st Lieutenant, Coast Artillery Corps, Harlan N. Hartness, 1st Lieutenant, Infantry; Instructors Alfred Brandt, Master Sergeant, Infantry, Retired, Harry E. Strider, Master Sergeant, Signal Corps, Aubrey R. Dunkum, Technical Sergeant, Coast Artillery Corps, Roy Cunningham, Staff Sergeant, Infantry, Ernest R. Mylk, Sergeant, Coast Artillery Corps, Arley V. Buckner, Sergeant, Infantry, Clayton A. Peterson, Sergeant, Infantry

MINE PLANT AND MECHANICS

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MINING

Professor Walter H. Parker, E.M.; Instructor Stanley A. Trengove, E.M.

MINING ENGINEERING

Professor Edwin M. Lambert, M.E.

PETROLEUM ENGINEERING

Professors Walter H. Parker, E.M., Peter Christianson, B.S., E.M., Elting H. Comstock, M.S.; Instructor Stanley A. Trengove, E.M.

PHYSICS

Professors Henry A. Erikson, Ph.D., Anthony Zeleny, Ph.D., Louallen F. Miller, Ph.D.

GENERAL INFORMATION

The School of Mines and Metallurgy was established by the Board of Regents in 1888, upon recommendation of the general faculty of the University. The buildings and laboratories of the school are located on the main campus of the University. The mining districts of Minnesota are within a few hours, by rail, of Minneapolis. The heartiest co-operation exists between the various mine managements and the school, so that the mining properties are at all times open to parties from the school for observation and study trips. Practical surveying, geological field work, and underground work are carried on in one or more of the districts. Students in the School of Mines and Metallurgy have, therefore, all the advantages afforded by a large university combined with ample opportunity for field observation and experience.

The School of Mines and Metallurgy occupies the building provided by the Legislature of 1913. In the basement are the assay and electrometallurgical laboratories, together with machinery room, instrument room, balance room, furnace rooms, and necessary storerooms. On the first floor are the administrative offices, the offices and lecture rooms of the departments of Metallurgy and Mine Plant and Mechanics. On the second floor are the lecture rooms and drafting rooms of the Department of Mining, the ore dressing laboratory, and the library of the school. On the third floor are the offices, laboratories, and lecture rooms of the Department of Metallography, Department of Mining Engineering, junior drafting room, dark rooms, blue printing room, and offices and computing rooms for the branch of the experiment station serving the Tax Commission.

DEGREES

In the School of Mines and Metallurgy there are four regular courses of study, viz., Mining Engineering, Mining Engineering specializing in Geology, Mining Engineering specializing in Petroleum, and Metallurgy, leading to the degrees of engineer of mines (E.M.), engineer of mines in geology (E.M.[Geology]), engineer of mines in petroleum (E.M.[Petroleum]), and metallurgical engineer (Met.E.), respectively.

Students in the College of Science, Literature, and the Arts, in the College of Engineering and Architecture, and in the School of Chemistry, who contemplate taking a degree in this school after completing their course, are recommended to select their electives with reference to as full a preparation as possible for the technical work of the course they propose to enter.

CLASSIFICATION OF SUBJECTS

The work falls under the following subdivisions, supplemented by thoro courses in mathematics, mechanics, surveying, physics, chemistry, and the necessary theory and practice of structural, mechanical, and electrical engineering.

(a) *Geology*—to determine the location of the ore. (b) *Mineralogy*—to determine its nature. (c) *Assaying*—to determine whether or not it has

value for treatment. (d) *Mining engineering*—to furnish material for treatment. (e) *Mine plant*—to provide the physical equipment for mining and treating the ore. (f) *Ore testing*—to determine best methods of treatment. (g) *Ore dressing*—to furnish products for metallurgical treatment. (h) *Metallurgy*—to smelt and refine ores and ore dressing products; reduction to metals. (i) *Metallography*—to study metals and their alloys.

EXPERIMENT STATION

The School of Mines and Metallurgy Experiment Station was established in 1911 and is maintained to promote the development of the mining and mineral resources of the state; to assay specimens of ores, rocks, clays, and minerals; to make such assays free of charge for private parties subject to such regulations as the Board of Regents may deem necessary; to make mining and metallurgical experiments in the treatment of such substances and in the utilization of mining and metallurgical by-products; to investigate methods of mining and the use of explosives; to undertake such other mining and metallurgical problems as may seem desirable; to make all ore estimates for the Tax Commission, and to do such other work along the lines above outlined as may be requested by other state departments. Co-operation has been effected with the United States Bureau of Mines, the United States Geological Survey, the Minnesota Geological Survey, and the School of Chemistry.

The experiment station is prepared to assist citizens interested in these lines of work and to assay specimens of ore, rocks, clays, and minerals found within the state, free of charge.

In submitting samples the sender must state the exact location in which each sample was found, giving all possible additional information. This information, together with results of any test or analysis, will be on file and available to the public at the office of the station. Citizens desiring free assay privileges must agree to give accredited representatives of the School of Mines and Metallurgy Experiment Station and of the Geological Survey access to the property should they desire to visit the same for purposes of examination and geological study.

Correspondence will receive prompt attention, but consultations generally prove more satisfactory.

Each sample should be numbered for identification and bear the name and address of the sender. All shipments must be delivered to the Minnesota School of Mines and Metallurgy, charges prepaid. Shipping tags will be furnished upon request.

Address all communications to William R. Appleby, Director, Minnesota School of Mines and Metallurgy Experiment Station, the University of Minnesota, Minneapolis, Minnesota.

ADMISSION

The courses leading to the degrees of engineer of mines, engineer of mines (in geology), engineer of mines (in petroleum), and metallurgical engineer may be completed in four years.

Freshmen will be divided into two sections as follows:

a. Those entering with credits in higher algebra and solid geometry.

b. Those entering without credits in higher algebra and solid geometry. Students in section b will carry a special course in mathematics during their freshman year.

Details as to admission and entrance requirements, description of subjects accepted for admission, and list of fees and expenses will be found in the bulletin of general information, which will be sent to any address upon application to the registrar, University of Minnesota, Minneapolis.

UNCLASSED STUDENTS

No unclassed students will be admitted to the School of Mines and Metallurgy.

ADMISSION TO ADVANCED STANDING

Students who desire to obtain advanced standing must present their applications and certificates to the department concerned, obtain a written statement from the department, showing the exact credit allowed, and present this to the Advanced Standing Committee of the School of Mines and Metallurgy.

CREDIT FOR OUTSIDE WORK

Credit for certain courses, as a result of work done outside of the regular classes, may be obtained by satisfactorily passing comprehensive examinations.

Work done outside of class includes work done by correspondence, by the aid of a private tutor, by individual study, through practical experience, or otherwise.

The comprehensive examination will be conducted by a committee appointed by the head of the department in which the course is given.

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

FEES

Tuition fee (per quarter)	
Residents of Minnesota	$30.00
Non-residents	40.00
Incidental fee (per quarter)	6.00
Matriculation deposit* (first quarter only) men	15.00
Special fees	
Examination for removal of condition	1.00
Examination for credit (after the first six weeks in residence)	5.00
Special examination	5.00
Chemistry deposit	5.00
Graduation fee	10.00

Certain courses have laboratory fees. Such fees are indicated in the Description of Courses later in this bulletin.

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

Penalty Fees

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

COST OF FIELD TRIPS

The approximate cost of the field trips is $125 for the northern trip taken at the end of the sophomore year and $200 for the western trip taken at the end of the junior year.

FIELD WORK

MINE SURVEYING

The work in surveying is given in the sophomore year and is designed primarily for mining engineers. The work begins with the elements of plane surveying, with special reference to the computations necessary, followed by the higher theoretical work in plane surveying and its application to the problems met in underground surveying. Beginning about May 1, the class devotes seven weeks to field work at some convenient point on the Mesabi, Cuyuna, or Vermilion Range. The exact location will be announced in March of each year. The expenses for this trip are estimated at $125.

The students will be divided into squads of two to four. Each student will be required to complete satisfactorily a practical course in plane and underground surveying including exercises in chaining and taping; adjustment and use of surveying instruments, solar and stellar observations; laying out railroad tangents and curves; making earthwork estimates; solving three-point problem by use of a plane table; and other problems. In addition each squad will be required to make a yardage estimate of the stripping of an open-pit mine; to transfer a meridian, from the surface, underground and make a complete survey of an underground mine.

The data obtained will be used in the course in mine mapping during the winter quarter of the junior year, and credit for field work is withheld until maps of the underground survey are satisfactorily completed.

A full equipment of surveying instruments of the latest and best types is furnished each squad for this work.

SOPHOMORE GEOLOGY

At the end of the sophomore year mining students are required to devote about two weeks to geologic mapping. This course usually comes after a seven-week course in surveying and the fields chosen are the Vermilion and Mesabi iron ranges of Minnesota. This work is intended to train the students in the interpretation of field relations and the preparation of geologic maps and cross sections.

JUNIOR MINING, METALLURGY, AND PETROLEUM ENGINEERING

At the end of the junior year students are required to study plants and operations in one or more districts under the direction of members of the faculty. This work begins about May 15, and not over three weeks will

be devoted to it. The work in mining and metallurgy is carried on in the leading western metal mining districts, that in petroleum engineering in the leading oil fields. The exact location will be announced in March of each year. The expenses for the trip are estimated at $200. A deposit of $50 must be made before starting on the trip to cover board and lodging and necessary side trips. Any balance will be returned at the close of the work in the field.

All notes, data, and sketches, necessary for a complete report on the field work, must be fully and neatly recorded in notebooks. These notebooks will be collected at the close of the trip and returned to the student at the reopening of field work at the school. In judging the character of the student's field work, equal importance will be attached to the completed report and to the original field notes. The departments reserve the right to reject notebooks considered below the standard that should be demanded of candidates for senior work. During the months of June, July, and August, the student is urged to spend at least six weeks in actual work in some district for which he may receive wages. The department will render all possible assistance in locating students in districts of their choice.

Field work will reopen at the School of Mines and Metallurgy on Monday of Freshman Week for a period of three weeks. No senior will be registered after that date. A limited program will be carried in addition to field work after the regular university class work starts.

The final reports covering field work must be prepared at the School of Mines and Metallurgy under the direct supervision of the department concerned. This report must be typewritten and contain drawings, to scale, made from the field sketches, covering operations, and details of plant and equipment. These reports shall become the property of the school. Class work in the remaining subjects of the first quarter, senior year, will begin when the final field work reports are accepted.

JUNIOR GEOLOGY

The second field course in geology is required only of those students who are candidates for the engineer of mines (in geology) degree. The course begins early in May and is completed in June. The course requires altogether about six weeks' work, and the field chosen is the Black Hills region of South Dakota or some other western region. The expenses of the trip are estimated at $200. The student is trained in interpretation of field data; in detailed mapping, underground and on the surface; in the preparation of geologic cross sections through mines; and he may gather material which will serve as a basis for future study in advanced courses the following year. The work conforms to the standards of official surveys as nearly as practicable. In preparation for the trip a lecture of one hour per week will be scheduled for part of the third quarter preceding the trip. At the close of the field season the students are expected to obtain positions with mining companies either as miners or as engineers, or if openings are available, they may enter geological surveys for the season's work.

The completion of sophomore and junior field work is a requisite for graduation, and satisfactory evidence thereof must be submitted to the

department. Should a student, for sufficient reason, fail to complete this work in regular course, he may, with the consent of the department, be permitted to pursue his regular studies. In all such cases, however, the degree will be withheld until all field work is completed.

THESIS

The thesis work is intended to bring in review and connect the work in mining and metallurgy, geology and mineralogy, mechanical and electrical engineering, mathematics and mechanics.

It has been found that this purpose is most satisfactorily accomplished by assigning to each student a project, embracing the prospecting, development, and equipment of a group of mining claims, for candidates for the degree of engineer of mines; the investigation of a problem in mining geology, for candidates for the degree of engineer of mines (in geology); the investigation of an oil field problem, for candidates for the degree of engineer of mines (in petroleum); and the investigation of a metallurgical or metallographic problem, for candidates for the degree of metallurgical engineer.

As much latitude as possible will be allowed the student in the choice of his problem. He must select a suitable problem during the summer preceding the senior year. Outlines are furnished setting forth the lines of investigation necessary to obtain the required data. The junior field work affords opportunity therefor.

Prior to October 25 each student is required to submit to the department concerned an outline embodying the principal features of the problem. Unless this outline is submitted when due and is accepted by the department, registration for the first semester, senior year, may be cancelled.

All preliminary work must be done and final work on the project must be under way by December 1. On April 7 the text of the thesis must be completed and submitted for final approval. Completed work (typewritten and bound) together with all tracings and one set of clear blue prints therefrom must be in and accepted not later than April 27. Theses will not be accepted or examined after these dates. Unless the above conditions are complied with no student can expect to graduate with his class.

These theses shall become the property of the school.

GRADUATION

Students completing courses of study to the satisfaction of the faculty are entitled to receive the appropriate degrees. Any person may undergo, at suitable times, examination in any subject. If such person pass in all the studies and exercises of a course, he is entitled to the appropriate degree, provided that at least the full year be spent at the University before such degree shall be granted, and provided the examination in every case be held before a committee of the faculty appointed for that purpose.

Seniors must be in regular attendance at all classes until after the final examination for the third quarter. Irregular attendance will debar a student from entering all final examinations.

SPECIAL NOTES

Students failing to receive a quarter mark of 75 per cent in any subject shall have the privilege of a supplementary examination before the opening of the following year.

Each student must obtain from the registrar his average in all subjects and present himself for supplementary examinations, according to the program to be found in a booklet on examinations issued during the summer.

Failure of the registrar to notify a student of deficiencies will not be accepted as a reason for neglecting to report for necessary supplementary examinations. Students failing to report for supplementary examinations will be compelled to take work over in class as in case of failures.

Students having deficiencies in any subject will become members of the class in which such subject is a part of the program for the year and must register for all deficiencies. They may take in addition certain other subjects not more than one year in advance of their class. Students having deficiencies can be registered for mining, mining engineering, and metallurgical courses only by special vote of the faculty.

Students failing to receive a quarter mark of 65 per cent in any subject shall not be allowed to pursue any dependent subject except by permission of the faculty. A student may be permitted to take the dependent subject conditionally for six weeks, at the end of which time he must have a passing grade in the subject if he is to continue it for the remainder of the quarter.

The faculty may exclude students from attending classes in any subject upon recommendation of the department concerned.

All students must report in time to make suitable arrangements with departments concerned in case of conflicts in program.

Students failing to present themselves for final examination for any quarter will be given zero on the examinations, unless satisfactory excuse is presented.

Students whose absences in any quarter exceed 20 per cent of the scheduled class hours will not be permitted to take examinations without special permission of the faculty.

Sophomores and juniors who, at the end of the winter quarter, are deficient in 15 hours or more of any subject, or who, at the end of the spring quarter examination period for sophomores and juniors, are deficient in any subject of the preceding year will not be eligible to take the spring field trip unless declared eligible by a special vote of the faculty. Sophomores who are deficient in one or more quarters of surveying will not be eligible for the sophomore field trip unless recommended for the trip by the Department of Mining Engineering and declared eligible by the faculty.

During the academic year students will be held responsible for the receipt of official communications sent to them through the university post-office. During the summer vacation they will be held responsible for the receipt of such communications sent to the home address given on registration blank for the preceding academic year, unless formal notification of their correct address is filed with the registrar and the dean.

COURSES OF STUDY

UNIFORM CURRICULUM TO END OF SOPHOMORE YEAR

The courses leading to the degrees of engineer of mines, engineer of mines (in petroleum), engineer of mines (in geology), and metallurgical engineer are uniform for the first two years.

Freshmen will be divided into two sections as follows:

a. Those entering with credits in advanced algebra and solid geometry.

b. Those entering without credits in advanced algebra and solid geometry.

Subjects with the prefix a are to be taken by freshmen in section a; those with the prefix b are to be taken by freshmen in section b; and those without prefix are to be taken by students of both sections.

FRESHMAN YEAR

First Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Chemistry	14f*	General Inorganic	3†	6†	.....
Drawing	11f	Eng. Drawing	..	10	.....
Geology	1f	General Geology	3	2	.....
a. Mathematics	2f	Algebra	6	..	.....
b. Mathematics	1f	Alg. and Solid Geom.	6	..	.....
Military Science	1	Basic Course, R.O.T.C.	3	..	.....

Second Quarter

Chemistry	15w	General Inorganic	3	6	Chem. 14f
Drawing	12w	Eng. Drawing	..	4	Draw. 11f
Geology	23w	Elements of Mineralogy	3	4	Geol. 1f
Mathematics	4w	Trigonometry	6	..	Math. 1f or 2f
Metallurgy	1w	Assaying	4	..	Chem. 14f, Geol. 1f
Metallurgy	2w	Assaying Laboratory	..	8	Chem. 14f, Geol. 1f
Military Science	1	Basic Course, R.O.T.C.	3	..	.....

Third Quarter

Chemistry	16s	Qualitative Analysis	3	6	Chem. 15w
Drawing	13s	Eng. Drawing	..	8	Draw. 12w
Geology	24s	Elements of Mineralogy	3	4	Geol. 23w
Mathematics	5s	Analytical Geometry	6	..	Math. 4w
b. Mathematics	3s	Algebra	4	..	Math. 1f
Military Science	1	Basic Course, R.O.T.C.	3	..	.....

* The suffixes f, w, or s, after the course number indicate the quarter in which a course is offered—fall, winter, or spring quarter, respectively. Two or three suffixes indicate that a course is offered in each of the corresponding quarters.

† Figures following the descriptive name of a course indicate number of hours per week. Course names following indicate prerequisite courses.

SOPHOMORE YEAR

First Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Drawing	14f	Descriptive Geometry	3	..	Draw. 13s
Geology	105f	Rock Study	..	4	Geol. 24s
Mathematics	6f	Calculus	4	..	Math. 5s
Metallurgy	3f	General	3	..	Met. 1w, 2w, Chem. 16s
Mining Engineering	1f	Mine Surveying	3	..	Math. 4w
Physics	3f	Elements of Mechanics	3	..	Math. 5s
Physics	4f	Mechanics Laboratory	..	2	Math. 5s
or Mechanics	51f	Elementary Tech. Mech.	4	..	Math. 5s
Mil. Sci.	2a, 2b, or 2c	Basic Course, R.O.T.C.	3	..	.....

Second Quarter

Anal. Chemistry	9w	Quantitative Analysis	1	7	Chem. 16s
Drawing	15w	Drafting	..	4	Draw. 14f
Geology	2w	Historical	3	..	Geol. 1f
Geology	106w	Petrography	..	4	Geol. 105f
Mathematics	7w	Calculus	3	..	Math. 6f
Metallurgy	4w	Met. of Pig Iron	3	..	Met. 3f
Mining Engineering	2w	Mine Surveying	3	..	Min. Eng. 1f
Physics	23w	Heat	3	..	Phys. 3f
Physics	24w	Heat Laboratory	..	2	Phys. 4f
or Mechanics	52w	Elementary Tech. Mech.	4	..	Mech. 51f
Mil. Sci.	2a, 2b, or 2c	Basic Course, R.O.T.C.	3	..	.....

Third Quarter

Geology	84s	Field Methods	..	4	Geol. 2w, 105f
Mathematics	8s	Calculus	6	..	Math. 7w
Metallurgy	5s	Wrought Iron and Steel	3	..	Met. 4w
Mining	21s	Introductory Mining	4	..	.....
Mining Engineering	3s	Mine Surveying	3	4	Min. Eng. 2w
Physics	43s	Magnetism & Electricity	3	..	Phys. 3f
Physics	44s	Magnetism & Elec. Lab.	..	2	Phys. 4f
or Mechanics	53s	Elementary Tech. Mech.	4	..	Mech. 52w
Mining Engineering	4s	Field Work beginning about May 1	7 weeks		Soph. year
Geology	85s	Field Work beginning about June 20	2 weeks		Soph. year

JUNIOR AND SENIOR YEARS

Courses Leading to the Degree of Engineer of Mines

JUNIOR YEAR

First Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Exp. Eng., M.E.	36f	Elementary Lab.	..	4	With Mech. 112f
Geology	73f	Economic	3	..	Geol. 2w, 105f
Mechanics	109f	Mechanics	5	..	Math. 8s
Mechanics	112f	Mine Plant	6	..	Math. 8s
Metallurgy	106f	Base Metals	4	..	Met. 3f
Metallurgy	110f	Ore Dressing	3	..	Geol. 24s
Mining	131f	Exploration	5	..	Mining 21s

Second Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Exp. Eng., M.&M.	144w	Materials Testing Lab.	..	4	With Mech. 110w
Mechanics	110w	Mechanics of Materials	5	..	Mech. 109f
Mechanics	113w	Mine Plant	6	..	Mech. 112f
Metallurgy	107w	Base Metals	4	..	Met. 106f
Metallurgy	111w	Ore Dressing	3	..	Met. 110f
Mining	132w	Development	5	..	Min. 131f
Mining Eng.	105w	Mine Mapping	..	6	Min. Eng. 4s

Third Quarter

Mechanics	111s	Mechanics	5	..	Mech. 110w
Mechanics	114s	Mine Plant	6	..	Mech. 113w
Metallurgy	108s	Precious Metals	4	..	Met. 107w
Metallurgy	115s	Ore Dressing Lab.	..	6	Met. 111w
Mining	130s	First Aid	1 week		.....
Mining	140s	Mine Rescue	1 week		.....
Mining	134s	Mining Methods	5	..	Min. 132w
Mining Eng.	107s	Mine Mapping	..	6	Min. Eng. 105w
Metallurgy	116s	Field Work in Metallurgy beginning about May 1	10 days		Junior year
Mining	135s	Field Work in Mine Plant and Mining beginning about May 1	2 weeks		Junior year

SENIOR YEAR

First Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Electrical Eng.	41f	Electric Power	2	3	Phys. 43, or Mech. 53s
Geology	111f	Ore Deposits	3	..	Geol. 73f, 106w
Mechanics	117f	Water Power	5	2	Mech. 111s
Mechanics	118f	Eng. Construction	..	8	Mech. 111s
Metallurgy	119f	Ore Testing	2	..	Met. 108s
Metallurgy	120f	Ore Testing Lab.	..	8	Met. 108s
Mining	141f	Mine Examinations and Contracts	5	..	Min. 134s
Mining	146f	Thesis	..	2	Min. 134s

Second Quarter

Exp. Eng., M.E.	147w	Advanced Lab.	..	4	Exp. Eng. 36f
Geology	112w	Petroleum	3	..	Geol. 111f
Geology	115w	Applied Geology	3	..	Geol. 73f, 111f
Mechanics	119w	Mine Plant Design	..	9	Mech. 118f
Metallurgy	121w	Special Problems	..	4	Met. 119f
Mining	143w	Coal Mining anl Mining Law	5	..	Min. 141f
Mining	147w	Thesis	..	12	Min. 146f

Third Quarter

Geology	113s	Problems in Ore Dep's	..	4	Geol. 112w
Mechanics	120s	Mine Plant Design	..	12	Mech. 119w
Metallurgy	122s	Special Problems	..	8	Met. 121w
Mining	145s	Placers and Quarries	5	..	Min. 143w
Mining	148s	Thesis	..	12	Min. 147w

DEPARTMENT OF MINING

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

Courses Leading to the Degree of Engineer of Mines in Geology

JUNIOR YEAR

First Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Geology	61f	Blowpipe Analysis	2	4	Geol. 24s
	or 65f	or Crystallography	2	4	Geol. 24s
Geology	73f	Economic	3	..	Geol. 2w, 105f
Geology	131f	Advanced Petrology	3	3	Geol. 2w, 106w
Geology	151f	Advanced General	3	..	Geol. 73f
Mechanics	109f	Mechanics	5	..	Math. 8s
Mining	131f	Exploration	5	..	Min. 21s
Elective	....	.....	3	..	.....

Second Quarter

Geology	124w	Struct. & Metamorphic	3	..	Geol. 73f, 105f
Geology	132w	Advanced Petrology	3	3	Geol. 2w, 106w
Geology	144w	Geologic Maps	..	6	Geol. 73f
Geology	152w	Advanced General	3	..	Geol. 73f
Mechanics	110w	Mechanics of Materials	5	..	Mech. 109f
Mining	132w	Development	5	..	Min. 131f
Mining Eng.	105w	Mine Mapping	..	6	Min. Eng. 4s
Elective	....	.....	3	..	.....

Third Quarter

Geology	125s	Struct. & Metamorphic	6	..	Geol. 73f, 105f
Geology	133s	Advanced Petrology	3	3	Geol. 2w, 106w
Geology	145s	Geologic Maps	..	12	Geol. 73f
Geology	153s	Advanced General	3	..	Geol. 73f
Mechanics	111s	Mechanics	5	..	Mech. 110w
Mining	134s	Mining Methods	5	..	Min. 132w
Geology	150s	Field Work beginning about May 1	6 weeks		Geol. 125s

SENIOR YEAR

First Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Geology	91f	Paleontology	3	..	Geol. 2w
Geology	111f	Ore Deposits	3	..	Geol. 73f, 106w
Geology	137f	Testing Econ. Materials	1	4	Geol. 73f
Metallurgy	110f	Ore Dressing	3	..	Phys. 43s, Geol. 24s
Mining	141f	Mine Examinations and Contracts	5	..	Min. 134s
Thesis	....	.....	..	8	.....
Electives	....	.....	6	..	.....

Second Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Geology	92w	Paleontology	3	..	Geol. 2w
Geology	112w	Petroleum	3	..	Geol. 111f
Geology	140w	Applied Petrography	1	4	Geol. 111f, 133s
Geology	166w	Mineralography	..	6	Geol. 111f
Metallurgy	111w	Ore Dressing	3	..	Met. 110f
Mining	143w	Coal Mining and and Mining Law	5	..	Min. 141f
Thesis	....	.....	..	8	.....

Third Quarter

Geology	93s	Paleontology	3	..	Geol. 2w
Geology	113s	Prob. in Ore Deposits	..	4	Geol. 112w
Geology	141s	Applied Petrography	1	4	Geol. 111f, 133s
Geology	167s	Mineralography	..	6	Geol. 111f
Metallurgy	115s	Ore Dressing Lab.	..	6	Met. 111w
Thesis	....	.....	..	8	.....

DEPARTMENT OF GEOLOGY

The department is well supplied with working collections of minerals, crystal models, rocks, thin sections, ores and economic minerals, fossils, and other illustrative material used in connection with the courses in paleontology, stratigraphy, and historical geology. The department has large, well-lighted laboratories and classrooms located on the first, second, and basement floors of Pillsbury Hall.

Courses Leading to the Degree of Engineer of Mines in Petroleum

JUNIOR YEAR

First Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Exp. Eng.	36f	Elementary Laboratory	..	4	With Mech. 112f
Geology	73f	Economic	3	..	Geol. 2w, 105f
Geology	131f	Petrology of Sediments	3	3	Geol. 106w
Geology	151f	Advanced General	3	..	Geol. 73f
Mechanics	109f	Mechanics	5	..	Math. 8s
Mechanics	112f	Mine Plant	6	..	Math. 8s
Pet. Eng.	131f	Exploration	5	..	Min. 21s

Second Quarter

Geology	124w	Struct. & Metamorphic	3	..	Geol. 73f, 105f
Geology	144w	Geologic Maps	..	6	Geol. 73f
Geology	152w	Advanced General	3	..	Geol. 73f
Mechanics	110w	Mechanics of Materials	5	..	Mech. 109f
Mechanics	113w	Mine Plant	6	..	Mech. 112f
Min. Eng.	106w	Mine Mapping	..	3	M.E. 4s
Pet. Eng.	132w	Oil Field Development	5	..	Pet. Eng. 131f
Pet. Eng.	134w	Oil Field Equip.	2	..	Pet. Eng. 131f

Third Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Geology	125s	Struct. & Metamorphic	6	..	Geol. 124w
Geology	153s	Advanced General	3	..	Geol. 152w
Mechanics	111s	Mechanics	5	..	Mech. 110w
Mechanics	114s	Mine Plant	3	..	Mech. 113w
Pet. Eng.	138s	Oil Field Mapp.	..	12	Geol. 144w
Pet. Eng.	151s	Petroleum Refining	5	..	.....
Mining	130s	First Aid	1 week		.....
Mining	140s	Mine Rescue	1 week		.....
Pet. Eng.	135s	Field Work	3 weeks		Junior year

SENIOR YEAR

First Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Geology	91f	Paleontology	3	..	Geol. 2w
Geology	111f	Ore Deposits	3	..	Geol. 73f, 106w
Mechanics	117f	Hydraulics	5	2	Mech. 111s
Mechanics	118f	Engineering Const.	..	8	Mech. 111s
Pet. Eng.	141f	Administration	5	..	Pet. Eng. 132w
Pet. Eng.	144f	Thesis	..	6	Pet. Eng. 132w
Electives	....	.....	3	..	.....

Second Quarter

Chemistry	168w	Petroleum & Pet. Prod.	1	4	.....
Geology	92w	Paleontology	3	..	Geol. 2w
or Geology	102w	Micropaleontology	..	6	Geol. 91f or 111f
Geology	112w	Petroleum	3	..	Geol. 111f
Mechanics	119w	Engineering Const.	..	9	Mech. 118f
Pet. Eng.	142w	Administration	5	..	Pet. Eng. 141f
Pet. Eng.	145w	Thesis	..	6	Pet. Eng. 144f
Elective	....	.....	2	..	.....

Third Quarter

Geology	93s	Paleontology	3	..	Geol. 2w
or Geology	103s	Micropaleontology	..	6	Geol. 102w
Mechanics	121s	Plant Design	..	12	Mech. 119w
Pet. Eng.	137s	Pipe Lines	3	..	Mech. 117f
Pet. Eng.	143s	Production Technology	5	..	Pet. Eng. 142w
Pet. Eng.	146s	Thesis	..	12	Pet. Eng. 145w

DEPARTMENT OF PETROLEUM ENGINEERING

The department is well supplied with samples of the smaller oil field equipment, well logs, drill cores, models, maps, photographs, lantern slides, and samples of petroleum products. The lectures treat of location, prospecting, development, production, distribution, administration, leasing, mineral law, and allied subjects affecting oil and gas production. The courses in petroleum production extend through the junior and senior years.

Courses Leading to the Degree of Metallurgical Engineer

JUNIOR YEAR

First Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Mech. Eng.	76f	Survey of Shop Practice	3	..	.....
Mechanics	109f	Mechanics	5	..	Math. 8s
Mechanics	112f	Mine Plant	6	..	Math. 8s
Metallurgy	106f	Base Metals	4	..	Met. 3f
Metallurgy	110f	Ore Dressing	3	..	Geol. 24s
Metallurgy	112f	Ore Dressing Lab.	..	4	Geol. 24s
Metallography	153f	Metallography	3	4	.....

Second Quarter

Mechanics	110w	Mechanics of Materials	5	..	Mech. 109f
Mechanics	115w	Metallurgical Plant	3	..	Mech. 112f
Metallurgy	107w	Base Metals	4	..	Met. 106f
Metallurgy	111w	Ore Dressing	3	..	Met. 110f, 112f
Metallurgy	113w	Ore Dressing Lab.	..	4	Met. 110f, 112f
Metallurgy	123w	Electrometallurgy	5	..	Met. 5s
Metallography	154w	Metallography	3	4	Met. 153f
Mining Eng.	106w	Mine Mapping	..	3	Min. Eng. 4s

Third Quarter

Mechanics	111s	Mechanics	5	..	Mech. 110w
Mechanics	116s	Metallurgical Plant	3	..	Mech. 115w
Metallurgy	108s	Precious Metals	4	..	Met. 107w
Metallurgy	114s	Ore Dressing Lab.	..	6	Met. 111w, 113w
Metallography	155s	Metallography	3	4	Met. 154w
Mining	133s	Elementary Mining	5	..	Min. 21s
Mining Eng.	107s	Mine Mapping	..	3	Min. Eng. 4s
Mining	130s	First Aid	1 week		.....
Mining	140s	Mine Rescue	1 week		.....
Metallurgy	116s	Field Work in Metallurgy beginning about May 1	2 weeks		Junior year
Mining	139s	Field Work in Mine Plant and Mining beginning about May 1	10 days		Junior year

SENIOR YEAR

First Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Electrical Eng.	41f	Electric Power	2	3	Phys. 43s or Mech. 53s
Mechanics	117f	Water Power	5	2	Mech. 111s
Metallurgy	119f	Ore Testing	2	..	Met. 108s
Metallurgy	120f	Ore Testing Lab.	..	8	Met. 108s
Metallurgy	124f	Thesis	..	8	.....
*Electives	....	.....	9	..	.....

* It is recommended that electives be taken from the following courses: Chem. 101f, 102w, 103s, Phys. Chem.; Met. 130f, 131w, 132s, Special Problems; Met. 163f, 164w, 165s, Advanced Metallography; Mech. 118f, 119w, 121s, Engineering Construction.

Second Quarter

Dept.	No.	Title	Lect.	Lab.	Prereq.
Metallurgy	117w	Advanced Metallurgy	4	6	Met. 108s
Metallurgy	121w	Special Problems	..	4	Met. 119f
Metallurgy	125w	Thesis	..	18	Met. 124f
*Electives	....	.....	9	..	.....

Third Quarter

Metallurgy	118s	Advanced Metallurgy	4	6	Met. 117w
Metallurgy	122s	Special Problems	..	8	Met. 121w
Metallurgy	126s	Thesis	..	18	Met. 125w
*Electives	....	.....	6	..	.....

DEPARTMENT OF METALLURGY

This department is well supplied with representative ores of all the most important metals, models and drawings of furnaces, and samples of all the different furnace products. The lectures treat of all the principal methods now in use. The practical work consists in visits to smelting and refining works which are accessible. The work in metallurgy extends through four years.

ASSAYING

The lectures treat of, and describe, apparatus, reagents, assay furnaces, fuels, etc., in connection with this subject. The principles of assaying and sampling are fully explained. A collection of representative ores of various metals with a collection of corresponding slags is shown, and instruction is given as to nature and quality of fluxes. Special and rapid methods of testing slags and metallurgical products as employed in western smelting works are emphasized.

The laboratory course includes preparing and testing reagents, making cupels, etc., and assaying samples of ores, furnace and mill products, and bullion; different charges are tried and practical conclusions drawn.

Great importance is attached to the work of the laboratory. A large, well-ventilated furnace room in which are located muffle and crucible furnaces, and another room of similar dimensions equipped with desks, pulp and bead balances, afford accommodations to a large number of students. Ores of various metals of known value are given the students who are required to make up the necessary charges and submit their report in detail. This work is offered to students completing the necessary course in mineralogy and chemistry.

ORE DRESSING

The lectures and recitations in ore dressing extend through the junior year, and comprise a detail study of ore dressing and concentrating machinery, together with a study of typical combinations of dressing machines as found in the various mining districts of the United States. In connection with the theoretical work, the ore dressing laboratory and testing plant of

* It is recommended that electives be taken from the following courses: Chem. 101f, 102w, 103s, Phys. Chem.; Met. 130f, 131w, 132s, Special Problems; Met. 163f, 164w, 165s, Advanced Metallography; Mech. 118f, 119w, 121s, Engineering Construction.

the school are utilized for illustration, and practical use of ore dressing machinery.

ORE TESTING

The lectures treat of the problems in ore testing such as extraction and losses in roasting, concentration, and other milling operations. Both the ore dressing laboratory and the Mines and Metallurgy Experiment Station laboratory are available for working out practical problems. The Mines and Metallurgy Experiment Station laboratory is maintained to aid the mining interests of the state of Minnesota in solving problems connected with concentration and conservation of the iron and manganiferous ores in the state.

The School of Mines and Metallurgy laboratories therefore serve both educational and commercial needs.

Educational.—The student becomes familiar with the use of the various types of machines such as crushers, rolls, classifiers, concentration and flotation machinery.

Commercial.—The laboratories are used by the Mines and Metallurgy Experiment Station to determine the best methods of treatment to produce a commercial product at the lowest cost. Recently additional commercial machinery has been obtained and new appliances are constantly being developed. Commercial samples varying from 500 pounds to carload lots can be treated by various methods.

METALLOGRAPHY

Courses in metallography are offered to candidates for the degree of metallurgical engineer in the School of Mines and Metallurgy, to students in the Colleges of Dentistry, Engineering and Architecture, Science, Literature, and the Arts, in the School of Chemistry, and in the Graduate School.

These courses deal with the study of metals and alloys. The lectures treat of, and describe, the apparatus used in connection with this subject, the method of preparing specimens, physical and metallographic principles involved, and the interpretation of the results of microscopic examination and thermal analysis. There is an elaborate file of references and abstracts relating to the whole field of metallography, furnishing up-to-date information on the various phases of the work. A collection of specimens, photomicrographs, and lantern slides covering wrought iron, low carbon, structural, rail, and tool steels, brasses, bronzes, and other industrial alloys is available for study and comparison. The laboratory course includes the microscopic and pyrometric study of metals and alloys as related to their mechanical and physical properties. The laboratories are equipped with grinding and polishing apparatus, microscopes, photomicrographic apparatus, vacuum electric furnace, carbon resistance furnaces, nichrome and platinum resistance furnaces of various designs, gas furnaces, heat treating furnaces, pyrometers, and testing apparatus of the latest and improved type. This department has a special dark room for the preparation of photomicrographs.

DESCRIPTION OF COURSES

EXPLANATION OF COURSE NUMBERS

All undergraduate courses are numbered from 1 to 100. All courses open to undergraduates and graduates are numbered from 101 to 200. Strictly graduate courses are numbered from 201 up.

CHEMISTRY

9. Quantitative Analysis. A short 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. $2 laboratory fee.
14. General Inorganic Chemistry. A study of the general laws of chemistry and of the non-metals, the metals, and their compounds. $2 laboratory fee.
15. General Inorganic Chemistry. A continuation of Course 14. $2 laboratory fee.
16. Qualitative Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibrium, oxidation and reduction, etc. $2 laboratory fee.

101-102-103. Physical Chemistry. A general survey of the subject. $2 laboratory fee per quarter.

168. Petroleum and Petroleum Products. Examination and testing of petroleum products. $2 laboratory fee.

DRAWING

11. Engineering Drawing. Sketching, lettering, representation, elements of drafting, details of machines and structures, interpretation of working drawings.
12. Engineering Drawing. Continuation of Course 11. The elements of general drafting, mechanical drawing as a language. Lines, views, dimensions, standards, signs, abbreviations, and explanatory notes.
13. Engineering Drawing. Continuation of Course 12. The elements of general drafting. Maps and sketches. Brush and pen conventions.
14. Descriptive Geometry. Projection; central and special cases, principles and application, representation of lines, planes, and solids, and of their relations; tangencies, intersections, and developments. Recitations, lectures, and solution of problems.
15. Drafting. Graphics, machine drafting, and structural drafting. Instruction in drafting room methods.

ELECTRICAL ENGINEERING

41. Electric Power. Elementary principles of continuous currents. Continuous current generators and motors. Elementary principles of alternating currents. Alternating current generators, transformers,

and motors. Measurement of power. Elementary principles of transmission and distribution. Lectures, recitation, laboratory work.

EXPERIMENTAL ENGINEERING

MATHEMATICS AND MECHANICS

144. Materials Testing Laboratory. Investigation of physical properties of metals and engineering materials; wood, cement, ropes, etc., supplemented by lectures and materials of construction and methods of testing.

MECHANICAL ENGINEERING

36. Elementary General Laboratory. Calibration of gages, anemometers, and gas meters. Physical tests of lubricating oils. Calibration of transmission dynamometer. Properties of steam; separating and throttling calorimeters; indicator and planimeter practice; valve setting. Tests of simple steam engine and steam pump.
147. Advanced General Laboratory. Tests of steam engines, steam turbines, gas engines, air compressors, fans, and blowers. Steam boiler trial. Calibration of V-notch weir. Tests of centrifugal pump, Pelton wheel, and hydraulic reaction turbine.

GEOLOGY AND MINERALOGY

1. General Geology. A synoptical treatment of materials of the earth and of geological processes. Physiographic, dynamic, and structural geology.
2. Historical Geology. The sequence of events in geologic history, with special reference to North America.
23-24. Elements of Mineralogy. Morphological, physical, chemical characters of minerals; occurrence, genesis, and uses of minerals; classification and description of common minerals, rock minerals, and common rocks. Determinative work in the laboratory, blowpipe analysis, sight identification.
61. Blowpipe Analysis. The determination of minerals by systematic blowpipe analysis.
65. Crystallography. Study of crystal models and space groups. Crystal drawings and measurements. Projections and mathematical calculations.
73. Economic Geology. Study of non-metallic minerals of economic value, and discussions of geologic guides to prospecting for these deposits.
84. Field Methods. General methods of field work necessary for Course 85.
85. Field Work. About two weeks in June are spent in geologic mapping of selected areas in the iron district of Minnesota. Involves preparation of geologic maps and written reports.
91-92-93. Index Fossils of North America. A study of fossil forms with special reference to those of geologic importance; faunas and their correlation.

101. Sedimentation. Origin and structure of sedimentary deposits; the interpretation of these in relation to paleogeography. Lectures and assigned readings.

102-103. Micropaleontology. A study and classification of Foraminifera, diatoms, and other small fossil organisms, and their use for purposes of correlation.

105. Rock Study. The occurrence and genesis of igneous, sedimentary, and metamorphic rocks; their mineral and chemical composition; their structure, texture, and alteration. The classification and methods of identification and description of rocks.

106. Petrography. The identification and study of minerals and rocks by optical methods; the study of igneous rocks, crystalline schists, and metamorphic rocks. The origin and classification of rocks.

111. 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.

112. Geology of Petroleum. The nature, origin, and accumulation of petroleum; discussion of the various oil fields of the world.

113. Problems in Ore Deposits. Field excursions, map work, lectures on field and laboratory methods.

115. Applied Geology. The application of methods to laboratory, library, and field problems in geology.

124-125. Structural and Metamorphic Geology. A study of the principles and application of structural geology. The conditions, processes, and results of metamorphism.

127. 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.

131-132-133. Advanced Petrology. Advanced optical methods. Criteria for rapid identification of minerals and rocks. The uses of schedules and tables. Standard rock types. Regional and genetic studies. Petrographic reports.

137. Testing Economic Minerals. Methods of determining quality of mineral deposits, described and illustrated by laboratory tests of coal, clay, oil, building stone, and metallic ores.

140-141. Applied Petrography. Determination of ores and gangue minerals. Microscopic studies of paragenesis of ores and other mineral associations. Practical problems in mining and geology settled by microscopic and optical examinations.

144-145. Interpretation of Geological Maps. Study and problems in construction and interpretation of geologic maps; recognition of structural and stratigraphic relations. Geology 124 should precede or accompany this course.

150. Field Geology. Detailed, systematic work conforming with standards of official surveys. Preparation of geologic maps, structure sections, reports; paragenesis of ores and their relations to geologic structures. Field, Black Hills, South Dakota. Reports to be written week before college opens in fall.

151-152-153. Advanced General Geology. Geologic processes and their results; development of the North American continent.

166-167. Mineralography. Methods of studying opaque minerals and the application of the methods to problems in ore genesis and history.

246. Pre-Cambrian Geology. The problems of pre-Cambrian correlation and structure; the pre-Cambrian stratigraphy of North America. (Given in alternate years.)

GERMAN

24-25-26. Beginning for Miners. Pronunciation, grammar, conversation; selected reading in easy prose.

27. Narrative Prose for Chemists. Reading, grammar review.

28-29. Chemical German. Selections from more difficult works on chemistry.

MECHANICAL ENGINEERING

76. Survey of Shop Practice. Technique of pattern making, molding, forging, and machining.

METALLURGY

1. Assaying. The determination of values of ores, metallurgical products by the fire method. Lectures and recitations.

2. Assay Laboratory. Practical determination of gold, silver, lead, and tin by the fire method.

3. General Metallurgy. Combustion, fuels, refractory materials, furnaces and fluxes. Lectures and recitations.

4. Metallurgy of Pig Iron. General principles of iron blast furnace practice. Construction of furnace, handling of stock, and products; principles of regulation. Lectures and recitations.

5. Metallurgy of Wrought Iron and Steel. General principles involved in the production of wrought iron and steel. Lectures and recitations.

9. Introductory Metallurgy. General principles of furnace practice.

106. Metallurgy of Base Metals. Lead, copper, zinc, and mercury. Consideration of smelting methods and principles involved in refining. Lectures and recitations.

107. Metallurgy of Base Metals. Continuation of Course 106.

108. Metallurgy of the Precious Metals. Principles involved in methods used in the extraction of gold, silver, and other precious metals. Lectures and recitations.

109. Metallurgy of Base Metals. Short course for mechanical engineers. Special consideration is given to the mechanical appliances.

109. Metallurgy of Base Metals. Short course for electrical engineers. Special consideration is given to electrical appliances. Lectures and recitations.

110. Ore Dressing. Crushing, sizing, classification, and concentration of ores. Lectures and recitations.

111. Ore Dressing. Continuation of Course 110.

112. Ore Dressing Laboratory. Practical examination of ores and the use of ore dressing machinery.

113. Ore Dressing Laboratory. Practical problems in ore dressing.
114. Ore Dressing Laboratory. Continuation of Course 113.
115. Ore Dressing Laboratory. Short course in the laboratory use of ore dressing machinery.
116. Field Work in Metallurgy. Study of metallurgical operations at smelters and mills. Detail reports are required covering plants visited.
117. Advanced Metallurgy. Metallurgical calculations to determine heat balance and heat distribution. Lectures and laboratory work.
118. Advanced Metallurgy. Design of furnaces. Conferences and laboratory work.
119. Ore Testing. General principles involved in determining the best method of extraction, including amalgamation, concentration, cyanidation, roasting, etc. Lectures and recitations.
120. Ore Testing Laboratory. Practical determination of extraction and distribution of values in mill and metallurgical products. Methods of calculation.
121. Special Problems in Ore Testing. Continuation of Course 120. Practical determinations for regulating metallurgical operations.
122. Special Problems in Ore Testing. Continuation of Course 121.
123. Electrometallurgy. Application of electricity to production of heat for smelting ores and refining metals. Costs of fuel and electricity for heating, relative efficiencies of electric and fuel furnaces. Construction of high temperature furnaces and commercial plants.
124. Thesis in Metallurgy. Conferences to select suitable problem together with preliminary laboratory work on problem selected.
125. Thesis in Metallurgy. Continuation of Course 124.
126. Thesis in Metallurgy. Continuation of Course 125.
130-131-132. Special Problems in Metallurgy. Seminar work on metallurgical problems. Credits and hours to be arranged.
150. 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.
151. Advanced Metallography for Electrical Engineers. Continuation of 150. Study of iron and steel, alloy steels, metals and alloys used in electrical engineering practice. Special problems for outside reading and for research. Laboratory work.
152. Metallography for Senior Aeronautical Engineers. Principles of metallography; metallography of iron and steel with special reference to alloy steels, and light alloys used in airplane construction. Laboratory work and demonstrations.
153-154-155. Metallography. (Long course for metallurgical engineers.) Theory of metallic alloys. Metallographic technique. Properties of metals and alloys. Metallography of iron and steel and commercial alloys. Technical metallography. Laboratory work.

156. Metallography for Mechanical Engineers. Principles of metallography, including pyrometry, thermal analysis, constitution diagrams, microscopic and photomicrographic technique; metallography and heat treatment of iron and steel. Laboratory work.

157. Advanced Metallography for Mechanical Engineers. Continuation of 156. Metallography of alloy steels, tool steels, high speed tool steels, and important non-ferrous alloys; metallography applied to engineering practice and specifications. Outside reading and special reports. Laboratory work.

159. Dental Metallography. Study of the dental alloys from the standpoint of metallography. Lectures, recitations, and demonstrations, taking up the most important metals and alloys, with special reference to those used in dentistry.

160. Metallography for Chemical Students. Metallography, including constitution diagrams, preparation and standardization of thermocouples, preparation and thermal analysis of alloys, their microscopic examination and making photomicrographs; typical alloy systems such as iron-carbon (steel and cast iron); some non-ferrous alloys. Laboratory work.

161. Advanced Metallography for Chemical Students. Metallography and heat treatment of iron and steel, including alloy steels, commercial uses of various steels, and engineering specifications. Laboratory work.

162. 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. Laboratory work.

163. Advanced Metallography. Seminar work on recent advances in metallography. Lectures and recitations, with outside reading and special reports. May be accompanied by laboratory work.

164. Advanced Metallography. Advanced consideration of the structures, properties, and uses of metals and alloys. May be accompanied by laboratory work.

165. Advanced Metallography. Technical metallography as applied to the automotive industry. Lectures and special reports. May be accompanied by laboratory work.

166-167-168. Laboratory. Laboratory work on special problems in ferrous, non-ferrous, and X-ray metallography.

201-202-203. Advanced Metallography for Graduate Students. Intended primarily for research work.

204-205-206. Special Problems in Advanced Metallurgy. Intended primarily for research work. Credits and hours to be arranged.

210-211-212. Thesis courses for graduate students. Intended primarily for research work. Credits and hours to be arranged.

MILITARY SCIENCE AND TACTICS

1. First Year Basic Course, R.O.T.C.

2a, 2b. Second Year Basic Course, R.O.T.C., Infantry and Coast Artillery.

3a, 3b. First Year Advanced Course, R.O.T.C., Infantry and Coast Artillery.

4a, 4b. Second Year Advanced Course, R.O.T.C., Infantry and Coast Artillery.

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.

MINE PLANT AND MECHANICS

1. Algebra and Solid Geometry. Equations, involution and evolution, theory of exponents, surds, quadratic equations, theory of logarithms, determinants. Demonstrations of most important theorems of solid geometry. Volumes, approximate volumes, prismoidal formula, etc.
2. Algebra. Functions, functional notation, factor and remainder theorems, factors and values of functions, development of functions, progressions, series, theory of equations, permutations and combinations, theory of logarithms, determinants.
3. Algebra. Continuation of Course 1. Functions, functional notation, factor and remainder theorems, factors and values of functions, development of functions, progressions, series, theory of equations, permutations and combinations.
4. Trigonometry. Trigonometric ratios, right triangles, definitions of trigonometric functions, analytic relations, trigonometric equations, etc., solution of spherical triangles.
5. Analytical Geometry. Systems of co-ordinates, loci, equations, properties of straight lines, transformation of co-ordinates, equations and properties of conics, equations of second degree, higher plane curves, space co-ordinates, point, plane, quadric surfaces, etc., empirical equations, graphic algebra.

6-7-8. Calculus. Differentiation, elementary forms, geometric applications, rates, successive differentiation, maxima and minima, expansion of functions, intermediate forms, partial derivatives, change of variable, elementary integration, undetermined coefficients, rationalization, formulas of reduction, some differential equations of mechanics.

51, 52, 53. Elementary Technical Mechanics. Elementary principles of mechanics and their application to technical problems of mining.

109-111. Mechanics. Composition and resolution of forces, laws of equilibrium, practical applications, rectilinear motion, circular motion,

curvilinear motion in general, dynamics of rigid bodies, impact, work, and energy.

110. Mechanics of Materials. Mechanical and elastic properties of materials of construction; beams, columns, shafts, hollow cylinders and spheres, rollers, plates; theory of internal stress; reinforced concrete.

112-113-114. Mine Plant. Discussion of the machinery and appurtenances employed in the equipment of mines. Air compression, rock drills, mechanical features of hoisting, pumping, ventilation, underground transportation. Electricity applied to mining.

115-116. Metallurgical Plant. Power, air, and water supply for metallurgical plants.

117. Hydraulics and Water Power. Laws of the equilibrium, pressure, and flow of liquids, hydrographs and mass diagrams, estimate of power to be developed at a power site, design of dams and hydroelectric plants, theory of water wheels and turbines, speed control, power house equipment, transmission.

118. Engineering Construction. Theory of structures, loading, analytic and graphic resolution of stresses in framed structures, stresses in ore bins, headframes, etc.

119. Engineering Construction. Design of structures for mining and metallurgical plant.

120. Mine Plant Design. A study of power possibilities, costs, etc., and design of a power plant, surface equipment, and structures for a mine.

121. Plant Design. A study of power possibilities, costs, etc., and design of a power plant, and structures for a metallurgical or oil field plant.

MINING

21. Introductory Mining. Introductory mining course, preparatory to sophomore field trip.

130. First Aid. Course in first aid to the injured given by the staff of the United States Bureau of Mines.

140. Mine Rescue. Course in mine rescue given by the staff of the United States Bureau of Mines.

131. Exploration. Location of mineral lands, prospecting, exploration, boring, explosives, drilling blasting, and timber treating.

132. Tunneling. Tunneling, drifting, shaft sinking, raising, and mining methods.

133. Elementary Mining. Short course in mining for metallurgists.

134. Mining Methods. Underground mining methods and support of underground excavations.

135. Practical Mining. Study of mining operations. Mine plant and mining work in one or more mining camps.

139. Practical Mining. Study of mining operations, mine plant and mining work in one or more mining camps for metallurgists.

141. Mine Examination and Contracts. Mine examinations, sampling, and mining reports. Amortization. Contracts and specifications. Corporations, capitalization, stocks, and bonds.

143. Coal Mining and Mining Law. Coal mining methods. Mechanization and coal preparation. Mine gases. Accident prevention. State mining codes. Compensation laws. Mining law and court interpretations. Taxation.
145. Placer and Quarries. Placer, hydraulic mining and dredging. Quarries.
146. Thesis. Preparatory work on the mining thesis.
147. Thesis. Preparation of an original thesis on some mining project, covering the exploration and development of a mining property.
148. Thesis. Completion of thesis project.
151-152-153. Special Problems in Mining. Seminar work on mining problems. Credits and hours to be arranged.

MINING ENGINEERING

1-2-3. Mine Surveying. Theory and problems in mine surveying, including land subdivision, stadia measurements, triangulation, railroad curves and cross sections, computation of areas by co-ordinates; differential leveling, plane table surveying, topographic map reading, solar observations, shaft plumbing, underground traversing and leveling.
4. Field Work. Practice in general plane surveying during the month of May. Practice in underground surveying during the first three weeks of June. This work is given on the iron ranges of Minnesota.
105-106-107. Mine Mapping. Mine mapping in accordance with prevalent practice in mining districts. Ore and stripping estimates and mine maps based on Mesabi Range practice.

PETROLEUM ENGINEERING

131. Exploration. Location of oil lands, methods of drilling, explosives, blasting, timber treating.
132. Oil Field Development. Aerial surveys, geophysical prospecting, oil and gas production.
134. Oil Field Equipment. Mechanical features of drilling equipment, gas lift, pumping, natural gasoline extraction. Special devices for abnormal conditions.
135. Field Work. Study of equipment and operations in one or more oil fields.
137. Pipe Lines. Mechanical features of transmission lines for oil and gas. Flow formulas, soil corrosion and prevention.
138. Oil Field Mapping. Oil and gas well logs, peg models, records, contour and subsurface maps.
141. Administration. Reports, amortization, corporations, capitalization, stocks and bonds, leases, contracts and specifications.
142. Administration. Accident prevention, state codes, compensation laws, taxation, proration and unitization, production decline.
143. Production Technology. Special problems in oil and gas production.
144. Thesis. Preparation of an original thesis on the exploration and development of an oil property.

145. Thesis. Continuation of thesis project.
146. Thesis. Completion of thesis project.
151. Petroleum Refining. Distillation and purification processes used in the production of commercial products from crude petroleum.
155-156-157. Special Problems in Petroleum Engineering. Seminar work on petroleum problems. Credits and hours to be arranged.

PHYSICS

3. Elements of Mechanics and Sound. Mechanics of solids, fluids, wave motion, and sound. A study of the simpler fundamental principles. First part of the general course, 3, 23, 33, 43. Course 4 should be taken in conjunction with this course.
4. Elements of Mechanics and Sound Laboratory. Measurements in the mechanics of solids, fluids, wave motion, and sound; the laboratory part supplementing Course 3. One two-hour session in the laboratory a week. $2 laboratory fee.
23. Heat. A study of the principles underlying heat phenomena. Course 24 should be taken in conjunction with this course.
24. Heat Laboratory. The laboratory part supplementing Course 23. One two-hour session in the laboratory a week. $2 laboratory fee.
43. Magnetism and Electricity. A study of the principles underlying magnetic and electric phenomena. Course 44 should be taken in conjunction with this course.
44. Electrical Laboratory. The laboratory part supplementing Course 43. One two-hour session in the laboratory a week. $2 laboratory fee.

ROMANCE LANGUAGES

FRENCH

1-2. Beginning French.
3-4. Intermediate French.
21-22-23. General Survey of French Literature. Outline of French literature from 1600 to the present. Reading of representative texts.

SPANISH

1-2. Beginning Spanish.
3-4. Intermediate Spanish.
65-66-67. Spanish Literature. Outline of Spanish literature from 1500 to the present. Reading of representative texts.

Students should retain this bulletin for use throughout the year.

The Bulletin *of the* University *of* Minnesota

College of Engineering and Architecture
and
School of Chemistry
1934-1935

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UNIVERSITY CALENDAR

1934-35

Fall Quarter

1934			
September	20	Thursday	Payment of fees closes, except for new students*
September	24	Monday	Entrance tests
September	24-25		Registration for Freshman Week for all new students entering the freshman class
September	24-28		Examinations for removal of conditions Physical examinations
September	26-29		Freshman Week
September	27	Thursday	Senior qualifying examination for chemists and chemical engineers
September	28	Friday	Registration day† for the College of Engineering and Architecture and the School of Chemistry Payment of fees for new students closes* at 4:30 p.m.
October	1	Monday	Fall quarter classes begin 8:30 a.m.§
October	18	Thursday	Senate meeting, 4:30 p.m.
November	3	Saturday	Homecoming Day
November	7	Wednesday	Mid-quarter grades due
November	17	Saturday	Dad's Day
November	29	Thursday	Thanksgiving Day; a holiday
December	6	Thursday	State Day Convocation
December	20	Thursday	Commencement Convocation Senate meeting, 4:30 p.m.
December	17-22		Final examination period
December	22	Saturday	Fall quarter ends, 6:00 p.m.

Winter Quarter

December	27	Thursday	Payment of fees closes at 12 m. for all students in residence fall quarter*
1935			
January	4	Friday	Entrance tests
January	5	Saturday	Registration day† for all students in the College of Engineering and Architecture and the School of Chemistry Payment of fees for new students closes at 12 m.*
January	7	Monday	Winter quarter classes begin 8:30 a.m.§
February	12	Tuesday	Lincoln's Birthday; a holiday (except for Extension classes)

*†§ See footnotes on page 4.

February	13	Wednesday	Mid-quarter grades due
February	21	Thursday	Charter Day Convocation
			Senate meeting, 4:30 p.m.
February	22	Friday	Washington's Birthday; a holiday (except for Extension classes)
March	18-23		Final examination period
March	21	Thursday	Commencement Convocation
			Payment of fees closes for all students in residence winter quarter*
March	23	Saturday	Winter quarter ends, 6:00 p.m.

Spring Quarter

March	29	Friday	Entrance tests
March	30	Saturday	Registration day† for all students in the College of Engineering and Architecture and the School of Chemistry
			Payment of fees closes at 3:00 p.m.*
April	1	Monday	Spring quarter classes begin, 8:30 a.m.§
April	19	Friday	Good Friday; a holiday (except for Extension classes)
May	8	Wednesday	Mid-quarter grades due
May	11	Saturday	Mother's Day
May	16	Thursday	Cap and Gown Day Convocation
			Senate meeting, 4:30 p.m.
May	18	Saturday	Senior qualifying examination (general inorganic) for junior chemists and chemical engineers
May	30	Thursday	Memorial Day; a holiday
June	1	Saturday	Senior qualifying examination (quantitative) for junior chemists and chemical engineers
June	7, 8 & 10-14		Final examination period
June	16	Sunday	Baccalaureate service
June	17	Monday	Sixty-third annual commencement

Summer Quarter

June	17-18		Registration, first term
June	19	Wednesday	Summer quarter classes begin, 8:00 a.m.
July	4	Thursday	Independence Day; a holiday
July	25	Thursday	Commencement Convocation
July	27	Saturday	Registration and payment of fees for second term close at 12 m.
			First term closes
July	29	Monday	Second term classes begin, 8:00 a.m.
August	31	Saturday	Second term closes

*†§ See footnotes on page 4.

Entrance Examinations

Entrance examinations for admission to the College of Engineering and Architecture and School of Chemistry will be conducted for students whose credentials do not meet the requirements.

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

For further information concerning these examinations see "Admission by Examination," page 18.

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

† Registration subsequent to the date specified will necessitate the approval of the college concerned. See also penalty fees for late registrations, page 19. No student will be allowed to register in the University after one week from the beginning of the quarter excepting in unusual cases wherein special circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

§ First hour classes begin at 8:15 a.m. at University Farm.

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Harry E. Strider, Master Sergeant, Signal Corps, Instructor in Military Science and Tactics
Aubrey R. Dunkum, Technical Sergeant, Coast Artillery Corps, Instructor in Military Science and Tactics
Roy Cunningham, Staff Sergeant, Infantry, Instructor in Military Science and Tactics
John E. Seay, Staff Sergeant, Infantry, Instructor in Military Science and Tactics
Ernest R. Mylke, Staff Sergeant, Coast Artillery Corps, Instructor in Military Science and Tactics
Clayton A. Peterson, Sergeant, Infantry, Instructor in Military Science and Tactics
Arley V. Buckner, Sergeant, Infantry, Instructor in Military Science and Tactics

PHYSICAL EDUCATION

PHYSICAL EDUCATION FOR MEN

Frank McCormick, LL.B., Professor of Physical Education for Men and Director of Athletics
Bernard W. Bierman, B.A., Professor of Physical Education for Men and Head Football Coach
Louis J. Cooke, M.D., Professor of Physical Education and Athletics for Men
Louis F. Keller, M.A., Associate Professor of Physical Education for Men
Sherman W. Finger, Ph.B., Associate Professor of Physical Education for Men
David MacMillan, B.S., Assistant Professor of Physical Education for Men
Phil Brain, Instructor in Physical Education for Men
Lowell P. Dawson, B.A., Instruction in Physical Education for Men
Blaine McKusick, B.A., LL.B., Instructor in Physical Education for Men
Clarence R. Osell, B.S., Instructor in Physical Education for Men
Ralph A. Piper, B.Phys.Ed., Instructor in Physical Education for Men
Niels Thorpe, Instructor in Physical Education for Men
Clarence Munn, B.S., Assistant Coach

PHYSICAL EDUCATION FOR WOMEN

J. Anna Norris,* M.D., Professor of Physical Education for Women and Director of Physical Education for Women
Gertrude M. Baker, M.A., Associate Professor of Physical Education for Women
May S. Kissock, M.A., Assistant Professor of Physical Education for Women
Alice J. H. Tolg, M.D., Assistant Professor of Physical Education for Women
Florence Warnock, M.A., Assistant Professor of Physical Education for Women
Grace Christensen, B.S., Instructor in Physical Education for Women
Josephine Dickson, B.A., Instructor in Physical Education for Women
Mildred Lee, B.S., Instructor in Physical Education for Women
Florence I. Mahoney, M.S., Instructor in Physical Education for Women
Catherine Snell, B.S., Instructor in Physical Education for Women
Helen M. Starr, B.S., Instructor in Physical Education for Women

* On sabbatical leave, 1934-35.

GENERAL INFORMATION

COLLEGE OF ENGINEERING AND ARCHITECTURE

The College of Engineering and Architecture had its beginning in the College of Agriculture and the Mechanic Arts which was authorized by the legislative act of 1868. Courses in civil and mechanical engineering were first offered in 1871. In the reorganization of the University, in 1872, the College of the Mechanic Arts was established. It became the College of Engineering, Metallurgy, and the Mechanic Arts in 1892, and the College of Engineering and the Mechanic Arts in 1897. A course in Electrical Engineering was first offered in 1887. Architecture and Architectural Engineering were announced in 1912. In 1916 the college received its present name. In 1925, the name of the Department of Architecture was changed to the School of Architecture. The course in Interior Architecture was established in 1923 being called Interior Decoration until 1929. The Agricultural Engineering course was offered in 1925, and the courses in Aeronautical Engineering and Landscape Architecture in 1928. Combined courses with Business Administration were established in 1934.

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

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

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

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

SCHOOL OF CHEMISTRY

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

It occupies a large modern building, 180 by 200 feet, having six floors. Its laboratories are designed to afford facilities for instruction in the various branches of chemistry. The chemistry library is well provided with complete sets of journals and compendia of chemical literature, among which are important

sets not frequently found in university libraries. Many special laboratories for private research have been provided and facilities are available for graduate work leading to the higher degrees.

COURSES AND DEGREES

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

A four-year course in Interior Architecture is provided, of which the first two years are taken in the College of Science, Literature, and the Arts and the last two years in the College of Engineering and Architecture, leading to the degree of bachelor of interior architecture.

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

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

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

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

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

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

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

* The four-year courses in Architecture and Architectural Engineering will be discontinued after the present classes graduate, in 1935, to be replaced by the new five-year course in Architecture which went into effect in 1932.

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

Candidates for the Engineer degrees register in the Graduate School.

ADMISSION

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

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

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

Students who expect to enter the College of Engineering and Architecture or School of Chemistry are urged to include in their high school courses additional mathematics, beyond the three years required; Latin, two units; German or French, two units; chemistry, one unit; physics, one unit; ancient, modern, and American history; and American government or civics. French is desirable for students in architecture. German is important for students entering the School of Chemistry.

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

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

Group A English: 2 or 3 units.

Group B Foreign languages: Latin, Greek, German, French, Spanish, Scandinavian, 1 to 4 units each.

Group C History and social sciences: European history, ½ to 2 units; English and American history, ½ or 1 unit each; economics and sociology, ½ unit each; American government, commercial geography, and history of commerce, ½ or 1 unit each.

Group D Mathematics: elementary algebra and plane geometry, 1 unit each; unified mathematics, 2 units; higher algebra, ½ or 1 unit; solid geometry and trigonometry, ½ unit each.

Group E Natural sciences: biology, physics, and chemistry, 1 unit each; botany and zoology, ½ or 1 unit each; physiology, astronomy, and geology, ½ unit each.

Group F Vocational and miscellaneous subjects: The three units which are not required to be in Groups A, B, C, D, E, may be in work which the superintendent

certifies as being of acceptable nature and as having been counted toward the applicant's graduation.

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

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

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

Time of admission.—The regular time to enter the college is in September. However, students will be admitted at the beginning of the winter quarter in January, but they should have had high school chemistry. Admission at the opening of the spring quarter is permitted altho not recommended.

ADVANCED STANDING

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

Students who have taken college algebra or trigonometry in high school with satisfactory records may be permitted to take comprehensive examinations for credit in these subjects, if they apply before registration day at the office of the Department of Mathematics and Mechanics.

REGISTRATION

All undergraduate students are required, at the beginning of each quarter of residence, to pay the prescribed fees to the university bursar, to fill and file at the Main Engineering Building (Chemistry Building for students registering in School of Chemistry except freshmen) the necessary classification blanks showing the courses they expect to pursue during the quarter, and to enroll for their various classes.

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

Students should consult the university calendar in regard to registration dates and the *Handbook for Students in the College of Engineering and Architecture* or *Handbook for Students in the School of Chemistry* for regulations governing registration and scholastic work.

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

No change in registration will be permitted later than 7 days after the beginning of the quarter.

FEES AND EXPENSES

The annual fee for students in this college is $90 for residents and $120 for non-residents, one third of which is due at the beginning of each quarter. Fellows, scholars, assistants, and instructors are not required to pay university fees or tuition when they are regularly enrolled in the Graduate School.

Tuition fee (per quarter):	
Residents of Minnesota	$30.00
Non-residents	40.00
Matriculation deposit* (first quarter only)	
Men	15.00
Women	5.00
Incidental fee, per quarter	6.40
Special fees:	
Examination for removal of condition	1.00
Examination for credit (after the first six weeks in residence)	5.00
Special examination	5.00
Chemistry deposits, including laboratory fee of $2.00 per quarter	10.00
Graduation fee	7.50

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

A penalty fee of three dollars ($3) is charged for change of registration beginning the third day after classes begin. After this date the penalty will increase at the rate of one dollar ($1) per day to a maximum of ten dollars ($10).

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

Tuition and fees	$135.00
Laundry	40.00
Room rent	120.00
Meals	270.00
Books and instruments	35.00
Incidentals	200.00
Total	$800.00

For non-residents of Minnesota, $30 should be added for tuition.

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

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

THE UNIT OF CREDIT

The standard unit of credit in the University is the quarter credit, or simply, the *credit.* It corresponds to one class period per week for one quarter. This class period may be a one-hour lecture or recitation, or a two- or three-hour

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

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

CREDIT FOR OUTSIDE WORK

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

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

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

EXTENSION COURSES

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

Credit for certain required courses in the College of Engineering and Architecture or the School of Chemistry on the basis of work done in the Extension Division is obtainable on petition by passing a comprehensive examination in each course given by the department concerned. A fee of five dollars ($5) is charged for each examination except when taken within six weeks after admission. Definite information regarding extension work will be found in the bulletins of the General Extension Division.

ATTENDANCE

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

SENIOR QUALIFYING EXAMINATIONS IN CHEMISTRY

The Senior Qualifying Examinations, courses Inorganic Chemistry 51 (4 hours), and Analytical Chemistry 53 (3 hours), are required of all students registered in the School of Chemistry, but not of students in other colleges who may be taking chemistry courses. The following rules apply only to students registered in the School of Chemistry.

1. The requirement of the two Senior Qualifying Examinations must be satisfied before registration for any required courses of the student's senior year

or the summer courses in chemical manufacture (Ch.E. 151-152) or the senior courses in the minor groups in bacteriology, biochemistry, or geology.

2. They will be held regularly once each year in the latter part of the spring quarter on specified dates.* They need not be taken simultaneously, but each must be preceded by Analytical Chemistry 1 and 2, Quantitative Analysis, or registration in these.

3. Students who have taken their general inorganic and qualitative courses, or their quantitative courses in the School of Chemistry and with an average in either of these groups higher than "C," will be excused from the corresponding Senior Qualifying Examination.

4. A special examination requires a fee of $5 and the permission of the Students' Work Committee.

5. Students who transfer to the School of Chemistry from another college or another institution will be required to take and pass the Senior Qualifying Examinations in those subjects for which they have received advanced standing, before entering the courses specified in Rule 1.

CHEMICAL ENGINEERING INSPECTION TRIP

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

REQUIREMENTS FOR GRADUATION

To be recommended for the degree of bachelor of aeronautical, architectural, civil, electrical, or mechanical engineering, of architecture (4-year course), or of landscape architecture, the student must satisfactorily complete all of the courses prescribed in the corresponding curriculum together with sufficient electives to make a total of at least 204 credits. In the 5-year course in architecture, 225 credits are required for graduation. In agricultural engineering and chemistry, 210 credits are required for graduation. For the degree of bachelor of interior architecture, the requirements are 192 credits, including all required courses, plus 90 honor points from the first two years. For the degree of bachelor of chemical engineering, 218 credits are required. For the degree of bachelor of business administration in combination with engineering or chemistry, a student must complete the requirements for the Bachelor's degree in one of the engineering or chemistry curricula and include 74 prescribed credits in business subjects.

In cases of continued low scholarship, even tho all the courses of the curriculum have been passed, the faculty reserves the right to require additional work to be completed, over and above the regular curriculum, and with a specified grade, before the degree will be recommended.

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

* For the year 1934-35, these examinations will be held, also, on Thursday, September 27, 1934.

SCHOLARSHIPS AND PRIZES

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

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

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

The du Pont Fellowship in Chemistry.—This fellowship was founded by E. I. du Pont de Nemours and Company, Wilmington, Delaware, and yields $750 annually. The holder devotes his entire time to graduate work and is not required to render any service to the University. Applications for this fellowship should be submitted to the dean of the School of Chemistry before March 15. (Not available in 1934-35.)

The Albert Moorman Memorial Fellowship in Architecture.—This covers the traveling expenses of the recipient on a trip to study notable examples of architecture in this country. It is awarded for excellence in architectural design as determined by competition in the senior class. (Not offered in 1934-35.)

Assistants.—The School of Chemistry employs thirty-two assistants at the rate of $600 per annum half time. They are required to devote twelve hours per week to instruction and other assigned work. They thereby obtain valuable experience in laboratory teaching under competent direction. In addition to these duties, each assistant is expected to pursue graduate work toward a higher degree. Application should be made to the dean of the School of Chemistry.

Prizes.—Various prizes in the University are open to students in these colleges. A list of them is given in the General Information bulletin. Certain prizes are awarded to students in Engineering only, such as the prizes of the Northwestern Section of the American Society of Civil Engineers and the Twin Cities sections of the American Society of Mechanical Engineers. The Tau Beta Pi, Chi Epsilon, Eta Kappa Nu, and Pi Tau Sigma honorary engineering fraternities also offer prizes.

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

Twelve prizes and two medals are open to students registered in the School of Architecture. Medals are offered by the American Institute of Architects, Alpha Rho Chi, and the Scarab Fraternity. The prizes were established respectively by the Minnesota section of the American Institute of Architects, the faculty of the school, Magney and Tusler of Minneapolis, Mr. William A. French of Minneapolis, Alpha Alpha Gamma Sorority, the Gargoyle Club, and the Northern States Power Company.

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

RESERVE OFFICERS TRAINING CORPS

The War Department has established at this University units of infantry, coast (anti-aircraft) artillery, and signal corps, in which both basic and advanced courses are given. The artillery and signal corps units are made up almost entirely of students in engineering, architecture, chemistry, and mines, for whom this technical and military training is particularly valuable. The Basic Course is required for the first two years; the Advanced Course is open to selected students for the third and fourth years.

Students in this college may enroll in the advanced course of the infantry, signal corps, or artillery under the prescribed regulations, and receive for this work eighteen elective credits toward graduation. They receive an allowance of cash and clothing from the government during the two years of the course, pay and transportation to attend a special training camp in the summer, and if successful, a commission in the Officers' Reserve Corps of the U. S. Army after graduation. Special arrangements may be made in the student's program to enable him to take this course, the advantages of which are recognized.

Besides receiving technical instruction, the student in the Advanced Course has the opportunity to develop and exercise leadership and discipline which will be of value to him in his professional career. The students who qualify in the Basic Course and are selected for the Advanced Course possess many advantages over others who are less fortunate.

SELF-SUPPORT AND OUTSIDE ACTIVITIES

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

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

HANDBOOK FOR STUDENTS

Regulations and instructions for the guidance of students are issued at the time of registration in the form of a small pamphlet. Each student is expected to observe these instructions.

CHANGES IN BULLETIN

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

SOCIETIES

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

CURRICULA

COLLEGE OF ENGINEERING AND ARCHITECTURE

SCHOOL OF CHEMISTRY

FRESHMAN YEAR

The freshman year for the courses in Aeronautical, Agricultural, Civil, Electrical, and Mechanical Engineering, and Engineering Pre-Business is shown below. The freshman year for Architecture, is shown on page 32, for Landscape Architecture on page 52, and for Chemistry and Chemical Engineering on page 36.

Chemistry.—Students entering the College of Engineering and Architecture who have not had high school chemistry will take Inorganic Chemistry 14f-15w, five credits per quarter, instead of Inorganic Chemistry 4f-5w, four credits per quarter.

Military Science and Tactics.—Students who, for any reason, are not required to take military science and tactics for their freshman and sophomore years, must take physical education both years and without credit. This applies to women and foreign students, as well as others.

REGULAR FRESHMAN PROGRAM

(For Aeronautical, Agricultural,* Civil, Electrical, and Mechanical Engineering, and Pre-Business*)

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 11	College Algebra	5	5	..	..
Inorg. Chem. 4	General Inorganic Chemistry	4	1	3	3
Engl. 4	Rhetoric and Composition	3	3	..	..
Draw. 1	Engineering Drawing	3	..	..	8
M.E. 11, 12, or 13*	Shop Practice (for Agr.E. and Pre-bus.)	2	..	1	4
G.E. 11	Orientation	0	..	1	..
Mil. Sci. 1	First Year Basic Course	0	..	..	3
	Winter Quarter				
M.&M. 12	Trigonometry	5	5	..	..
Inorg. Chem. 5	General Inorganic Chemistry	4	1	3	3
Engl. 5	Rhetoric and Composition	3	3	..	..
Draw. 2	Engineering Drawing	3	..	..	8
M.E. 11, 12, or 13*	Shop Practice (for Agr.E. and Pre-bus.)	2	..	1	4
G.E. 12	Orientation	0	..	1	..
Mil. Sci. 2	First Year Basic Course	0	..	..	3

* Freshmen in Agricultural Engineering and Engineering Pre-Business are required to take Shop Practice, M.E. 11, 12, and 13, 2 credits per quarter; not required of the others.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	..	..
Inorg. Chem. 16	Qualitative Chemical Analysis	5	..	3	6
Engl. 6	Rhetoric and Composition	3	3	..	..
Draw. 3	Descriptive Geometry	3	..	..	8
M.E. 11, 12, or 13*	Shop Practice (for Agr.E. and Pre-bus.)	2	..	1	4
G.E. 13†	Orientation	0	..	1	..
Mil. Sci. 3	First Year Basic Course	0	..	..	3

AERONAUTICAL ENGINEERING

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

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 204 credits for graduation.

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

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

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

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

For freshman year, see page 25.

* Freshmen in Agricultural Engineering and Engineering Pre-Business are required to take Shop Practice, M.E. 11, 12, and 13, 2 credits per quarter; not required of the others.

†Not required of women students. Included in Phys.Ed. 7f,w,s for women.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	..	..
Phys. 3	Elements of Mechanics	3	1	3	..
Phys. 4	Elements of Mechanics Laboratory	1	..	..	2
Draw. 28‡	Drafting	2	..	..	6
Aero.E. 1	Aeronautics	3	3	..	..
M.E. 14	Pattern Practice	2	..	1	4
M.E. 70	Mechanical Technology	1	..	2	..
Mil. Sci. 4	Second Year Basic Course	0	..	..	3
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	..	..
Phys. 23	Heat	3	1	3	..
Phys. 24	Heat Laboratory	1	..	..	2
Phys. 33	Optics	3	1	3	..
Phys. 34	Optics Laboratory	1	..	..	2
Aero.E. 2	Aircraft and Auto Engines	3	2	..	2
M.E. 16	Forge Practice	2	..	1	4
Mil. Sci. 5	Second Year Basic Course	0	..	..	3
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	..	..
Phys. 43	Electricity	3	1	3	..
Phys. 44	Electricity Laboratory	1	..	..	2
Aero.E. 3	Aeronautics	3	3	..	..
C.E. 17	Surveying	3	..	1	7
Draw. 29	Drafting	2	..	..	6
Mil. Sci. 6	Second Year Basic Course	0	..	..	3

JUNIOR YEAR

	Fall Quarter				
M.&M. 129	Hydraulics	4	3	1	..
M.&M. 143	Hydraulic Laboratory	1	..	..	2
Aero.E. 100	Aerodynamics	3	3	..	..
M.E. 30	Steam Engineering	3	3	..	..
M.E. 33	Elementary Mechanical Laboratory	2	..	..	4
M.E. 71	Machine Shop Practice	3	..	1	7
	Electives*				
	Winter Quarter				
M.&M. 128	Strength of Materials	5	5	..	..
M.&M. 141	Materials Testing Laboratory	2	..	1	3
Aero.E. 101	Aerodynamics	3	3	..	..
M.E. 26	Mechanism and Kinematics	3	3	..	..
M.E. 31	Thermodynamics	3	2	1	2
	Electives*				
	Spring Quarter				
M.&M. 127	Technical Mechanics (Dynamics)	5	5	..	..
Aero.E. 83	Stresses in Simple Structures	3	3	..	..
Aero.E. 102	Aerodynamics	3	3	..	..
M.E. 27	Machine Design	3	..	1	6
M.E. 32	Thermodynamics	3	2	1	2
	Electives*				

* For list of elective courses in other colleges, see page 57.

‡ For permissible substitute, see page 57.

SENIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
E.E. 46	Electric Power	3	2	..	2
M.E. 150	Internal Combustion Engines	3	3	..	..
Met. 152	Metallography	3	..	2	3
Aero.E. 115	Airplane Stresses	3	2	..	2
Aero.E. 120	Airplane Design	2	1	..	3
Aero.E. 140	Aeronautical Laboratory	2	..	..	6
Aero.E. 190	Seminar	1	1	..	..
	Winter Quarter				
E.E. 47	Electric Power	3	2	..	2
M.E. 151	Advanced Internal Combustion Engines	3	3	..	..
M.E. 154	Design of Airplane Engines	2	..	..	6
Aero.E. 121	Airplane Design	4	2	..	6
Aero.E. 141	Aerodynamics Laboratory	2	..	..	6
Aero.E. 191	Seminar	1	1	..	..
	Electives*				
	Spring Quarter				
E.E. 48	Electric Power	3	2	..	2
M.E. 158	Aero Engine Testing	2	..	..	6
Aero.E. 122	Airplane Design	3	1	..	6
Aero.E. 160	Airships	3	2	..	3
Aero.E. 170	Air Transport	2	2	..	..
Aero.E. 192	Seminar	1	1	..	..
	Electives*				

AGRICULTURAL ENGINEERING

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

Requirements for graduation include all prescribed courses with sufficient approved electives to make a total of at least 210 credits. This is an average of 17½ credits per quarter for 12 quarters.

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

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

The field, as yet comparatively new and uncrowded, offers many opportunities among which the following are prominent: with manufacturers of farm machinery,

* For list of elective courses in other colleges, see page 57.

equipment, and building materials; as executives, research engineers, publicity and sales managers, and technical field experts; as managers of large farms requiring extensive machinery or equipment; as reclamation engineers with the local, state, and federal governments, and with development companies; as agricultural advisers with power companies in development of rural service; as agricultural engineering editors for farm papers and trade journals; as rural architects and builders; as teachers, investigators, and extension specialists in state agricultural colleges, experiment stations, and in the United States Department of Agriculture; as consulting agricultural engineers in general practice.

For freshman year, see page 25.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	..	..
Phys. 3	Elements of Mechanics	3	1	3	..
Phys. 4	Elements of Mechanics Laboratory	1	..	..	2
Ag.E. 19	Elementary Surveying	3	..	1	6
Ag.E. 43	Mechanical Laboratory	3	..	1	5
Ag.E. 91	Agendum	0	..	1	..
Hort. 6	Fruit Growing	3	..	2	4
Mil. Sci. 4	Second Year Basic Course	0	..	..	3
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	..	..
Phys. 43	Electricity	3	1	3	..
Phys. 44	Electricity Laboratory	1	..	..	2
Ag.E. 5	Farm Building Construction	3	..	1	4
Ag.E. 92	Agendum	0	..	1	..
Soils 6	Soils	5	5	..	..
Mil. Sci. 5	Second Year Basic Course	0	..	..	3
	Spring Quarter				
M.&M. 84‡	Technical Mechanics	5	5	..	..
Ag.E. 7	Farm Structures	3	1	1	3
Ag.E. 12	Field Machinery	3	..	2	3
Ag.E. 13	Gas Engines	3	..	..	6
Ag.E. 20	Advanced Surveying	3	..	1	6
Ag.E. 93	Agendum	0	..	1	..
Mil. Sci. 6	Second Year Basic Course	0	..	..	3

JUNIOR YEAR

	Fall Quarter				
M.&M. 128	Strength of Materials	5	5	..	..
Phys. 23	Heat	3	1	3	..
Phys. 24	Heat Laboratory	1	..	..	2
Econ. 8	General Economics	3	3	..	..
Ag.E. 14	Tractors	3	..	2	4
Ag.E. 71	Power Machinery	3	..	2	3
Ag.E. 94	Agendum	0	..	1	..

‡ For permissible substitute, see page 57.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
M.&M. 86‡	Hydraulics	2	2	..	..
M.&M. 143	Hydraulic Laboratory	1	..	..	2
Econ. 9	General Economics	3	3	..	..
Ag.E. 31	Principles of Drainage	3	1	2	..
Ag.E. 37	Rural Sanitation	3	..	3	..
Ag.E. 72	Applied Electricity	3	..	1	6
or					
Soils 108	Physical Properties of Soils	3	..	1	6
M.E. 26	Mechanism and Kinematics	3	3	..	..
Ag.E. 95	Agendum	0	..	1	..
	Spring Quarter				
Agron. 1	General Farm Crops	3	3	..	..
or					
A.H. 15	Fundamentals of Livestock Production	3	3	..	..
C.E. 37	Structural Engineering	3	..	1	7
D.H. 7	Elements of Dairying	3	..	3	..
M.E. 27	Machine Design	3	..	1	6
Econ. 28	Business Law	3	3	..	..
Ag.E. 42	Principles of Irrigation	3	1	2	..
Ag.E. 96	Agendum	0	..	1	..
	SENIOR YEAR				
	Fall Quarter				
C.E. 51	Highways and Pavements	3	..	2	3
C.E. 146	Plain Concrete	3	..	2	4
Geol. 5	Engineering Geology	3	..	3	..
Ag.E. 67	Farm Structures Design	3	..	1	6
Ag.E. 70	Steam Boilers and Engines	3	..	3	..
Ag.E. 97	Agendum	0	..	1	..
	Electives to complete program.				
	Winter Quarter				
Soils 108	Physical Properties of Soils	3	..	1	6
or					
Ag.E. 72	Applied Electricity	3	..	1	6
Ag.Econ. 102	Farm Management: Organization	3	..	3	..
G.E. 101	Contracts and Specifications	3	..	3	..
Rhet. 22	Public Speaking	3	3	..	..
Ag.E. 98	Agendum	0	..	1	..
	Electives to complete program.				
	Spring Quarter				
Ag.Econ. 103	Farm Management: Operation	3	..	3	..
Ag.E. 150	Seminar	2	2	..	..
Agron. 1	General Farm Crops	3	3	..	..
or					
A.H. 15	Fundamentals of Livestock Production	3	3	..	..
G.E. 193	Engineering Practice	2	..	2	..
Ag.E. 99	Agendum	0	..	1	..
	Electives to complete program.				

‡ For permissible substitute, see page 57.

RECOMMENDED ELECTIVES

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

Farm Structures

Ag.E.111f,112w,113s	Farm Building Problems, per quarter	3–6
For. 27w	Farm Woodlots and Windbreaks	3
Hort. 74w	Principles of Landscape Design	3

Farm Mechanics

Ag.E. 15f	Ignition and Carburetion	3
Ag.E. 28w	Land Clearing	3
Ag.E. 101f	Drainage Engineering and Works	3
Ag.E. 121f,122w,123s	Farm Power and Machinery Problems, per quarter	3–6
Ag.E. 126s	Selection of Farm Equipment	3
E.E. 43f,44w,45s	Electric Power, per quarter	3
M.E. 24s	Machine Design	3

Reclamation

Ag.E. 28w	Land Clearing	3
Ag.E. 68f	Drainage Engineering and Works	3
Ag.E.101f,102w,103s	Advanced Drainage Problems, per quarter	3–6
Ag.E. 69s	Irrigation Engineering and Works	3
C.E. 161f	Hydrology	3
Hort. 74w	Principles of Landscape Design	3
M.&M. 130f	Open Channel Flow	3
M.&M. 193w	Hydraulic Measurements	3

ARCHITECTURE

(The following statement applies to students entering in the fall of 1932 and thereafter. Students who entered before that time will follow the curricula in Architecture and Architectural Engineering for the senior year as shown on pages 34 to 35.)

Five-year course leading to the degree of bachelor of architecture, B.Arch. In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 225 credits.

The curriculum leading to the degree of bachelor of architecture is intended for students who expect to enter the professional practice of architecture in any of its recognized phases. It provides a basis of both general and technical training, which, when supplemented by practical experience in architects' offices, places the student in line for recognition as a practicing architect according to the registration laws of the various states.

The total requirements for the degree include certain minima in design, construction, engineering, history, and drawing which are necessary to an all-round understanding of architecture, and which are required of all students. They also include certain flexible electives through which each student may supplement his basic work by more concentrated effort along the lines of his special interests, whether in design or construction (including what is understood as "architectural engineering") in his later years. Completion of the requirements for the degree is arranged on a five-year basis for the normal student. Students who are especially qualified by ability, experience, or advanced standing through transfer from other institutions may shorten this time.

Students who wish further to broaden their training may arrange a combined program of studies leading to the degree of bachelor of arts, with a major in Architecture, in the College of Science, Literature, and the Arts and the degree of bachelor of architecture in the College of Engineering and Architecture.

FRESHMAN YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 11	College Algebra	5	5	..	..
Engl. 4	Rhetoric and Composition	3	3	..	..
Arch. 11	Introduction to Architecture	1	..	1	..
Arch. 21	Freehand Drawing	2	..	..	6
G.E. 11	Orientation	0	..	1	..
Mil. Sci. 1†	First Year Basic Course	0	..	..	3
	Also one of the following courses:				
Inorg.Chem. 1	General Inorganic Chemistry, or	4	..	3	4
Hist. 1	Modern World, or	5	2	3	..
French 1	Beginning French	5	5	..	..
	Winter Quarter				
M.&M. 12	Trigonometry	5	5	..	..
Engl. 5	Rhetoric and Composition	3	3	..	..
Arch. 12	Introduction to Architecture	1	..	1	..
Arch. 22	Freehand Drawing	2	..	..	6
G.E. 12	Orientation	0	..	1	..
Mil. Sci. 2†	First Year Basic Course	0	..	..	3
	Also continuation of:				
Inorg.Chem. 2	General Inorganic Chemistry, or	4	..	3	4
Hist. 2	Modern World, or	5	2	3	..
French 2	Continuation French	5	5	..	..
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	..	..
Engl. 6	Rhetoric and Composition	3	3	..	..
Arch. 13	Introduction to Architecture	1	..	1	..
Arch. 23	Freehand Drawing	2	..	..	6
G.E. 13	Orientation	0	..	1	..
Mil. Sci. 3†	First Year Basic Course	0	..	..	3
	Also continuation of:				
Inorg.Chem. 3	General Inorganic Chemistry, or	4	..	3	4
Hist. 3	Modern Europe, or	5	2	3	..
French 3	Continuation French	5	5	..	..

SOPHOMORE YEAR

	Fall Quarter				
M.&M. 91	Calculus for Architects	4	4	..	..
Arch. 24	Freehand Drawing	2	..	..	6
Arch. 31	Architectural Design I	3	..	1	6
Arch. 61	Projections	2	..	1	3
Phys. 3‡	Elements of Mechanics	3	1	3	..
Mil. Sci. 4†	Second Year Basic Course	0	..	..	3
	Electives*				

* See pages 34 and 57.

† Women take Phys.Ed. for Women, Phys.Ed. 1, 2, 3 and 7 in place of Mil.Sci. 1, 2, 3 and G.E. 13; and Phys.Ed. 4, 5, 6 in place of Mil.Sci. 4, 5, 6.

‡ Students who present one unit of high school physics may omit physics.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
M.&M. 92	Mechanics for Architects	4	4	..	..
Arch. 25	Freehand Drawing	2	..	..	6
Arch. 32	Architectural Design I	3	..	1	6
Arch. 62	Shades and Shadows	2	..	1	3
Phys. 23‡	Heat	3	1	3	..
Mil. Sci. 5†	Second Year Basic Course	0	..	..	3
	Electives*				
	Spring Quarter				
M.&M. 93	Strength of Materials for Architects	4	4	..	..
Arch. 26	Freehand Drawing	2	..	..	6
Arch. 33	Architectural Design I	3	..	1	6
Arch. 63	Perspective	2	..	1	3
Phys. 43‡	Electricity	3	1	3	..
Mil. Sci. 6†	Second Year Basic Course	0	..	..	3
	Electives*				
	JUNIOR YEAR				
	Fall Quarter				
Arch. 14	Architectural History	2	..	2	..
Arch. 34	Architectural Design II	4	..	..	12
Arch. 41	Building Construction	3	1	3	..
C.E. 38	Stresses in Structures	3	..	3	..
	Electives*				
	Winter Quarter				
Arch. 15	Architectural History	2	..	2	..
Arch. 35	Architectural Design II	4	..	..	12
Arch. 42	Building Construction	3	1	3	..
C.E. 39	Structural Design	3	..	3	..
	Electives*				
	Spring Quarter				
Arch. 16	Architectural History	2	..	2	..
Arch. 36	Architectural Design II	4	..	..	12
Arch. 43	Building Construction	3	1	3	..
C.E. 41	Reinforced Concrete	3	..	3	..
	Electives*				
	FOURTH YEAR				
	Fall Quarter				
Arch. 17	Architectural History	2	..	2	..
Arch. 37	Architectural Design III	6	..	..	18
Arch. 141	Building Construction	2	..	2	..
E.E. 40	Electrical Wiring and Equipment	2	..	2	..
	Electives*				
	Winter Quarter				
Arch. 18	Architectural History	2	..	2	..
Arch. 38	Architectural Design III	6	..	..	18
Arch. 142	Building Construction	2	..	2	..
C.E. 171	Building Sanitation	2	..	2	..
	Electives*				

* See pages 34 and 57.

† Women take Phys.Ed. for Women, Phys.Ed. 1, 2, 3, and 7 in place of Mil.Sci. 1, 2, 3 and G.E. 13; and Phys.Ed. 4, 5, 6 in place of Mil.Sci. 4, 5, 6.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
Arch. 19	Architectural History	2	..	2	..
Arch. 39	Architectural Design III	6	..	..	18
Arch. 143	Building Construction	2	..	2	..
M.E. 164	Heating and Ventilation	2	..	2	..
	Electives*				
	SENIOR YEAR				
	Fall Quarter				
Arch. 131	Architectural Design IV	8	..	..	24
or					
Arch. 144	Construction Design	6	..	..	18
	Electives*				
	Winter Quarter				
Arch. 132	Architectural Design IV	8	..	..	24
or					
Arch. 145	Construction Design	6	..	..	18
	Electives*				
	Spring Quarter				
Arch. 133	Architectural Design IV	8	..	..	24
or					
Arch. 146	Construction Design	6	..	..	18
Arch. 140	Thesis	8	..	..	..
Arch. 153	Business Relations	2	..	2	..

ARCHITECTURAL ELECTIVES

Course No.	Title	Credits
Arch. 27f,w,s-28f,w,s-29f,w,s	Freehand Drawing, per quarter	2
Arch. 84f,w,s-85f,w,s-86f,w,s	Modeling, per quarter	2
Arch. 121f,w,s-122f,w,s-123f,w,s	Advanced Art, per quarter	2
Arch. 134f,w,s-135f,w,s-136f,w,s	Interior Design, per quarter	7
Arch. 151f	Architectural Seminar	1
Arch. 152w	Estimating	1
Arch. 154w	Acoustics of Buildings	2
Arch. 161w	Decoration and Applied Arts	2
Arch. 162w	Landscape Design	2
Arch. 163s	Theory of Form and Color	2
Arch. 165f	Housing	3

For those who desire to specialize in Building Construction, various elective courses in the fields of civil, electrical, and mechanical engineering are available. These students should elect both chemistry and physics.

For a general list of elective courses in other colleges, see page 57 of this bulletin. Others will be found in the bulletin of the College of Science, Literature, and the Arts.

The choice and distribution of elective subjects should be arranged in advance by consultation with the faculty.

FOUR-YEAR COURSE

Four-year course leading to the degree of bachelor of architecture, B.Arch., for students who entered prior to 1932. (Replaced by the 5-year course beginning in the fall of 1932.)

In addition to the prescribed courses, sufficient electives must be taken to com-

* See pages 34 and 57.

plete a total of at least 204 credits. Also, 1,008 design points must be earned (see note, page 63).

Course No.	Title	Credits	Rec.	Lect.	Lab.
	SENIOR YEAR				
	Fall Quarter				
Arch. 131	Architectural Design, Grade III	10	..	..	30
Arch. 141	Building Construction	2	..	2	..
E.E. 40	Electric Wiring and Equipment	2	..	2	..
	Winter Quarter				
Arch. 132	Architectural Design, Grade III	10	..	..	30
Arch. 142	Building Construction	2	..	2	..
Arch. 152	Estimating	1	..	1	..
Arch. 161	Decoration and Applied Arts	2	..	2	..
C.E. 171	Building Sanitation	2	..	2	..
	Spring Quarter				
Arch. 133	Architectural Design, Grade III	9	..	..	27
Arch. 143	Building Construction	2	..	2	..
Arch. 153	Business Relations	2	..	2	..
M.E. 164	Heating and Ventilation	2	..	2	..

ARCHITECTURAL ENGINEERING

Four-year course leading to the degree of bachelor of architectural engineering, B.Arch.E., for students who entered prior to 1932. (To be discontinued when present students graduate, in 1935.)

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 204 credits for graduation.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	SENIOR YEAR				
	Fall Quarter				
Arch. 141	Building Construction	2	..	2	..
C.E. 141a	Reinforced Concrete	3	1	..	2
E.E. 40	Electric Wiring and Equipment	2	..	2	..
M.E. 163	Heating and Ventilation	4	2	1	4
	Electives*				
	Winter Quarter				
Arch. 142	Building Construction	2	..	2	..
Arch. 152	Estimating	1	..	1	..
C.E. 142a	Reinforced Concrete	3	1	..	2
C.E. 171	Building Sanitation	2	..	2	..
E.E. 49	Electric Motors	2	2	..	..
	Electives*				
	Spring Quarter				
Arch. 143	Building Construction	2	..	2	..
Arch. 153	Business Relations	2	..	2	..
C.E. 17	Surveying	3	..	..	8
C.E. 135	Reinforced Concrete Design	4	..	2	6
M.E. 42	Heat Engines	4	3	..	4
	Electives*				

* Program is arranged to accommodate Econ. 8f-9w, 28s; Engl. 7w; Geol. 5f.

CHEMISTRY AND CHEMICAL ENGINEERING

FRESHMAN AND SOPHOMORE YEARS

The freshman year and the first two quarters of the sophomore year are the same in Chemistry as in Chemical Engineering, so that the student may change from one course to the other prior to the spring quarter.

REGULAR FRESHMAN YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 11	College Algebra	5	5	..	..
Inorg.Chem. 9	General Inorganic Chemistry	5	1	3	5
Engl. 4	Rhetoric and Composition	3	3	..	..
Draw. 4‡	Drawing and Descriptive Geometry	2	..	..	6
M.E. 12, 13, or 17‡	Shop	2	..	1	4
Mil. Sci. 1†	First Year Basic Course	0	..	..	3
	Winter Quarter				
M.&M. 12	Trigonometry	5	5	..	..
Inorg.Chem. 10	General Inorganic Chemistry	5	1	3	5
Engl. 5	Rhetoric and Composition	3	3	..	..
Draw. 5‡	Drawing and Descriptive Geometry	2	..	..	6
M.E. 12, 13, or 17‡	Shop	2	..	1	4
Mil. Sci. 2†	First Year Basic Course	0	..	..	3
	Spring Quarter				
M.&M. 13	Analytic Geometry	5	5	..	..
Inorg.Chem. 12	Qualitative Analysis	5	2	1	6
Engl. 6	Rhetoric and Composition	3	3	..	..
Draw. 6‡	Drawing and Descriptive Geometry	2	..	..	6
M.E. 12, 13, or 17‡	Shop	2	..	1	4
G.E. 13†	Orientation	0	..	1	..
Mil. Sci. 3†	First Year Basic Course	0	..	..	3

REGULAR SOPHOMORE YEAR

	Fall Quarter				
M.&.M. 24	Differential Calculus	5	5	..	..
Inorg.Chem. 13	Qualitative Analysis	5	2	..	9
Phys. 3	Elements of Mechanics	3	1	3	..
Phys. 4	Elements of Mechanics Laboratory	1	..	..	2
German 24	Chemical German	4	4	..	..
Mil. Sci. 4†	Second Year Basic Course	0	..	..	3
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	..	..
Anal.Chem. 1	Quantitative Analysis	5	1	1	10
Phys. 23	Heat	3	1	3	..
Phys. 24	Heat Laboratory	1	..	..	2
German 25	Chemical German	4	4	..	..
Mil. Sci. 5†	Second Year Basic Course	0	..	..	3

† Women take Phys.Ed. for Women, Phys.Ed. 1, 2, 3, and 7 in place of Mil. Sci. 1, 2, 3 and G.E. 13; and Phys.Ed. 4, 5, 6 in place of Mil.Sci. 4, 5, 6.

‡ For permissible substitutes, see page 57.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter (Chemistry)				
M.&M. 84‡	Technical Mechanics	5	5	..	..
Anal.Chem. 2	Quantitative Analysis	5	1	1	10
Phys. 43	Electricity	3	1	3	..
Phys. 44	Electricity Laboratory	1	..	..	2
German 26	Chemical German	4	4	..	..
Mil. Sci. 6†	Second Year Basic Course	0	..	..	3
	Spring Quarter (Chemical Engineering)				
M.&M. 84‡	Technical Mechanics	5	5	..	..
Anal.Chem. 2	Quantitative Analysis	5	1	1	10
Chem.E. 80	Technical Engineering Materials	1	..	2	..
Phys. 43	Electricity	3	1	3	..
Phys. 44	Electricity Laboratory	1	..	..	2
German 26	Chemical German	4	4	..	..
Mil. Sci. 6†	Second Year Basic Course	0	..	..	3

CHEMISTRY

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

In addition to the prescribed courses, sufficient approved electives must be taken to complete a total of at least 210 credits.

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

For freshman year see page 36.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Org.Chem. 51	Organic Chemistry	5	0	5	6
Phys.Chem. 101	Physical Chemistry	5	1	3	6
Phys. 33	Optics	3	1	3	..
Phys. 34	Optics Laboratory	1	..	..	2
	Electives*				
	Winter Quarter				
Org.Chem. 52	Organic Chemistry	5	0	5	6
Phys.Chem. 102	Physical Chemistry	5	1	3	6
Ch.E. 131	Industrial Inorganic Chemistry	4	1	4	..
	Electives*				
	Spring Quarter				
Org.Chem. 153	Organic Chemistry	5	0	5	6
Phys.Chem. 103	Physical Chemistry	5	1	3	6
Ch.E. 132	Industrial Organic Chemistry	4	1	4	..
Inorg.Chem. 51	Senior Qualifying Exam. (Inorg. and Qual.)	0	..	..	..
Anal.Chem. 53	Senior Qualifying Exam. (Quant.)	0	..	..	..
	Electives*				

* For list of suggested electives in other colleges see page 57.

† Women take Phys.Ed. for Women, Phys.Ed. 1, 2, 3, and 7 in place of Mil. Sci. 1, 2, 3 and G.E. 13; and Phys.Ed. 4, 5, 6 in place of Mil. Sci. 4, 5, 6.

‡ For permissible substitutes, see page 57.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	SENIOR YEAR (See note below)				
	Fall Quarter				
Inorg.Chem. 103	Advanced Inorganic Chemistry	3	..	3	..
Anal.Chem. 131	Applications of Indicators	3	..	2	5
Phys.Chem. 161	Radioactivity	2	..	2	..
	Electives*				
	Winter Quarter				
Inorg.Chem. 104	Advanced Inorganic Chemistry	3	..	3	..
Anal.Chem. 132†	Electrometric Measurements and Titrations	3	..	2	5
Phys.Chem. 162	Radioactivity	2	..	2	..
	Electives*				
	Spring Quarter				
Inorg.Chem. 105	Advanced Inorganic Chemistry	3	..	3	..
Ch.E. 110†	Special Analytical Apparatus	3	..	1	6
	Electives*				

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

LIST OF ADVISERS FOR SENIORS

Inorganic Chemistry: Professors Sneed, Cohen, Barber, Heisig, Pervier, Stephens.
Analytical Chemistry: Professors Kolthoff, Geiger, Sarver.
Organic Chemistry: Professors Smith, Koelsch, Lauer.
Physical Chemistry: Professors Lind, MacDougall, Reyerson, Glockler, Livingston.
Chemical Engineering: Professors Mann, Montillon, Montonna, Stoppel.

SPECIALIZATION IN BACTERIOLOGY, BIOCHEMISTRY, AND GEOLOGY

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

MINOR IN BACTERIOLOGY

JUNIOR YEAR

Four credits of botany or zoology are prerequisite to Bacteriology 41. Botany 1f, 4 credits, or Zoology 14f-15w, 6 credits, should be taken in the junior year to satisfy this requirement. By special arrangement it may be possible to take Bact. 41, 5 credits, in the winter or spring quarter of the junior year, if desired.

SENIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Bact. 41	General Bacteriology	5	..	3	6
Bact. 121	Physiology of Bacteria	3	..	3	..

* For list of suggested electives in other colleges see page 57.
† For permissible substitute, see page 57.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
Bact. 122	Physiology of Bacteria	3	..	3	..
	Spring Quarter				
Bact. 123	Applied Bacteriology	3	..	3	..

Minor in Biochemistry

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Zool. 14†	General Zoology	3	..	2	4
	Winter Quarter				
Zool. 15†	General Zoology	3	..	2	4
	Spring Quarter				
Zool. 16†	General Zoology	3	..	2	4

SENIOR YEAR

	Fall Quarter				
Ag.Biochem. 113	Biochemical Laboratory Methods	2	..	..	6
Ag.Biochem. 119	Colloids	3	..	3	..
Bact. 41	General Bacteriology	5	..	3	6
	Winter Quarter				
Ag.Biochem. 114	Biochemical Laboratory Methods	2	..	..	6
	Spring Quarter				
Ag.Biochem. 115	Biochemical Laboratory Methods	2	..	..	6
Ag.Biochem. 123	Enzymes	3	..	3	..

Minor in Geology

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
Min. 23	Elements of Mineralogy	4	1	2	4
	Spring Quarter				
Min. 24	Elements of Mineralogy	4	1	2	4

SENIOR YEAR

	Fall Quarter				
Geol. 1	General Geology	3	1	3	..
Geol. A	General Geology Laboratory	2	..	..	4
Geol. 121	Crystallography	3	..	3	2
	Winter Quarter				
Geol. 3	General Geology (Dynamic and Economic)	3	1	3	..
Geol. C	General Geology Laboratory	2	..	..	4

† Nine credits of Botany may be substituted for Zoology 14-15-16.

CHEMICAL ENGINEERING

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

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

The additional eight credits above the course in Chemistry are made up of two credits for the inspection trip in the spring vacation of the senior year and six credits for the two courses in Chemical Manufacture in the summer quarter following the junior year. Thus the term requirements of the two courses are equal in amount and average 17½ credits per quarter for 12 quarters.

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

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

As many industries are based on some chemical operation, the chemical engineer is much in demand. He may be engaged in the manufacture of inorganic products—the mineral acids, alkalies, ammonia, paint pigments, fertilizers; in the organic industries—dyes, explosives, lacquers, solvents, medicinals; in the manufacture of gases—coal gas, carbureted blue gas, hydrogen, acetylene, helium; in the electro-chemical industries such as the manufacture of graphite, calcium carbide, carborundum and other abrasives, wet and dry batteries, electroplating; in the metallurgical industries; and even in the food industries such as the manufacture of sugar, flour, salt, and starch. There are many others as leather, paper, textiles, soaps, petroleum, glass, and cement.

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

For freshman and sophomore years see pages 36 and 37.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Chem. E. 101	Unit Processes	3	..	5	..
Chem. E. 105	Gas and Fuel Analysis	3	1	1	4
Org. Chem. 51	Organic Chemistry	5	0	5	6
M.&M. 85‡	Strength of Materials (with lab.)	4	3	..	2
Phys. 33	Optics	3	1	3	..

‡ For permissible substitutes, see page 57.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
Chem. E. 106	Petroleum and Petroleum Products	3	1	1	4
Chem. E. 131	Industrial Inorganic Chemistry	4	1	4	..
Org. Chem. 52	Organic Chemistry	5	0	5	6
M.&M. 86‡	Hydraulics	2	2	..	..
M.&M. 143	Hydraulics Laboratory	1	..	..	2
M.E. 38	Heat Engines	3	..	3	..
	Spring Quarter				
Chem. E. 102	Unit Processes	3	3	..	..
Chem. E. 132	Industrial Organic Chemistry	4	1	4	..
Chem. E. 150	Unit Process Laboratory	1	..	..	3
Org. Chem. 153	Organic Chemistry	5	0	5	6
M.E. 28	Machine Design	3	..	1	6
M.E. 39	Heat Engines	3	..	2	4
Inorg. Chem. 51	Senior Qualifying Exam. (Inorg. and Qual.)	0	..	..	..
Anal. Chem. 53	Senior Qualifying Exam. (Quant.)	0	..	..	..

SUMMER QUARTER

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

SENIOR YEAR

	Fall Quarter				
Chem. E. 103	Unit Process Problems	3	3	..	..
Phys. Chem. 101	Physical Chemistry	5	1	3	6
E.E. 43	Electric Power	3	..	2	2
Met. 160	Metallography	3	..	2	3
	Electives*				
	Winter Quarter				
Chem. E. 104	Unit Process Problems	3	3	..	..
Chem. E. 121	Chemical Engineering Economics	3	1	2	..
Phys. Chem. 102	Physical Chemistry	5	1	3	6
E.E. 44	Electric Power	3	..	2	2
	Electives*				
	Spring Quarter				
Chem. E. 187	Inspection Trip, spring vacation	2	..	..	..
Chem. E. 117	Chemical Engineering Equipment Design	3	..	1	6
Phys. Chem. 103	Physical Chemistry	5	1	3	6
E.E. 45	Electric Power	3	..	2	2
	Electives*				

CIVIL ENGINEERING

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

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 204 credits for graduation. This is an average of 17 credits per quarter.

The principal aim of the course in civil engineering is to present to the student an opportunity to become familiar with the methods of science, so that in

* For list of electives in other colleges see page 57.

‡ For permissible substitutes, see page 57.

his attack upon any professional problem he may employ his abilities with economy and secure dependable conclusions. A secondary but important object of the course is to train the student in technique, so that at graduation he may be able to be an economic asset to his employer.

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

The field of civil engineering is so comprehensive that no attempt is made toward specialization in the regular course of four years. Special courses for graduate students are offered in all of the divisions of railroad, highway, structural, hydraulic, and municipal engineering.

For freshman year, see page 25.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	..	..
Phys. 3	Elements of Mechanics	3	1	3	..
Phys. 4	Elements of Mechanics Laboratory	1	..	..	2
Draw. 21	Drafting	2	..	..	6
C.E. 11	Surveying	3	1	..	7
Mil. Sci. 4	Second Year Basic Course	0	..	..	3
	Electives*				
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	..	..
Phys. 23	Heat	3	1	3	..
Phys. 24	Heat Laboratory	1	..	..	2
Draw. 22	Drafting	2	..	..	6
C.E. 12	Surveying	3	1	..	7
Mil. Sci. 5	Second Year Basic Course	0	..	..	3
	Electives*				
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	..	..
Phys. 43	Electricity	3	1	3	..
Phys. 44	Electricity Laboratory	1	..	..	2
Draw. 23	Drafting	2	..	..	6
C.E. 13	Surveying	3	1	..	7
Mil. Sci. 6	Second Year Basic Course	0	..	..	3
	Electives*				

JUNIOR YEAR

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

* For list of electives in other colleges see page 57.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
M.&M. 129	Hydraulics	4	3	1	..
M.&M. 143	Hydraulics Laboratory	1	..	..	2
C.E. 15	Surveying	2	..	4	..
C.E. 21	Railway Engineering	2	1	..	4
C.E. 32	Stresses in Structures	3	..	2	4
C.E. 52	Highways and Pavements	3	..	1	6
	Electives*				
	Spring Quarter				
M.&M. 127	Technical Mechanics (Dynamics)	5	5	..	..
C.E. 16	Surveying	2	..	4	..
C.E. 22	Railway Engineering	2	1	..	4
C.E. 33	Elementary Structural Design	4	..	2	6
C.E. 53	Civil Engineering Practice	3	1	2	..
	Electives*				
	Summer Camp				
C.E. 23	Summer camp is held in the vacation preceding the senior year for 6 weeks beginning about the middle of August. Nine credits. Required of all students taking the course in Civil Engineering. Fee, $25.				
	SENIOR YEAR				
	Fall Quarter				
C.E. 121	Railway Engineering	3	..	1	6
C.E. 134	Statically Indeterminate Structures	3	2	..	2
C.E. 137†	Structural Laboratory	2	..	..	6
C.E. 141	Reinforced Concrete	3	1	..	2
C.E. 161	Hydrology	3	1	1	3
C.E. 146	Plain Concrete	3	..	2	4
or					
C.E. 164	Water Power	3	..	1	6
	Electives*				
	Winter Quarter				
C.E. 124	Transportation	3	3	..	..
C.E. 131	Bridge Analysis	2	..	1	3
C.E. 142	Reinforced Concrete Design	3	1	..	2
C.E. 162	Water Supply and Sewerage	3	..	2	4
E.E. 42	Electric Power	4	3	..	2
or					
M.E. 42	Heat Engines	4	3	..	4
	Electives*				
	Spring Quarter				
C.E. 132	Bridge Design	2	..	1	3
C.E. 163	Water Supply and Sewerage	3	..	2	5
C.E. 146	Plain Concrete	3	..	2	4
or					
C.E. 164	Water Power	3	..	1	6
E.E. 42	Electric Power	4	3	..	2
or					
M.E. 42	Heat Engines	4	3	..	4
	Electives*				

* For list of electives in other colleges see page 57.

† May be taken f,w, or s.

ELECTRICAL ENGINEERING

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

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 204 credits for graduation.

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

The main laboratory of the department is well equipped for preliminary training in the operation of electrical machinery and for advanced research problems in this field. The communication laboratories contain, besides the general equipment for study of circuits and equipment, a complete commercial radio broadcasting station and an experimental high frequency, short wave station.

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

For freshman year, see page 25.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	..	..
Phys. 3	Elements of Mechanics	3	1	3	..
Phys. 4	Elements of Mechanics Laboratory	1	..	..	2
M.E. 16	Forge Practice	2	..	1	4
E.E. 11	Elements of Electrical Engineering	3	2	1	..
Mil. Sci. 4	Second Year Basic Course	0	..	..	3
	Electives*				
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	..	..
Phys. 23	Heat	3	1	3	..
Phys. 24	Heat Laboratory	1	..	..	2
Draw. 26§	Drafting	2	..	..	6
E.E. 13	Elements of Electrical Engineering	3	2	1	2
Mil. Sci. 5	Second Year Basic Course	0	..	..	3
	Electives*				
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	..	..
Phys. 43	Electricity	3	1	3	..
Phys. 44	Electricity Laboratory	1	..	..	2
E.E. 15	Elements of Electrical Engineering	3	2	1	2
M.E. 19	Machine Shop Practice	2	..	1	4
Mil. Sci. 6	Second Year Basic Course	0	..	..	3
	Electives*				

* For list of electives in other colleges see page 57.

‡ For permissible substitutes, see page 57.

JUNIOR YEAR§

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 129	Hydraulics	4	3	1	..
M.&M. 143	Hydraulics Laboratory	1	..	..	2
E.E. 111	Electrical Engineering	5	5	..	..
E.E. 112	Electrical Engineering Laboratory	2	..	..	4
Phys. 144	Electrical Measurements	3	1	1	4
	Electives*				
	Winter Quarter				
M.&M. 127	Technical Mechanics (Dynamics)	5	5	.	..
E.E. 113	Electrical Engineering	5	5	..	..
E.E. 114	Electrical Engineering Laboratory	2	..	..	4
M.E. 26	Mechanism and Kinematics	3	3	..	..
	Electives*				
	Spring Quarter				
M.&M. 128	Strength of Materials	5	5	..	..
M.&M. 141	Materials Laboratory	2	..	1	3
E.E. 115	Electrical Engineering	5	5	..	..
E.E. 116	Electrical Engineering Laboratory	2	..	..	4
	Electives*				

SENIOR YEAR

Power Option

	Fall Quarter				
E.E. 121	Electrical Engineering	3	3	..	..
E.E. 122	Electrical Engineering Laboratory	2	..	..	4
E.E. 132	Electrical Design †	2	2	..	..
M.E. 40	Heat Engines †	3	2	..	3
	Electives*				
	Winter Quarter				
E.E. 123	Electrical Engineering	3	3	..	..
E.E. 124	Electrical Engineering Laboratory	2	..	..	4
E.E. 134	Electrical Design †	2	2	..	..
M.E. 41	Heat Engines †	3	2	..	3
	Electives*				
	Spring Quarter				
E.E. 125	Electrical Engineering	3	3	..	..
E.E. 126	Electrical Engineering Laboratory	2	..	..	4
E.E. 136	Electrical Design † ‡	2	2	..	..
M.E. 55	Internal Combustion Engines †	3	2	..	3
	Electives*				

Communication Option §

	Fall Quarter				
E.E. 121	Electrical Engineering	3	3	..	..
E.E 122	Electrical Engineering Laboratory	2	..	..	4
E.E. 161	Radio Communication	3	..	2	3
E.E. 164	Electrical Communication	3	..	2	3
	Electives*				

* For list of electives in other colleges see page 57.

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

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

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

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
E.E. 123	Electrical Engineering	3	3	..	..
E.E. 124	Electrical Engineering Laboratory	2	..	..	4
E.E. 162	Radio Communication	3	..	2	3
E.E. 165	Electrical Communication	3	..	2	3
	Electives*				
	Spring Quarter				
E.E. 125	Electrical Engineering	3	3	..	..
E.E. 126	Electrical Engineering Laboratory	2	..	..	4
E.E. 163	Radio Communication	3	..	2	3
E.E. 166	Electrical Communication	3	..	2	3
	Electives*				

SPECIALIZED COURSES IN ELECTRICAL ENGINEERING

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

ENGINEERING AND BUSINESS ADMINISTRATION

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

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

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

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

* For list of electives in other colleges see page 57.

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

FIVE-YEAR COMBINED COURSES WITH BUSINESS ADMINISTRATION

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

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

The business courses are intended to be spread over three or four years. Generally, it will be most convenient to begin the business sequence in the sophomore year by taking economics and business law, 3 credits per quarter, as electives, in addition to the usual engineering program. If, however, this is not done in the sophomore year, it may be possible to take these courses along with accounting and corporation finance in the junior year, if the program permits. In this case the entire business sequence may be completed in three years.

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

Under this plan the student will be registered in the College of Engineering and Architecture or the School of Chemistry for the entire combined program. His registration for each quarter beginning with the fourth year is subject to approval by the adviser representing the School of Business Administration, Professor Filipetti, as well as by the regular classifier.

Students at the beginning of their senior year who have had economics, business law, accounting, and possibly some of the other courses in business and who desire to complete this five-year program for the Business Administration degree should consult the adviser regarding the necessary procedure. Irregular students who for any reason find it necessary to extend their engineering courses over five years may wish to take advantage of this plan, in whole or in part. The business courses are appropriate as electives whether or not the entire list is taken.

It should be clearly understood that a student must complete one of the regular courses in engineering, architecture, or chemistry, in order to qualify

for the degree of bachelor of business administration under this plan. He will however, receive his regular degree as soon as he has completed the requirements therefor.

The following order and distribution by years are suggested. Both may be varied, however, so as to accommodate individual programs, as long as the prerequisites (indicated in parentheses) are satisfied.

		Credits		
		F	W	S
	Second Year			
Econ. 8f-9w	General Economics	3	3	..
Econ. 28f,s	Business Law (8, 9)	..	..	3
	Third Year			
Econ. 29f,s, 26f,w,s	Principles of Accounting	3	3	..
B.A. 155f,w,s	Corporation Finance (8, 9)	..	..	3
	Fourth Year			
Econ. 161f,w,s	Labor Problems (8, 9)	3	..	..
B.A. 167w	Personnel Administration (161)	..	3	..
B.A. 130f,s	Survey of Cost Accounting (29)	..	..	3
B.A. 142f,w,s	Money and Banking (8, 9)	3	..	..
B.A. 58f,w,s	Public Finance (8, 9)	..	3	..
B.A. 89f,w,s	Production Management (8, 9)	..	..	3
B.A. 70f	Statistics Survey (8, 9)	4	..	..
B.A. 112f,w,s	Business Statistics (70)	..	3	..
Econ. 149f,w,s	Business Cycles (142)	..	..	3
	Fifth Year			
B.A. 180-181-182Gf,w,s	Senior Topics Course: Production Management (89, 130)	3	3	3
B.A. 77f,s	Survey of Marketing	3	..	..
B.A. 71f,w,s	Traffic Management (8, 9)	..	3	..
B.A. 139f,w,s	Advanced General Accounting (26)	..	..	3
B.A. 101f,w-102w,s	Advanced General Economics (8, 9)	3	3	..
B.A. 165f,w,s	Economics of Public Utilities (8, 9)	..	..	3
B.A. 100f,w,s	Report Writing	..	1	..
	Total Credits			74

ENGINEERING PRE-BUSINESS

(Four-year course in Engineering and Business Administration)

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

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

For freshman year, see page 25.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 91‡	Calculus	4	4	..	..
Phys. 3	Elements of Mechanics	3	1	3	..
Phys. 4	Elements of Mechanics Laboratory	1	..	..	2
Econ. 8	General Economics	3	..	3	..
M.E. 17‡	Machine Shop Practice	2	..	1	4
M.E. 70	Mechanical Technology	1	..	2	..
Mil. Sci. 4	Second Year Basic Course	0	..	..	3
	Electives*				
	Winter Quarter				
Phys. 23	Heat	3	1	3	..
Phys. 24	Heat Laboratory	1	..	..	2
Econ. 3	The Mechanism of Exchange	5	3	2	..
Econ. 9	General Economics	3	3	..	..
Econ. 20†	Elements of Accounting	3	3	..	..
Mil. Sci. 5	Second Year Basic Course	0	..	..	3
	Electives*				
	Spring Quarter				
M.&M. 84‡	Technical Mechanics	5	5	..	..
Phys. 43	Electricity	3	1	3	..
Phys. 44	Electricity Laboratory	1	..	..	2
Econ. 14	Elements of Statistics	5	5	..	..
Econ. 25	Principles of Accounting	3	3	..	..
Mil. Sci. 6	Second Year Basic Course	0	..	..	3

JUNIOR YEAR§

(In the School of Business Administration)

	Credits
Strength of Materials (M. & M. 85f)‡	4
Principles of Accounting (Econ. 26f,s)	3
Business Law (Bus. Adm. 51f,s-52w-53s)	9
Business Statistics (Bus. Adm. 112f,w,s)	3
Corporation Finance (Bus. Adm. 155f,w,s)	3
Money and Banking—Advanced Course (Bus. Adm. 142f,w,s)	3
Transportation: Services and Charges I (Bus. Adm. 71f,w,s)	3
Survey of Marketing (Bus. Adm. 77f,s)	3
Production Management (Bus. Adm. 89f,w,s)	3
Advanced General Accounting (Bus. Adm. 139f,w,s)	3
Report Writing (Bus. Adm. 100f,w,s)	1
Electives (See list below)	4

SENIOR YEAR§

(In the School of Business Administration)

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

* For list of electives in other colleges see page 57.

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

‡ For permissible substitute, see page 57.

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

ELECTIVES

Students may divide the time available for electives between Groups A and B.

A. General and Business

	Hours
Economic History (Hist. 80f-81w-82s)	9
Finance Management (Bus. Adm. 156f)	3
Theory of Statistics (Econ. 113w-114s)	3
Geography of Commercial Production (Geog. 41f,w,s)	5
Fire and Marine Insurance (Bus. Adm. 60w)	3
Casualty Insurance (Bus. Adm. 61s)	3

B. Engineering

	Hours
Auto and Airplane Engines (M.E. 50f,w,s)	3
Gas Manufacture and Distribution (Ch.E. 41s)	3
Civil Engineering Practice (C.E. 53s)	3
Contracts and Specifications (G.E. 101w)	3
Estimating (G.E. 81f,w,s)	3
Technical Writing (Engl. 36s)	3

INTERIOR ARCHITECTURE

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

The course in interior architecture is primarily designed to meet vocational needs of women who wish to prepare for the practice of architecture, or interior decoration. This course requires normally four years for its completion, the first two years in the College of Science, Literature, and the Arts, and the last two years in the College of Engineering and Architecture, including 192 credits.

For the freshman and sophomore years, students register in the College of Science, Literature, and the Arts and complete the requirements of the Junior College, including the required courses, 90 credits, and 90 honor points.

Courses Required in the First Two Years

	Credits
English A-B-C or Composition 4-5-6 or exemption from requirements (see page 36, Combined Class Schedule)	0 to 15
Mathematics 4 or 6 (with prerequisite)	4 to 10
French (see Junior College Requirements, page 75, Combined Class Schedule)	0 to 20
History 11-12-13	9
Physics or Chemistry	8
Architecture 11-12-13	3
Architecture 21-22-23	6
Architecture 24-25-26	6
Architecture 31-32-33	9
Architecture 61-62-63	6

In the freshman year students should register for Chem. 1f-2w, or if they have entrance credits in chemistry, for Chem. 4-5 and for Arch. 11-12-13 and 21-22-23. If possible, they should elect Arch. 84-85-86.

Having satisfied the requirements of the Junior College, the students transfer to the College of Engineering and Architecture and pursue the following curriculum, amounting to 102 credits for the remaining two years:

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Arch. 14	Architectural History	2	..	2	..
Arch. 34	Architectural Design	4	..	..	12
Arch. 51	Building Construction	2	..	2	..
Arch. 182	Furniture and Decoration	3	..	3	..
	Non-technical electives	6			
	Winter Quarter				
Arch. 15	Architectural History	2	..	2	..
Arch. 35	Architectural Design	4	..	..	12
Arch. 52	Building Construction	2	..	2	..
Arch. 183	Furniture and Decoration	3	..	3	..
M.E. 5	Woodworking and Wood-Finishing	2	..	..	6
	Non-technical electives	4			
	Spring Quarter				
Arch. 16	Architectural History	2	..	2	..
Arch. 36	Architectural Design	4	..	..	12
Arch. 53	Building Construction	2	..	2	..
Arch. 184	Furniture and Decoration	3	..	3	..
	Non-technical electives	6			

SENIOR YEAR

	Fall Quarter				
Arch. 17	Architectural History	2	..	2	..
Arch. 27	Freehand Drawing	2	..	..	6
Arch. 134	Interior Design	7	..	..	21
Arch. 151	Seminar	1	..	1	..
	Non-technical electives	6			
	Winter Quarter				
Arch. 18	Architectural History	2	..	2	..
Arch. 28	Freehand Drawing	2	..	..	6
Arch. 135	Interior Design	7	..	..	21
	Non-technical electives	6			
	Spring Quarter				
Arch. 19	Architectural History	2	..	2	..
Arch. 29	Freehand Drawing	2	..	..	6
Arch. 136	Interior Design	7	..	..	21
Arch. 163	Theory of Form and Color	2	..	2	..
	Non-technical electives	3			

LANDSCAPE ARCHITECTURE

Four-year course leading to the degree of bachelor of landscape architecture, B.L.A.

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 204 credits for graduation. This is an average of 17 credits per quarter for 12 quarters.

The course in landscape architecture is intended to provide instruction and training for students who desire to enter this profession. It involves the same

fundamental preparation as the course in architecture, and, also, special attention is given to architectural as well as landscape design.

The profession of landscape architecture is a broad one and should not be confused with the work of the landscape gardener. The landscape architect may be concerned in the design and construction involved in parks and park systems, real estate development of a high order, and on a large scale, university campuses, civic centers, municipal and state building plans, town and city planning, etc. His professional relations with architects are so intimate as to require familiarity with the architectural profession. This is given consideration in the close relationship between the course in landscape architecture and the course in architecture.

Students who desire to enter the profession of landscape architecture, and who wish to study at the University of Minnesota before transferring to another institution to complete their professional studies, can obtain the equivalent of the two years of the standard course in Landscape Architecture, by selecting certain courses in the School of Architecture, the College of Agriculture, and other departments of the University.

FRESHMAN YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 11	College Algebra	5	5	..	.
Engl. 4	Rhetoric and Composition	3	3	..	..
Arch. 21	Freehand Drawing	2	..	..	6
Arch. 31	Architectural Design	3	..	1	6
Arch. 61	Projections	2	..	1	3
G.E. 11	Orientation	0	..	1	..
Mil. Sci. 1	First Year Basic Course	0	..	..	3
	Winter Quarter				
M.&M. 12	Trigonometry	5	5	..	..
Engl. 5	Rhetoric and Composition	3	3	..	..
Arch. 22	Freehand Drawing	2	..	..	6
Arch. 32	Architectural Design	3	..	1	6
Arch. 62	Shades and Shadows	2	..	1	3
G.E. 12	Orientation	0	..	1	..
Mil. Sci. 2	First Year Basic Course	0	..	..	3
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	..	..
Engl. 6	Rhetoric and Composition	3	3	..	..
Arch. 23	Freehand Drawing	2	..	..	6
Arch. 33	Architectural Design	3	..	1	6
Arch. 63	Perspective	2	..	1	3
G.E. 13	Orientation	0	..	1	..
Mil. Sci. 3	First Year Basic Course	0	..	..	3

SOPHOMORE YEAR

	Fall Quarter				
M.&M. 91‡	Calculus	4	4	..	..
Arch. 14	Architectural History	2	..	2	..
Arch. 24	Freehand Drawing	2	..	..	6
Arch. 34	Architectural Design	4	..	..	12
Bot. 1	General Botany	4	1	3	..
Mil. Sci. 4	Second Year Basic Course	0	..	..	3

‡ For permissible substitutes, see page 57.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
M.&M. 92‡	Technical Mechanics	4	4	..	..
Arch. 15	Architectural History	2	..	2	..
Arch. 25	Freehand Drawing	2	..	..	6
Arch. 35	Architectural Design	4	..	..	12
Bot. 21	Elementary Ecology	3	..	..	6
Mil. Sci. 5	Second Year Basic Course	0	..	..	3
	Spring Quarter				
M.&M. 93‡	Strength of Materials	4	4	..	..
Arch. 16	Architectural History	2	..	2	..
Arch. 26	Freehand Drawing	2	..	..	6
Arch. 36	Architectural Design	4	..	..	12
Bot. 7	Taxonomy of Flowering Plants	3	..	1	5
Mil. Sci. 6	Second Year Basic Course	0	..	..	3
	Summer Quarter between Sophomore and Junior Years				
Arch. 20	Outdoor Sketching	1			
Geol. 1	General Geology	5			
Hort. 70†	Plant Materials	3			
	JUNIOR YEAR				
	Fall Quarter				
Arch. 27	Freehand Drawing	2	..	..	6
Arch. 84	Modeling	2	..	..	6
C.E. 11	Surveying	3	1	..	7
Econ. 8	General Economics	3	..	3	..
Hort. 71	Elementary Design and Plant Material	3	..	1	4
Phys. 3	Elements of Mechanics	3	1	3	..
Phys. 4	Elements of Mechanics Laboratory	1	..	..	2
	Winter Quarter				
Arch. 28	Freehand Drawing	2	..	..	6
Arch. 85	Modeling	2	..	..	6
C.E. 12	Surveying	3	1	..	7
Econ. 9	General Economics	3	3	..	..
Hort. 74	Principles of Landscape Design	3	..	1	4
Phys. 23	Heat	3	1	3	..
Phys. 24	Heat Laboratory	1	..	..	2
	Spring Quarter				
Arch. 29	Freehand Drawing	2	..	..	6
Arch. 86	Modeling	2	..	..	6
C.E. 13	Surveying	3	1	..	7
Econ. 28	Business Law	3	3	..	..
Hort. 72	Woody Plants and Garden Flowers	2	..	1	2
Phys. 43	Electricity	3	1	3	..
Phys. 44	Electricity Laboratory	1	..	..	2

† Given by special arrangement.

‡ For permissible substitutes, see page 57.

SENIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Arch. 160	History of Landscape Architecture	2	..	2	..
C.E. 14	Surveying	3	..	..	8
C.E. 51	Highways and Pavements	3	2	..	3
For. 1	General Forestry	3	..	3	..
	Electives*				
	Winter Quarter				
G.E. 81	Estimating	3	3	..	..
Hort. 75	Landscape Problems	3	..	1	4
Phys. 33	Optics	3	1	3	..
Phys. 34	Optics Laboratory	1	..	..	2
Engl. 37	Technical Discussions	3	3	..	..
	Electives*				
	Spring Quarter				
Ag.E. 31	Principles of Drainage	3	1	2	..
C.E. 172	City Planning	3	..	3	..
Engl. 36	Technical Writing	3	3	..	..
Hort. 76	Landscape Construction	3	..	1	4
	Electives*				

RECOMMENDED ELECTIVES

Arch. 41f,42w,43s	Building Construction .....per quarter	3
Hort. 56s	Plant Propagation	3

MECHANICAL ENGINEERING

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

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 204 credits for graduation.

It is recommended that each student in Mechanical Engineering spend at least one summer vacation in machine shop practice.

The field of mechanical engineering is very broad and the graduates enter almost every kind of industry, both in technical and non-technical positions.

The profession includes the following divisions: design of machinery and apparatus for all purposes; production and manufacturing methods; inspection and testing of materials and apparatus; operation of industrial plants; sales engineering; research and development; management of industry.

The course is planned to give broad training rather than highly specialized work. Fundamental courses in mathematics, physics, chemistry, and English are followed by strong courses in steam and gas machinery, electricity, hydraulics, machine design, materials testing, and mechanical laboratory work. Courses in economics, industrial management, and finance may be elected if desired.

The young man graduating in mechanical engineering will find an ever widening field of service in the future both in technical work and in administrative positions, and there is no limit to future progress except the ability of the individual.

For freshman year, see page 25.

* See pages 54 and 57.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	..	..
Phys. 3	Elements of Mechanics	3	1	3	..
Phys. 4	Elements of Mechanics Laboratory	1	..	..	2
M.E. 15	Foundry Practice	2	..	1	4
M.E. 20	Elementary Machine Design	2	..	..	6
M.E. 70	Mechanical Technology	1	..	2	..
Mil. Sci. 4	Second Year Basic Course	0	..	..	3
	Electives*‡				
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	..	..
Phys. 23	Heat	3	1	3	..
Phys. 24	Heat Laboratory	1	..	..	2
M.E. 14	Pattern Practice	2	..	1	4
Engl. 37	Technical Discussions	3	3	..	..
or					
M.E. 50	Auto and Airplane Engines	3	3	..	..
Mil. Sci. 5	Second Year Basic Course	0	..	..	3
	Electives*‡				
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	..	..
Phys. 43	Electricity	3	1	3	..
Phys. 44	Electricity Laboratory	1	..	..	2
M.E. 16	Forge Practice	2	..	1	4
M.E. 21	Kinematics	2	..	..	6
Engl. 37	Technical Discussions	3	3	..	..
or					
M.E. 50	Auto and Airplane Engines	3	3	..	..
Mil. Sci. 6	Second Year Basic Course	0	..	..	3
	Electives*‡				

JUNIOR YEAR

	Fall Quarter				
M.&M. 127	Technical Mechanics (Dynamics)	5	5	..	..
M.E. 22	Mechanism	3	3	..	..
M.E. 30	Steam Engineering	3	3	..	..
M.E. 33	Elementary Mechanical Laboratory	2	..	..	4
M.E. 71	Machine Shop Practice	3	..	1	7
	Electives*				
	Winter Quarter				
M.&M. 128	Strength of Materials	5	5	..	..
M.&M. 141	Materials Laboratory	2	..	1	3
M.E. 23	Machine Design	3	..	2	6
M.E. 31	Thermodynamics	3	2	..	3
M.E. 34	Mechanical Laboratory	2	..	..	4
	Electives*†				

* For list of electives in other colleges see page 57.

† Programs are arranged to accommodate M.E. 72, Machine Shop Practice or other electives.

‡ Programs are arranged to accommodate C.E. 17f,s Surveying; T. Chem. 1f,w, Power Plant Chemistry; Phys. 33f,w,s, Optics; and other electives. The Power Plant Chemistry sections are limited to 20 students each.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
M.&M. 129	Hydraulics	4	3	1	..
M.&M. 143	Hydraulics Laboratory	1	..	..	2
M.E. 24	Machine Design	3	3	..	..
M.E. 32	Thermodynamics	3	2	..	3
M.E. 35	Elementary Steam and Power Laboratory	2	..	..	4
	Electives*				
	SENIOR YEAR				
	Fall Quarter				
M.E. 63	Heating and Ventilation	3	1	2	..
M.E. 121	General Engineering Design	2	..	..	6
M.E. 141	Power Plant Engineering	3	3	..	..
M.E. 149	Advanced Steam Laboratory	2	..	..	4
or					
M.E. 159	Power and Gas Engine Laboratory	2	..	..	4
or					
M.E. 169	Heating and Ventilation Laboratory	2	..	..	4
M.E. 150	Internal Combustion Engines	3	3	..	..
M.E. 190	Seminar	1	1	..	..
E.E. 36	Electric Power	3	2	..	2
	Winter Quarter				
M.E. 149	Advanced Steam Laboratory	2	..	..	4
or					
M.E. 159	Power and Gas Engine Laboratory	2	..	..	4
or					
M.E. 169	Heating and Ventilation Laboratory	2	..	..	4
M.E. 171	Production Factors	3	3	..	..
M.E. 191	Seminar	1	1	..	..
	Engineering Design‡	2	..	..	6
E.E. 37	Electric Power	3	2	..	2
	Electives*				
	Spring Quarter				
M.E. 149	Advanced Steam Laboratory	2	..	..	4
or					
M.E. 159	Power and Gas Engine Laboratory	2	..	..	4
or					
M.E. 169	Heating and Ventilation Laboratory	2	..	..	4
M.E. 192	Seminar	1	..	1	1
	Engineering Design‡	2	..	..	6
E.E. 38	Electric Power	3	2	..	2
G.E. 193	Engineering Practice	2	..	2	..
	Electives*				

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

Graduate work for a degree is divided into a major subject, a minor subject, and a thesis. In this case, the major subject is mechanical engineering and the thesis will lie in the same field. The minor should be in another department. If

* For list of elective courses in other colleges, see page 57.

‡ The following courses are accepted for this requirement: M.E. 122w-123s, Advanced Engineering Design; M.E. 147w, Design of Steam Machinery; M.E. 148s, Design of Power Plant Units; M.E. 156w,157s, Design of Internal Combustion Engines; M.E. 168w, Heating and Ventilation Design; C.E. 37s, Structural Engineering.

the Master's degree is not sought as a result of the fifth year's work, the thesis is not required. The student is advised to obtain the Master's degree. A total of 15 to 18 credits per quarter, should be taken.

ELECTIVE COURSES IN OTHER COLLEGES

For detailed schedules of classes see the programs of respective departments.

Course No.	Title	Credits	Prerequisites
Ast. 11f,s	Descriptive Astronomy	5	3rd qtr. fr., soph., jr., sr.; none
Geog. 1f-2w	Introduction to Human Geography	10	None
Geog. 11f,w,s	Human Geography	5	3rd qtr. fr., soph., jr., sr.; none
Geol. 8f,w,s	Introductory Geology	5	None
Geol. 161w	Crystal Structures	3	Geol. 121, M.&M.13 and Elem. Phys.
Ger. 1f,w,s	Beginning German A	5	None
Ger. 2f,w,s	Beginning German B	5	Ger. 1 or one year preparation
Ger. 3f,w,s	Beginning German C	5	Ger. 2
Ger. 4f,w,s	Intermediate German	5	Ger. 3
Greek 42s	Greek Sculpture	2	None
Hist. 7f-8w-9s	American History	10	None
Hist. 11f-12w-13s	Medieval History	9	None (Int. Arch. only)
Italian 1f-2w	Beginning Italian	10	None
Jour. 5w,s	The American Newspaper	3	None
Jour. 13f-14w-15s	Reporting	9	Engl. 6
Lib. Meth. 1f,w,s	Use of Books and Libraries	2	None (fr. and soph. only)
Phil. 2f,w,s	Logic	5	None
Phys. 146w	Advanced Electrical Measurements	3	Phys. 144
Pol. Sci. 1f,w,s	American Government and Politics	5	10 cred. in hist. or econ.
Psy. 1f,w,s-2w,s	General Psychology	6	None
Psy. 160f	Psychology in Personnel Work	3	Psy. 1-2, Econ. 8 9
Soc. 1f,w,s	Introduction to Sociology	5	None
Span. 1f,w,s-2f,w,s	Beginning Spanish	10	None
Span. 3f,w,s-4f,w,s	Intermediate Spanish	10	Spanish 1-2 or two years' high school Spanish
Sp. 41f,w-42w,s-43f,s	Fundamentals of Speech	9	Engl. 6

SUBSTITUTIONS

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

Course	Cred.	Substitute Course	Cred.
Draw. 4	2	Draw. 1	3
5	2	2	3
6	2	3	3
4 and 5 and 6	6	7 and 8	6
26	2	28	2
28	2	26	2
M.&M. 84	5	M.&M. 26 and 127	10
85	4	128 and 141	7
86	2	129	4
91	4	24 and 25	10
92	4	26 or 84	5
93	4	85 or 128	4 or 5
M.E. 17	2	M.E. 19	2
19	2	17	2
19	2	71	3
Anal.Chem. 132 or Ch.E. 110	3	Anal. Chem. 105	3

DESCRIPTIONS OF COURSES

AERONAUTICAL ENGINEERING

1f—Aeronautics. History. Nomenclature. Resistance of simple bodies. Theory of flight. The airplane and its parts. Constructional details. Performance. 3 cred.; prereq., M.&M. 12. Mr. Barlow.

(1) I MWF; 202ME (2) I TThS; 202ME

2w—Aircraft and Auto Engines. Principles and Types. Electrical Systems. Lubrication and cooling. Carburetors. Accessories. (Open only to aeronautical engineers or by petition.) 3 cred.; prereq., 1. Mr. Barlow.

Lect. (1) III ThS; 202ME Lab. (1) III-IV T; Ex
(2) III MF; 202ME (2) VI-VII T; Ex

3s—Aeronautics. Instruments. Meterology. Avigation. 3 cred.; prereq., 1 and 2. Mr. Barlow.

(1) II MWF; 202ME (2) II TS, III F; 202ME

83s—Stresses in Simple Structures. Statically determinate trusses and beams. Graphic statics. Space frameworks. Combined stresses. Airplane wing bracing. Short and long struts. 3 cred.; prereq., M.&M. 128; III MWF; 21E. Mr. Wise.

100f-101w-102s—Aerodynamics. Atmospheric properties. Fluid mechanics. Stream functions and velocity potential. Motion of body in liquids in three dimensions. Prandtl's wing theory. Dynamic loads, stability, maneuverability, controllability. 3 cred. per qtr.; prereq., 3 and M.&M. 25; I TThS; 136E. Mr. Boehnlein.

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

Lect. III TS; 107E Lab. III-IV F; 229E

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

120f-121w-122s—Airplane Design. Stress analysis of wings, fuselages, chassis, control surfaces, etc. Specifications. Performance and design calculations. Propellers. 120f, 2 cred.; 121w, 4 cred.; 122s, 3 cred.; prereq., 83, 102, M.&M. 128. Messrs. Akerman and Barlow.

120f	Lect. IV S; 202ME	
	Lab. (1) II-IV W; 251ME	(2) II-IV W; 255ME
121w	Lect. I TS; 202ME	
	Lab. (1) II-IV WF; 251ME	(2) II-IV WF; 255ME
122s	Lect. IV T; 202ME	
	Lab. (1) II-IV MF; 251ME	(2) II-IV MF; 255ME

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

126f,w,s-127f,w,s-128f,w,s—Advanced Problems in Airscrew Design. Graphical and analytical methods of investigation. 2 to 5 cred. per qtr.; prereq., 122. Mr. Akerman.

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

(1) VII-IX TF; Ex (2) II-IV M, VII-IX Th; Ex

141w—Aerodynamics Laboratory. Measurement of air flow. Calibration of Pitot tubes and anemometers. Distribution of air pressure on surfaces. Wind tun-

nel tests of wings, propellers, and airplane models. 2 cred.; prereq., 102. Messrs. Boehnlein and Barlow.

(1) VII-IX TF; Ex (2) VII-IX MTh; Ex

160s—Airships. Theory and design. Rigid and non-rigid types. Stresses. Performance. 3 cred.; prereq., 83, 102, M.&M. 128. Mr. Akerman.

Lect. II TS; 254ME
Lab. (1) II-IV W; 151ME (2) II-IV W; 251ME

170s—Air Transport. Economics. Airports and airways and their equipment. Air commerce rules and regulations. Communication. 2 cred.; prereq., open to sr.; I TS; 202ME. Mr. Barlow.

190f-191w-192s—Seminar. Readings, reports, conferences, and discussions. 1 cred. per qtr.; prereq., 102. Mr. Akerman.

190f	(1) VI T; 202ME	(2) II T; 202ME
191w	(1) II Th; 202ME	(2) II T; 202ME
192s	(1) III T; 202ME	(2) VII M; 202ME

260s—Advanced Airship Stresses. Coplanar and space rigid frameworks. Secondary stresses. Buckling and elastic instability. Framework of dirigibles, gondolas, and cabins. 3 cred.; prereq., 115. Mr. Wise.

272f-273w-274s—Research in Aeronautical Engineering. 2 to 5 cred. per qtr.; grad. Messrs. Akerman, Boehnlein, Robertson, and Wise.

AGRICULTURAL BIOCHEMISTRY

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

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

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

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

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

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

AGRICULTURAL ECONOMICS

102w—Farm Organization. Business side of farming is emphasized. Attention is given to principles underlying farm organization and factors affecting returns. Analysis of farm business statements. 3 cred.; prereq., Econ. 8, 9; II TThS; 312HH(UF). Mr. Garey.

103s—Farm Operation. Selection and adjustment of crop and livestock enterprises. Utilization of labor, power, and equipment. Physical and productive reorganization of the farm business. Problems encountered by farmers in the operation of their business. 3 cred.; prereq., Econ. 8, 9; II TThS; 312HH(UF). Mr. Garey.

AGRICULTURAL ENGINEERING

FARM STRUCTURES

5w—Farm Building Construction. Instruction and practice in design of details, and in construction of farm buildings. 3 cred.; no prereq. Messrs. White and Berggren.

Lect. III M; 41En(UF) Lab. III-IV WF; 48En(UF)

7s—Farm Structures. Arrangement and planning of farm buildings. Special attention to convenience, economy, and durability. 3 cred.; prereq., Dr. 3 or equiv. Mr. White.

Lect. I T; 305En(UF) Lab. I-II ThF; 305En(UF)

37w—Rural Sanitation. Wells, pumps, and water supply. Methods of securing sanitary water systems for farmsteads and rural institutions. Sanitary sewage disposal methods for homes, creameries, etc. 3 cred.; no prereq.; I MWF; 101En(UF). Mr. Tyler.

67f—Farm Structures. Planning, estimating, and designing of farm structures. Study of materials commonly used. 3 cred.; prereq. 7, M.&M. 128; ar. Mr. White.

111f-112w-113s—Farm Building Problems. Investigations in building materials, methods of construction, cost and efficiency of farm buildings. 3 to 6 cred. per qtr.; prereq., 67; ar.; 305En(UF). Messrs. White and Neubauer.

211f-212w-213s—Farm Structures Research. Studies in farm structures as related to other factors in the farm business. 3 to 6 cred. per qtr.; prereq., 111; ar. Mr. White.

FARM MACHINERY

12s—Field Machinery. Construction, operation, adjustment, and use of soil preparation, seeding and harvesting machinery. 3 cred.; no prereq. Mr. Schwantes

Lect. I MW; 216En(UF) Lab. II-IV T; 49En(UF)

13s—Gas Engines. Theory, operation, care, and repair of gasoline engines. 3 cred.; no prereq.; VI-VIII TTh; 216, 37En(UF). Mr. Torrance.

14f—Tractors. Lecture and laboratory course dealing with the construction, operation, care, adjustment, testing, and use of the tractor. 3 cred.; prereq., 13. Mr. Torrance.

Lect. II TTh; 216En(UF) Lab. VI-IX F; 37En(UF)

15f—Ignition and Carburetion. Lecture and shop study of the construction and action of the various forms of ignition and carburetion systems in use on gas engines of all types. Offered only in alternate years, 1934-35, etc. 3 cred.; prereq. 13; III MW, III-IV F; 216En(UF). Mr. Torrance.

43f—Mechanical Laboratory. Instruction and laboratory practice in mechanical work, embracing cement work; soldering; welding; pipe fitting; electric wiring; harness repair, etc. 3 cred.; no prereq.; I-III ThS. 20, 106 En(UF). Mr. Dent.

70f—Steam Boilers and Engines. Construction, operation, and care of simple

steam engines and boilers. 3 cred.; prereq., Phys. 23, 24; II TThS; 216En(UF). Mr. Boss.

71f—Power Machinery. Study of machines requiring mechanical power for their operation such as feed grinders, corn shredders, ensilage cutters, threshers. 3 cred.; prereq., 12, 13; VII-VIII M; 105En(UF), VII-IX W; 49En(UF). Mr. Schwantes.

72w—Applied Electricity. Laboratory work in direct and alternating current machines as used on farms, including generators, motors, storage batteries, transformers, and complete isolated electric and hydroelectric plants (offered only in alternate years, 1934-35, etc. Alternate with Soils 108). 3 cred.; prereq., Phys. 43, 44. Mr. Romness.

Lect. VI, T; 101En(UF) Lab. VII-IX T, VI-VIII Th; 101En(UF)

121f-122w-123s—Farm Power and Machinery Problems. Special studies of farm machinery and mechanical power for the farm. Tests, design, and adaptability to various farm conditions. 3 to 6 cred. per qtr.; prereq., 126; ar. Mr. Schwantes.

126s—Selection of Farm Equipment. Types, sizes, and quantity of power and machine units for various types of farming. 3 cred.; prereq., 14, 71, M.E. 27, Ag.Econ. 103; III MW; 106En(UF), lab. 3 hr. ar.; 49En(UF). Mr. Schwantes.

221f-222w-223s—Farm Power and Machinery Research. Studies involving the design or utilization of power machinery used in connection with farm operation. 3 to 6 cred. per qtr.; prereq., 121; ar. Mr. Schwantes.

RECLAMATION

19f—Elementary Surveying. Use of tape, transit, level, and traverse board in field problems, e.g., mensuration surveys, traverses, differential and profile leveling; plotting and mapping. Care and adjustment of instruments. 3 cred.; prereq., Dr. 3, M.&M. 12. Messrs. Neal and Howe.

Lect. III T; 105En(UF) Lab. VI-VIII TTh; 305En(UF)

20s—Advanced Surveying. Topographic surveys by stadia and other methods, running simple curves, cross sectioning, plotting the survey, profile building, grade determination, and figuring of quantities in earth work. 3 cred.; prereq., 19. Messrs. Neal and Howe.

Lect. VI M; 105En(UF) Lab. VII-IX MF; 305En(UF)

28w—Land Clearing. Land clearing methods, explosives, and machinery. Farm development in cut over timber district. 3 cred.; no prereq.; I TThS; 103En(UF). Mr. Schoenleber.

31w,s—Principles of Drainage. Elementary principles and practice of soil erosion control and of drainage in relation to plant growth, crop and land values, and farm operation and development. 3 cred.; no prereq. Messrs. Roe and Neal.

(w) III TThS; 105En(UF) (s) I MWF; 105En(UF)

42s—Principles of Irrigation. Irrigation and the development of arid and semi-arid lands, irrigation practices; duty of water and water rights; correlation of drainage and irrigation. 3 cred.; no prereq.; II TThS; 105En(UF). Mr. Roe.

68f—Drainage Engineering and Works. Design, location, and construction of public and private drainage systems and works; construction estimates, drainage engineering, and public records. 3 cred.; prereq., 31, M.&M. 86; ar.; 105En(UF). Mr. Roe.

69s—Irrigation Engineering and Works. Design, location, and construction of irrigation works; reservoir and transmission losses; general irrigation law; irrigation engineering and public records. 3 cred.; prereq., 42, M.&M. 86; ar.; 105En(UF). Mr. Roe.

101f-102w-103s—Advanced Drainage Problems. Special drainage problems including surface run-off, soil permeability, relation of soil and crop type to drainage, shape and regulation of water table in relation to root growth, etc. 3 to 6 cred. per qtr.; prereq., 68; ar.; 105En(UF). Messrs. Roe and Neal.

201f-202w-203s—Reclamation Research. Studies of design and functioning of reclamation work with special reference to soil types and soil water conditions. 3 to 6 cred. per qtr.; prereq., 101 and one qtr. Mathematical Theory of Statistics; ar. Mr. Roe.

GENERAL

91f-92w-93s-94f-95w-96s-97f-98w-99s—Agendum. General agricultural engineering seminar. Official conference of entire group: topics of broad general interest to agricultural engineers discussed; as, for example, research problems, state and government service, agricultural engineering functions and developments. All staff members and all students above freshman classification required to attend. No cred.; no prereq. Mr. Boss and staff.

91f-94f-97f I T (third T. of each month); 107En(UF)
92w-95w-98w IX F (third F. of each month); 107En(UF)
93s-96s-99s VII W (third W. of each month); 107En(UF)

150s—Seminar (Ag.E.). Students will give reports of their investigations on certain assigned problems for research. 2 cred.; prereq., required of all sr. Messrs. Roe, Schwantes, and White.

AGRONOMY AND PLANT GENETICS

1f,s—Farm Crops. Important field crops of the United States with emphasis upon those of local importance, distribution, economic importance, agricultural classification, cultural methods, and principles of improvement and seed selection. 3 cred.; no prereq.; IV MWF; 100Ad(UF). Mr. Johnson.

ANIMAL HUSBANDRY

15s—Fundamentals of Livestock Production. Basic principles involved in the breeding, feeding, and management of livestock. 3 cred.; jr., sr.; no prereq.; I TThS; 3St(UF). (For professional agricultural engineering students only.) Mr. Peters.

ARCHITECTURE

HISTORY

14f-15w-16s—Architectural History. Technical study of architecture: (f) Ancient Egypt, Assyria, Persia, and especially Greece; (w) Ancient Rome and beginning of the Renaissance in Italy; (s) Renaissance in Italy and Spain. Illustrated lectures and library research. 2 cred. per qtr.; prereq., 22, 32; IV MW; 320E. Mr. Mann.

17f-18w-19s—Architectural History. Technical study of architecture: (f) The Middle Ages in Italy, France, and England; (w) Developed Gothic architecture and early Renaissance in France and England; sources and affecting influences; (s) Development from the seventeenth century to the present

time, particularly in France, England, and America. Lectures and library research. 2 cred. per qtr.; prereq., 15 for 17, 17 for 18, 16 for 19; IV TF; 320E. Mr. Mann.

219f,w,s—Special Researches in Architectural History. 5 cred. or less per qtr.; prereq., completion of undergraduate architectural history; ar. Mr. Mann.

DESIGN

*31f,su-32w,su-33s,su—Architectural Design, Grade I. Elements of architecture. Architectural drawing, and wash rendering. Elements of architectural design; walls, doors, windows, colonnades, arcades, moldings, vaults, etc. Relation of building materials to design. 3 cred. per qtr.; no prereq. Mr. Beals.
Lect. IV S; 320E Lab. (1) VI-VIII TTh; 402E

*34f,w,s,su-35f,w,s,su-36f,w,s,su—Architectural Design, Grade II. Long and short problems under individual criticism dealing in general with the elements of plan and elevation. Sketch problems dealing with composition. 4 cred. per qtr.; prereq. 23, 33, 62; VI-VIII MTThF; 402E. Mr. Robertson.

*37f,w,s-38f,w,s-39f,w,s—Architectural Design, Grade III. Long and short problems under individual criticism dealing with simple architectural composition. Sketch problems dealing with large composition or decorative detail. 6 cred. per qtr.; prereq., 36; VI-VIII MTWThF, II-IV S; 302E. Mr. R. C. Jones.

130f,w,s—Architectural Design. Special problems. 9 or less cred.; prereq., 36; .ar. Mr. R. C. Jones.

*131f,w,s-132f,w,s-133f,w,s—Architectural Design, Grade IV. Long, short, and sketch problems under individual criticism dealing with complex compositions and with subjects involving special character and a decorative and imaginative interest. 10 cred. per qtr. for 131 and 132, 9 cred.‡ for 133; prereq., 39; VI-IX MTWThF, I-IV S, and 6 hrs. ar.; 317E. Mr. Arnal.

140—Thesis. An original problem in architecture chosen and developed by the individual student, with the approval and advice of the architectural faculty. At least one quarter should be allowed for its completion. 8 cred.; prereq., 133 or 146.

220f,w,s—Archeology. 3 cred. or less; prereq., completion of undergraduate architectural history; ar. Mr. Arnal.

239f,w,s—Advanced Architectural Design. 10 cred. or less per qtr.; prereq., completion of undergraduate design; VI-IX MTWThF, I-IV S; 317E. Mr. Arnal.

CONSTRUCTION

41f-42w-43s—Building Construction. General study of the principles, methods, and materials involved in the design of ordinary masonry and frame construction. 2 cred. per qtr.; prereq., 33; I TThFS; 320E. Mr. ————

47f-48w-49s—Building Construction. Detail study of the principles, methods, and materials involved in the design of all systems of light and heavy construction. 2 cred. per qtr. for 47-48, 3 cred. for 49; prereq., 35 and 43; VI-IX W, III-IV F; 402E. Mr. Heath.

51f-52w-53s—Building Construction (Int.Arch.). Non-technical study of the principles, methods, and materials of ordinary construction, particularly as

* 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 four years; some students require more time and some less.

‡ Course 131-132-133 carries 8 cred. per qtr. for students in the five-year curriculum.

related to domestic architecture and interior finish. 2 cred. per qtr.; prereq., 33; IV TF; 206E.(f,w); 320E.(s). Mr. Heath.

141f-142w-143s—Building Construction. Advanced study of the technology of building materials, soils, foundations, systems of framing, and fireproof and mill construction. 2 cred. per qtr.; prereq., C.E. 41 or M.&M. 26; II MW; 320E. Mr. ————

144f-145w-146s—Construction Design. Problems in design involving the structural and economic phases of buildings. 6 cred. per qtr.; prereq., 39, 43, C.E. 39, 41. Mr. ————

240f,w,s—Technology of Building Materials. 3 cred. per qtr.; prereq., 49 or 143; hrs. ar. Mr. ————

FINE ARTS

20su—Sketching. Sketching out-of-doors in water color and other media. 1 cred.; prereq., 23 or evidence of intermediate ability. Mr. Young.

(1) I-III MW (3) III-V MW
(2) I-III TTh (4) III-V TTh

21f,w,s,su-22w,s,su-23s,su—Freehand Drawing. Freehand perspective and first principles of design and composition from geometrical solids. Drawing of ornament in pencil, charcoal, and wash. Indoor and outdoor sketching. 2 cred. per qtr.; no prereq. Messrs. Young and Doseff.

21f (1) VI-VIII TTh; 417E (Open to Arch. only) (3) I-III TTh; 417E
(2) VI-VIII TTh; 417E (4) II-IV MW; 417E
21w-22s II-IV MW; 417E
22w-23s (1) VI-VIII TTh; 417E (Open to Arch. only) (3) I-III TF; 417E
(2) VI-VIII TTh; 417E

24f,w,su-25f,w,s,su-26f,w,s,su—Freehand Drawing. Drawing and design in charcoal and water color from still life, figure details, and the antique. 2 cred. per qtr.; prereq., 23; VI-VIII MF; 417E. Messrs. Young and Doseff.

27f,w,s,su-28f,w,s,su-29f,w,s,su—Freehand Drawing. Drawing, design, and painting from architectural detail, the antique, and life. 2 cred. per qtr.; prereq., 26; II-III TThS(f,w), II-III MWF(s); 417E. Mr. Burton.

68s—Time Studies from Life. Drawing from head life and the costumed figure, in any medium. 1 cred.; no prereq. Mr. Burton.

70f,w,s—Pictorial Composition. Study of the arrangement of the pictorial art of all ages. Original compositions in all mediums. 1 cred.; prereq., 26 or equiv.; ar.; 405E. Mr. Burton.

71su—Painting. Still life, head, figure, and landscape. 3 or 6 cred.; prereq., evidence of elementary ability; VI-VII MWF; 405E. Mr. Young.

72su—Sculpture. Modeling in clay. Head, figure, and composition. 3 or 6 cred.; prereq., evidence of elementary ability; I-III MWF; 405E. Mr. Burton.

84f,w,s-85f,w,s-86f,w,s—Modeling. Elementary course in clay modeling. Ornament, heads, and animals from casts and from life. 2 cred. per qtr.; prereq., 23; VI-VIII MW; 405E. Mr. Burton.

87f,w,s-88f,w,s-89f,w,s—Advanced Modeling. 2 cred. per qtr.; prereq., 86; VI-VIII MW; 405E. Mr. Burton.

90f,w,s-91f,w,s-92f,w,s—Illustration. Design of illustration as applied to the printed page. Magazine illustration, posters and books. 1 cred. per qtr.; prereq., 23; ar.; 405E. Mr. Young.

93f,w,s-94f,w,s-95f,w,s—Hand Print Processes. Making and printing wood engravings, etchings, drypoints, and lithographs. 1 cred. per qtr.; prereq., 23; ar.; 405E. Mr. Young.

121f,w,s,su-122f,w,s,su-123f,w,s,su—Advanced Art. Life drawing, painting, or modeling and decoration. 2 cred. per qtr.; prereq. 29; VI-VIII MW; 405E. Mr. Burton.

163s—Theory of Form and Color. Fundamentals of design. 2 cred.; prereq.. sr. or grad. standing; II TTh; 320E. Mr. Burton.

221f,w,s,su-222f,w,s-223f,w,s—Life Drawing and Figure Composition. 2 cred. per qtr.; prereq., completion of undergraduate freehand drawing; hrs. ar. Mr. Burton.

287f,w,s-288f,w,s-289f,w,s—Advanced Modeling. Continuation of Arch. 89. 2 cred. per qtr.; prereq., 89; hrs. ar.; 405E. Mr. Burton.

INTERIOR ARCHITECTURE

81f,w—Stage Design. Making of original models to solve stage problems in design. Form and color. For students interested in dramatics. 2 cred.; no prereq.; VI-VIII TTh; 405E. Mr. Burton.

82w—Advanced Stage Design. Original models and costumes for actual productions. 2 cred.; prereq., 81; VI-VIII TTh; 405E. Mr. Burton.

*134f,w,s-135f,w,s-136f,w,s—Interior Design (Int.Arch.). Problems done under individual criticism dealing with the decorative treatment, furniture, and accessories of interiors. 7 cred. per qtr.; prereq., 36; VI-IX MTWThF; 317E. Mr. Arnal.

161w—Decoration and Applied Arts. Historical and technical study of decoration, furniture, etc., together with discussion of the use of color. 2 cred.; prereq., 16, 26; III TTh; 320E. Miss Carter.

180su—Architecture and Decoration. History and appreciation of interior architecture, furniture, and decoration. Illustrated lectures and research. 2 cred.; no prereq.; IV TWTh. Mr. Mann.

182f-183w-184s—Furniture and Decoration. Historical and technical study of ornament, decoration, furniture, textiles, etc. Discussion of the use of color in decoration. Interior perspective. 3 cred. per qtr.; prereq., 16, 23 for 182-183; 35 for 184. Miss Carter.

182f-183w II TThS; 320E
184s I-II TThS; 402E

243f,w,s—Advanced Interior Design. 10 cred. or less per qtr.; prereq., 136; hrs. ar. Mr. Arnal.

LANDSCAPE ARCHITECTURE

160f—History of Landscape Architecture. Study of landscape architecture in Italy, France, England, and America. 2 cred.; prereq., 16. (Not offered in 1934-35.)

162w—Landscape Design. Theory and practice. Lecture and design problems. 2 cred.; prereq., 39. (Not offered in 1934-35.)

164s—Landscape Design. Particular attention to the relation of buildings to their sites and surroundings. 2 cred.; prereq., 162. (Not offered in 1934-35.)

* 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 design courses is four years; some students require more time and some less.

GENERAL

11f-12w-13s—Introduction to Architecture. Orientation course. Architecture in its relations to civilization. Architecture in theory and practice. 1 cred. per qtr.; no prereq. Faculty of Architecture.
11f-12w VIII F; 320E 13s III F; 320E

61f—Projections. Elementary principles of descriptive geometry and their application to architectural problems of projections and intersections. 2 cred.; no prereq.; lect. VI W; 320E; lab. VII-IX W; 402E. Mr. Doseff.

62w—Shades and Shadows. Geometrical determination of shades and shadows on architectural forms. 2 cred.; prereq., 61; lect. VI W; 320E; lab. VII-IX W; 402E. Mr Doseff.

63s—Perspective. Principles and methods of perspective as applied to architectural drawing. 2 cred.; prereq., 61; lect. VI W; 320E; lab. VII-IX W; 402E. Mr. Doseff.

151f—Architectural Seminar. Literature of architecture, special topics, papers, and discussions. 1 cred.; prereq., sr. standing; IV F; 320E. Mr. Mann.

152w—Estimating. Principles of the quantity survey; cost analysis. 1 cred.; prereq., sr. standing; I W; 320E. Mr. Sault.

153s—Business Relations. Relations of the architect, owner, and builder; professional ethics and practice; office administration. 2 cred.; prereq., jr. or sr. standing; III MW; 206E. Mr. Mann.

154w—Acoustics of Buildings. Theory and applications in practice. 2 cred.; prereq., sr. standing; III FS; 320E. Mr. Mann.

165f—Housing. Social, economic, and city planning phases of modern group housing. 3 cred.; prereq., sr. and grad. standing; III MWF; 320E. Mr. ————

ASTRONOMY

51w—General Astronomy. A survey course covering the fundamental facts and principles of astronomy. 3 cred.; prereq., M.&M. 12; IV MWF; 133Ph. Mr. Luyten.

101f—Celestial Mechanics. 3 cred.; prereq., M.&M. 25; II MWF; Ph. Mr. Luyten.

140f—Method of Least Squares. The combination and adjustment of observations and the discussion of their precision as applied especially to engineering, physics, astronomy, and psychology. 3 cred.; prereq., 51 or 11 and M.&M. 24; ar.; Ph. Mr. Luyten.

BACTERIOLOGY AND IMMUNOLOGY

41f,w,s,su*—General Bacteriology. Principles and technique of general bacteriology; studies in the morphologic and biologic characters of the common bacteria; culture media; principles of sterilization and disinfection; examination of air, water, milk, food; relation of bacteriology to the industries. Lectures and laboratory. 5 cred.; prereq., 4 cred. of zoology or botany and Inorg.Chem. 10; VII-IX MWF; MH. Mr. Halvorson and Mrs. Green.

121f-122w—Physiology of Bacteria. 3 cred. per qtr.; prereq., 41 (41 may be taken concurrently with 121f) and 8 cred. of organic chemistry or biochemistry. III TThS; MH. Mr. Halvorson.

* Microscope fee of $1.50 is charged for this course.

123s—Applied Bacteriology. 3 cred.; prereq., 121-122; III TThS; MH. Mr. Halvorson.

BOTANY

1f,w,s—General Botany. Structure, physiology, life histories, and evolution of plants. Lectures and quizzes. 4 cred.; no prereq. Mr. Huff.

1f Lect. Bot. Aud. (1) III TThS (2) VI T, VI-VII Th
Quiz Bot. Aud. (1) III M (5) VI M
(2) II T (6) VII M
(3) III W (7) I M
(4) V T (8) IV T
1w,s Lect. III TThS, Bot. Aud.
Quiz Bot. Aud. (1) I T (3) III W
(2) II T (4) IV W

7f,s†—Taxonomy of Flowering Plants. A general study of the classification and relationship of flowering plants. 3 cred.; prereq., 1. Mr. Rosendahl.

7f I-II MWF; 1, 4, 5, 8 Bot.
7s (1) I-II MWF; 1, 4, 5, 8 Bot. (2) VI-VIII TTh; 1, 4, 5, 8 Bot.

21f,w,s†—Elementary Ecology. An introductory course in the study of plants in relation to their environment. 3 cred.; prereq., 1. Mr. Cooper.

21f III-IV MWF; 1, 4, 5, 8 Bot.
21w Lect. VI TTh; Bot. Aud. Lab. I-II ThS; 1, 4, 5, 8 Bot.
21s VI-VIII TTh; 1, 4, 5, 8 Bot.

CHEMICAL ENGINEERING

1f,w—Power Plant Chemistry. (M.E.) Proximate analysis of coal, determination of calorific power; technical analysis of flue gases and furnace gases. 3 cred.; prereq., Inorg. Chem. 16. Mr. Stoppel.

1f Lect. II T; 215C
Rec. II Th; 215C
Lab. (1) I-III MF; 10C
1w Lect. III T; 215C
Rec. III Th; 215C
Lab. II-IV MF; 10C

2s—Boiler Water. (Engineers and miners.) 2 or 3 cred.; prereq., 1 or Anal. Chem. 9 or by permission. Mr. Stoppel.

2s Lect. IV M; 215C
Lab. ar

31s—Chemistry of Engineering Materials. Application of general chemistry to engineering practice. Consideration of the technology and properties of wood, iron, and steel, alloys, fuels, water, cements, coating materials, etc. Lectures and recitations. 3 cred.; prereq., Inorg. Chem. 16. For engineers. IV MWF; 115C. Mr. Montonna.

41s—Gas Manufacture and Distribution. Fundamental principles of manufacture of coal gas, carburetted water gas, and other industrial fuel gases, and the apparatus for manufacture and distribution. Open to sophomores in the College of Engineering and Architecture who have completed one year of chemistry. Lectures and recitations. 3 cred.; ar. Mr. Montillon.

76f-77w—Applied Electrochemistry. Application of the electric current to chemical processes. Laws and phenomena of electrochemistry, batteries, electroplating, electric furnace construction and operation, and electrochemical products. Open to engineers who have had one year of chemistry and one year of physics. Class and laboratory work. 3 cred. per qtr. (Not offered in 1934-35.)

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

80s—Chemical Engineering Materials. The technology, physical and chemical properties, and economic considerations of materials used in the construction of chemical engineering equipment and plants. Ferrous and non-ferrous metals and alloys, woods, cement, and ceramic materials, textiles, rubber, protective materials, etc. 1 cred.; prereq., Inorg. Chem. 13; II TS; 325C. Mr. Mann.

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

101f,su—Unit Operations. Principles and materials of construction, operation, and uses of machinery for the unit processes. Lectures and recitations. 3 cred.; prereq., 80, Anal. Chem. 1, 2; I MTWFS; 325C. Mr. Mann.

102s,su—Unit Operations. Problems in combustion, furnaces, and kilns, the application of industrial heating and cooling devices on a commercial scale. 3 cred.; prereq., 101. Messrs. Ruth and McMillen.

(1) II MWF; 325C (2) II MWF; 111C

103f—Unit Operations. Problems in fluid flow and heat transfer and their applications including economic balance. 3 cred.; prereq., 101. Messrs. Ruth and McMillen.

(1) II MWF; 111C (2) II MWF; 115C

104w—Unit Operations. Problems in evaporation, humidification and air conditioning, drying, distillation, and filtration. 3 cred.; prereq., 101. Messrs. Ruth and McMillen.

(1) II MWF; 111C (2) II MWF; 115C

105f—Gas and Fuel Analysis. The chemical analysis of solid and gaseous fuels with a determination of their calorific value and methods of testing industrial gases. 3 cred.; prereq., Anal. Chem. 1, 2. Mr. Stoppel.

Lect. I Th; 325C
Rec. II S; 225C
Lab. (1) VI-IX M; 10C (4) VI-IX W; 10C
(2) II-V T; 10C (5) VI-IX Th; 10C
(3) VI-IX T; 10C

106w—Petroleum and Petroleum Products. Technology and testing of petroleum products, principally gasoline, illuminating, fuel, and lubricating oils. 3 cred.; prereq., Anal. Chem. 1, 2. Mr. Stoppel.

Lect. I Th; 225C
Rec. II S; 225C
Lab. (1) VI-IX M; 10C (4) VI-IX Th; 10C
(2) II-V T; 10C (5) VI-IX F; 10C
(3) VI-IX T; 10C

108s—Unit Operations Problems. Problems in absorption, extraction, crystallization, crushing and grinding. Size separation. Discussion of equipment used. 3 cred.; prereq., 104; I MWF; 111C. Mr. Ruth.

110s*—Special Analytical Apparatus. The use of special apparatus for chemical and physical testing of chemical products including gas apparatus, calorimeters for gases, liquids and solids, optical apparatus, viscosimeters, turbidimeters, etc. 3 cred.; prereq., Anal. Chem. 1, 2. Mr. Stoppel.

Lect. II Th; 215C Lab. VI-VIII MW; 10C

111f-112w-113s—Chemical Engineering Plant Design. Planning of plants and design of equipment based on collected data for the same. Classroom and laboratory work. 2 cred. per qtr.; prereq., 104. Mr. Montillon.

117s—Chemical Engineering Equipment Design. Fundamental principles in the design of simple chemical engineering equipment. Laboratory work. 3 cred.; prereq. 104. Messrs. Montonna and McMillen.

Lect. IV T; 410C
Lab. (1) VI-IX TTh; 410C (2) VI-IX TTh; 443C

* For permissible substitute, see page 57.

121w—Chemical Engineering Economics. The economic and business considerations controlling chemical engineering industries. Statistical analysis of these industries. Raw and finished products. Principles of plant location, layout, and design. Unit operation costs. Principles of management operation and control. Lectures and recitations. 3 cred.; prereq., 132; III MWF; 111C. Mr. Montonna.

131w—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. 4 cred.; prereq., (for chem. engrs.) 101; (for chem.) Anal. Chem., 1, 2; I MTWFS; 325C. Mr. Mann.

132s—Industrial Organic Chemistry. Similar to 131 but covering organic field. Destructive distillation of coal and wood, petroleum oils, paper, unit organic operations, vegetable and animal oils, fats, waxes, soap, sugar, starch, etc. Lectures and recitations. 4 cred.; prereq., (for chem. engrs.); 101; (for chem.) Org. Chem. 52 and Anal. Chem. 1, 2; I MTWThF; 325C. Mr. Mann.

133f—Chemistry of Explosives. History and technology of modern explosives, their manufacture and uses. Lectures, required reading, and reports. 3 cred.; prereq., 132; I MWF; 115C. Mr. Montonna.

134f—Intermediates and Dyestuffs. Their technical chemistry and manufacture. Processes, purification, uses, etc. Lectures and recitations. 3 cred.; prereq., 132 or equiv. (may be accompanied by laboratory work in 160); I TThS; 111C. Mr. Montonna.

136w—Chemistry and Technology of Cellulose. Processes and industries based on the use of cellulosic materials including the chemical and technological considerations. Pulp and paper, plastics, esters, rayon, etc. Lectures and recitations. 3 cred.; prereq., Org. Chem. 52 or equiv.; I TThS; 111C. Mr. Montonna.

140s—Sanitary Chemistry. Discussion of the chemistry of sewage and potable waters. Purification of water supplies, and the treatment of municipal and industrial wastes. Lectures and recitations. 3 cred.; jr., sr.; ar. prereq., Bact. 41 or by permission. Mr. Stoppel.

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. 3 cred.; prereq., Org. Chem. 52. Mr. Montillon.

150s—Unit Operations Laboratory. Operation and testing of chemical engineering equipment. Laboratory work and reports. 1 cred.; prereq., 101. Mr. Ruth.

Lab. (1) VI-VIII M; 90C	(3) II-IV S; 90C
(2) VI-VIII W; 90C	(4) Arranged

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 semi-plant scale equipment. Technical trade journals used. Laboratory. 3 or more cred.; prereq., 101. Messrs. Montonna and McMillen.

152w,su*—Chemical Manufacture (Organic). Similar to 151 but covering the organic field. Laboratory. 3 or more cred.; prereq., 101. Messrs. Montonna and McMillen

153f-154w-155s-156su—Special Laboratory Problems. Investigations on chemical engineering equipment and its use in the manufacture of special chemical

* Required for chemical engineers during summer quarter.

products on a semi-works scale. 3 or more cred. per qtr. Messrs. Mann, Montillon, and Montonna.

160f—Intermediates and Dyestuffs Laboratory. Manufacture of intermediates and dyestuffs using semi-works equipment. Operations on sulphonation, hydroxylation, nitration, reduction, alkylation, diazotization, coupling etc. Laboratory. 3 or more cred.; prereq., 132, 152 and preceded or accompanied by 134. Mr. Montonna.

168w—Petroleum and Petroleum Products. (Miners.) Technology and testing of petroleum and petroleum products. 3 cred.; prereq., Anal. Chem. 9. Mr. Stoppel.

Lect. I M; 115C
Rec. I W; 115C
Lab. VI-IX W; 10C

176f-177w—Applied Electrochemistry. Application of the electric current to chemical processes. Laws and phenomena of electrochemistry, batteries, electroplating, electric furnace construction and operation, and electrochemical products. Class and laboratory work. 4 cred. per qtr.; prereq., Phys. Chem. 103. Mr. Montillon.

Lect. I MWF; 111C Lab. VI-VIII W or Th; 25C

179s—Applied Electro-Organic Chemistry. Theory and practice of the electrochemistry of organic compounds. Lect. and rec., lab. 1 or 2 cred. optional. 3 cred.; prereq., 176-177; III MWF; 115C. Mr. Mann.

187s—Inspection Trip. Various industrial plants in the middle west are visited by the class on a trip which lasts about ten days, during the spring vacation period. Written reports covering the plants must be submitted. Required of seniors in Chemical Engineering. 2 cred.; prereq., 131, 132. Mr. Mann.

201f-202w-203s—Seminar. Presentation and discussion of papers concerning the newer developments in chemical industries. 1 cred. per qtr. Mr. Mann.

205f-206w-207s—Advanced Process Problems. A study of new developments in the unit operations including the theory and practical applications to equipment and plant process design problems. 2 cred. per qtr.; prereq., 104. Open to graduate students only. Mr. Montillon.

208f-209w-210s—Advanced Chemical Engineering. An extended study of the principles of chemical engineering and their applications to industrial problems, together with surveys of the literature. 2 cred. per qtr.; prereq., 104. Open to graduate students only. Mr. Montillon.

301f,su-302w-303s—Research in Chemical Engineering. Unit operations, applied, electrochemistry and electric furnace work, and chemical manufacture. Cred. ar. Messrs. Mann, Montillon, Montonna, Stoppel, and Ruth.

INORGANIC CHEMISTRY

(A fee of $2 per quarter is charged for Courses 1 to 17, inclusive.)

1f,su-2w-3s—General Inorganic Chemistry. 1. Study of general laws of chemistry and of the non-metals and their compounds. 2. Continuation of Course 1. 3. Metals and their compounds. Continuation of Course 2. 4 cred. per qtr.; no prereq. Messrs. Pervier and Stephens.

(1) (Pre-med., pre-dent.)
Lect. VI MWF; 225C
Lab. (1) VII-IX T; 290C (2) VII-IX Th; 290C
Quiz. (1) VI T; ar C (2) VI Th; ar C (Pre-dent)
(2) (Agr., arch.)
(f,w) Lect. VII MWF; 100C Lab. VIII-IX MW; 210C
(s) Lect. VII MF, IV S; 100C Lab. VIII-IX MF; 210C

4f,su-5w—General Inorganic Chemistry. Study of the general laws of chemistry and of the non-metals and their compounds. More intensive than Course 1f-2w-3s. 4 cred. per qtr.; prereq., high school chemistry. Messrs. Heisig, Stephens, and Maynard.

4f (Engrs.)
Lect. (1) I TThS; 100C
(2 and 3) IV T; 225C; VI Th, IV S; 100C
Quiz (1) VIII M; 100C
(2) and (3) III M; 225C
Lab. (1) II-IV T; 110C
(2) II-IV F; 110C
(3) II-IV W; 110C
(Pre-med., pre-dent)
Lect. (4) VI MWF; 100C
Lab. (1) VII-IX T; 210C (2) VII-IX Th; 210C
Quiz (1) VI T; ar C or
(2) VI Th; ar C

5w (Engrs.)
Lect. (1) I TThS; 100C
(2 and 3) IV T; 225C; VI Th, IV S; 100C
Quiz (1) VIII M; 100C
(2) and (3) VI T; 100C
Lab. (1) III-V T; 110C
(2) I-III F; 110C
(3) I-III W; 110C
(Pre-med., pre-dent.)
Lect. (4) VI MWF; 100C
Lab. (1) VII-IX T; 210C (2) VII-IX Th; 210C
Quiz (1) VI T; ar C
(2) VI Th; ar C

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

Sec. 1 (Not open to miners)
Lect. II MWF; 225C
Lab. I-III ThS; 210C
or
I-II TThS; 210C

Sec. 2 (Miners)
Lect. II TThS; 100C
Lab. VII-IX T, VI-VIII Th; 110C

8s†—Qualitative Chemical Analysis. (S.L.A., miners, and pharm.) Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation, and reduction, etc. 5 cred.; prereq., 7. Miss Cohen and Mr. Barber.

Sec. 1 (Not open to miners)
Lect. II MWF; 225C
Lab. I-II TThS; 210C
or
I-III ThS; 210C

Sec. 2 (Miners only)
Lect. II TThS; 100C
Lab. VII-IX TTh; 110C

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

9f-10w Lect. (1) (Agr.) VII MWF; 225C
(2) (Chem., S.L.A.) II MWF; 100C
Lab. (1) VIII-IX MWF; 110C
(2) I-III ThS; 290C
(3) (S.L.A.) I-II TThS; 290C

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

11f,s,su—Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical

equilibria, oxidation and reduction, etc. 4 cred.; prereq., 3 or 5. Miss Cohen, Mr. Stephens.

11f	Lect. IV MWF; 225C	Lab. VI-IX F; 210C
11s	Lect. VI MWF; 100C	Lab. (1) VI-IX T; 210C (2) VI-IX Th; 210C

*12f,s,su-13f,w†—Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation, and reduction, etc. 5 cred. per qtr.; prereq., 8 or 10. Messrs. Sneed, Heisig, and Maynard.

12f	Lect. I TThS; 225C	Lab. I-III MW; 290C
12s	Lect. II MWF; 100C	Lab. I-III ThS; 290C
13f,w	Lect. VI WF; 325C	Lab. VII-IX WF, VI-VIII M; 290C

14f,su-15w—General Inorganic Chemistry. (Engrs.) General laws of chemistry; the non-metals, the metals, and their compounds. 5 cred. per qtr.; no prereq. Mr. Barber.

Lect. II TThS; 100C
Quiz VIII F; 100C
14f Lab. (1) II-IV MW; 110C
(2) VII-IX TTh; 110C
15w Lab. (1) VII-IX T; VI-VIII Th; 110C
(2) I-III MW; 110C

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

(Engrs. who entered with h.s. chem.)

Lect. (1) I TThS; 100C	Lab. (1) VII-IX M, II-IV S; 110C
(2) IV TS, VI Th; 225C	(2) VI-VIII TF; 110C
(3) I TThS; 100C	(3) I-III W, II-IV F; 110C

(Engrs. who entered without h.s. chem.)

Lect. (4) II TThS; 100C	Lab. (4) I-III W, II-IV F; 110C (5) VII-IX TTh; 110C

17s,su—Glassblowing. Exercises in the more important operations in building chemical apparatus. 1 cred.; no prereq. Mr. Stephens.

51s—Senior Qualifying Examination in General Inorganic Chemistry and Qualitative Analysis. Required of juniors in the School of Chemistry. Prereq., Anal. Chem. 1, 2. Mr. Sneed.

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

101s—History of Chemistry. Historical development of the theories of chemistry from the period of the ancients to the present time is covered by this course, particular emphasis being given to modern theories and laws. 2 cred.; prereq., Org. Chem. 52. Miss Cohen.

102w,su—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., Anal. Chem. 1, 2; hrs. ar.; 290C. Mr. Sneed.

103f-104w-105s—Advanced Inorganic Chemistry. Discussion of the periodic system and the chemistry of the elements and their compounds and of special subjects of inorganic chemistry such as valency, oxidation and reduction, complex ions, etc. 3 cred. per qtr.; prereq., Anal. Chem. 1, 2, Org. Chem. 52; I TThS; 215C. Mr. Sneed.

* Course 12f may be taken by students registered in the College of Engineering and Architecture in place of 16s.

† Students who have completed Course 8 should omit Course 12 and take Course 13.

106f-107w-108s—Theories of Inorganic Chemistry. Theory of valency, electron conception and octet theory of G. N. Lewis, geometrical aspects, co-ordination theory, and modern theories of chemical combination. 3 cred. per qtr.; prereq., Phys. Chem. 103 or by permission. Mr. Glockler.

109w-110s—Synthetic Inorganic Chemistry. Methods of preparation and purification of inorganic compounds of special interest. Current literature, two lectures per week with laboratory to be arranged. 3 to 5 cred. per qtr.; prereq., 13. Mr. Heisig.

115su—Commercial Products and Their Analysis. Study of current commercial products, their composition and methods of analysis. 5 cred.; prereq., Anal. Chem. 1 and 2; lect. and lab. Mr. Barber.

134f-135w-136s—Seminar: Modern Problems in Inorganic Chemistry. 1 cred.; prereq., Anal. Chem. 1 and 2 and Phys. Chem. 103. Mr. Sneed.

301f,su-302w-303s—Research in Inorganic Chemistry. Cred. ar. Messrs. Sneed, Reyerson, and Heisig.

ANALYTICAL CHEMISTRY

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

1w,su-2s,su—Quantitative Analysis. Introductory courses covering the general principles and methods of quantitative analysis. Typical problems are assigned and attention given to proper laboratory practice. Course 1, Gravimetric Analysis. Course 2, Volumetric Analysis. 5 cred. per qtr.; prereq., Inorg. Chem. 13. Mr. Geiger.

Lect. VI M; 325C
Quiz VI F; 410C
Rec. (1) VI W; 111C (3) VIII W; 111C
(2) VII W; 111C
Lab. (1) VII-IX MF, VII-IX W; 310C (3) VII-IX MF, VI-VII, IX W; 310C
(2) VII-IX MF, VI, VIII-IX W; 310C

7f,s,su—Quantitative Analysis. (Pre-med.) Introductory course covering the general principles and methods of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention is given to proper laboratory practice. 4 cred.; prereq., Inorg. Chem. 11 or 13. Messrs. Geiger and Sarver.

7f Lect. (1, 2) VI M; 325C (3) VI Th; 325C
Rec. (1) VI W; 215C (Limit 35) (3) VII Th; 325C
(2) VI F; 315C (Limit 35)
Lab. (1) VII-IX MW, VI-VII F; 310C (3) VII-IX T, VIII-IX Th, I-III or II-IV S; 310C
(2) VII-IX MF, VI-VII W; 310C
7s Lect. VI Th; 325C
Rec. VII Th; 325C
Lab. VII-IX T, VIII-IX Th, I-III or II-IV S; 310C

9w—Quantitative Analysis. (Dentists, engineers, miners.) Short introductory course covering general principles of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention given to proper laboratory practice. 3 cred.; prereq., Inorg. Chem. 8, 11, or 16. Mr. Sarver.

Lect. VII Th; 325C Lab. VI-IX T, VIII-IX Th; 310C

52f—Fundamentals of Analytical Chemistry. Introductory lecture and recitation course covering the general principles of gravimetric and volumetric analysis for advanced standing students and graduate students who have inadequate knowledge of the subject. One lect.; one rec.; no cred.; ar. Mr. Geiger.

53s—Senior Qualifying Examination in Quantitative Analysis. Required of juniors in the School of Chemistry. Prereq., 1, 2. Mr. Kolthoff.

96f,su-97w-98s—Senior Thesis. 5 cred. per qtr.; sr. Messrs. Kolthoff, Geiger, Sarver, and Sandell.

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

103w—Exact Gas Analysis. 1 or 2 cred.; prereq., 1, 2. Mr. Sandell.

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

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

Lect. VI F; 215C Lab. ar.

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

109f,w,s—Rock Analysis. Laboratory course covering the technique of rock analysis. 3 cred.; prereq., 1, 2; 8 lab. hrs. per week ar.; 214P. Mr. Ellestad.

110f-111w-112s—Food Analysis. Course including the chemical analysis of the various food materials and food products and the detection of food adulterations. Course in methods of analysis. 3 cred. per qtr.; prereq., 1, 2. Mr. Sandell.

Lect. IV T; 325C Lab. VI-VIII TF; 217C

123f,su-124w,su-125s—Advanced Analytical Chemistry. Systematic survey by general lectures with typical procedures selected for laboratory practice. 1 lect., 7 lab. hrs. per week; 3 cred. per qtr.; prereq., 1, 2, or by permission. Mr. Sarver.

Lect. VI T; 315C Lab. VII-IX T, VI-IX Th; 310C

130f—Chemistry of Foods. Course in the origin, composition, and manufacture of foods. Systems of food inspection, legal food standards, and adulteration. Lectures and recitations. 3 cred.; jr., sr.; ar. Mr. Sandell.

131f—Applications of Indicators in Neutralization Reactions and p_h Determinations. 3 cred.; prereq., 1, 2 and Phys. Chem. 103; VI MW; 315C; lab. hrs. ar. Mr. Kolthoff.

132w*—Electrometric Measurements and Titrations. Application of potentiometric and conductometric methods in analytical work. 3 cred.; prereq., 1, 2, and Phys. Chem. 103. Mr. Kolthoff.

Lect. VI MW; 315C Lab. ar.

134f-135w-136s—Seminar: Modern Problems in Analytical Chemistry. 1 cred. per qtr.; prereq., 1, 2, and Phys. Chem. 103; III T; 315C. Mr. Kolthoff.

137s—Advanced Volumetric Analysis. 3 cred.; prereq., 131; 2 lect. ar.; lab. ar. Mr. Kolthoff.

138s—Advanced Gravimetric Analysis. Course in the formation properties of and coprecipitation with ionic lattices. 2 to 3 cred.; prereq., Phys. Chem. 103; 2 lect. ar.; lab. ar. Mr. Kolthoff.

140w—Water Analysis. Analysis of potable water with interpretation of results. 2 cred.; prereq., 1, 2. Mr. Sandell.

* For permissible substitute, see page 57.

201f-202w-203s—Selected Topics in Analytical Chemistry. 3 cred. per qtr.; prereq., 1, 2, and 123. Mr. Kolthoff.

204s—Modern Theories of Acidity and Basicity. 2 cred.; prereq., Phys. Chem. 103; ar. Mr. Kolthoff.

301f,su-302w-303s—Research in Quantitative Analysis. Cred. ar. Messrs. Kolthoff, Geiger, Sarver, and Sandell.

ORGANIC CHEMISTRY

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

1f-2w Lect. I MWF; 100C
Lab. Conference II T; 225C
Quiz I T; ar
Lab. (1) VI-IX T; 390C
(2) VI-IX W; 390C
(3) I-IV S; 390C

1w-2s Lect. IV MWF; 100C
Lab. Conference IV T; 100C
Quiz V T; ar
Lab. (1) VI-IX W; 390C
(2) VI-IX Th; 390C
(3) I-IV S; 390C

51f-52w†-153s—Elementary Organic Chemistry. (All except pre-med., pre-dent., pharm.) Discussion of the important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. Laboratory work includes the preparation of typical substances. Course 153 is a prereq. to all other advanced courses in organic chemistry except Course 130. 5 cred. per qtr.; prereq., 15 cred. of chemistry. Messrs. Smith and Lauer.

Lect. III MWF; 100C. Mr. Smith
Lab. Conferences (f,w) III ThS; 100C
(s) III TTh; 100C. Mr. Lauer
Lab. (1) (f,w) II-IV, VI-VIII T; 390C. Mr. Lauer
(s) VI-VIII T; I-III S, 390C
(2) VI-VIII T, VI-VIII Th; 390C
(3) (f,s) VI-VIII W, VI-VIII F; 390C
(w) VI-VIII M, VI-VIII W; 390C
(4) (f) II-IV T, VI-VIII F; 390C
(w) VI-VIII T, VI-VIII W; 390C
(s) VI-VIII W or F, I-III S; 390C

54f-55w†-156s—Elementary Organic Chemistry (without laboratory). (All except pre-med:, pre-dent., pharm., and chem. majors.) Discussion of the important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. General discussion of organic laboratory practice. 3 cred. per qtr.; prereq., 15 cred. of chemistry; III MWThF; 100C. Messrs. Smith and Lauer.

96f-97w-98s—Senior Thesis. 5 cred. per qtr.; sr. May be taken with any member of the Organic Chemistry Division staff.

105f-106w-107s—Advanced Organic Chemistry. Advanced, descriptive course covering the field of organic chemistry, together with an introduction to the literature of organic chemistry. Lectures and outside reading. Ability to

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

read German is assumed. 3 cred. per qtr.; prereq., 153 or equiv. I MWF; 225C. Mr. Smith.

110f*—Organic Qualitative Analysis. Reactions of typical functional groups, identification of pure organic compounds, separation and identification of constituents of mixtures. 5 cred.; prereq., 153 or equiv.; lect. IV T and 1 hr. ar.; 315C; 9 hrs. of lab. work ar. Mr. Koelsch.

130s—Organic Quantitative Analysis. Methods of proximate and ultimate analysis of organic compounds, with special attention to semi-micro methods. 2 or 3 cred.; prereq., 52 or 55, and Anal. Chem. 1 and 2; ar. One lecture and 3 or 6 hours lab. work per week. Mr. Lauer.

139f,w,s—Advanced Organic Chemistry Laboratory Work. Selected laboratory problems of an advanced nature, including some original work. Ability to read German is assumed. Students are advised to take this course during the winter quarter. Permission of instructor is required to take it at any other time. 2 to 5 cred.; prereq., 153. Mr. Thompson.

201f-202w-203s—Organic Chemistry Seminar. 1 hr. per week. 1 cred. per qtr. Required of all graduate students taking major work in organic chemistry. Messrs. Smith, Lauer, and Koelsch.

205f-206w—Theoretical Organic Chemistry. Structure, reaction mechanisms, relation of physical properties to constitution, and other topics of a theoretical nature. 3 cred. per qtr.; prereq., 107; IV MWF; 315C. Mr. Lauer.

211s. Reagents in Organic Chemistry. Discussion of typical reagents used in organic reactions: their limits of applicability, methods of use, and types of substances with which they react. Lectures, outside reading, and a term paper are required. 4 cred.; prereq., 107 and 110. (Not offered in 1934-35.)

212s—Physico-Organic Chemistry. Contributions made to organic chemistry by kinetic and equilibrium studies of organic reactions, including mechanisms of catalytic and ionotropic reactions; and an introduction to the current electronic formulations of organic reactions. Lectures, outside reading, and a term paper are required. 4 cred.; prereq., 107, Phys. Chem. 103, and calc., or permission of the instructor; II TThS; 315C. Mr. Thompson.

301f-302w-303s—Research in Organic Chemistry. Cred. ar.; prereq., 110. Messrs. Smith, Lauer, Stephens, and Koelsch.

PHYSICAL CHEMISTRY

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

101f-102w-103s—Physical Chemistry. General survey of the subject. 3 lect. and 1 rec.; lab. work 3 to 6 hrs. per week; 3, 4, or 5 cred. per qtr., depending on the amount of lab. work; prereq., two years' coll. chem., one year coll. phys. A knowledge of calculus is advisable. Messrs. MacDougall, Glockler, and Livingston.

Lect. IV MWF; 325C
Rec. IV S; 325C, 410C, (f,w) 225C
Lab. conf. (f) VI W; (w,s) VI M; 410C (for students registered for 5 cred.)
Lab. (1) (f) VI-VIII M, VII-VIII W; 190C
(2) (w,s) VII-VIII M, VI-VIII W; 190C (3) VI-VIII F; 190C

105w—Application of Higher Mathematics to Chemical Problems. 3 lect.; 3 cred.; prereq., integral calculus and permission of the instructor. Mr. MacDougall.

* A charge of $10 is made to cover special chemicals in this course.

106su-107su—Physical Chemistry. Courses 106 and 107su when completed in two summer quarters are equivalent to Phys. Chem. 101-102-103. (Given in alternate years. 106 given in 1934.) 4½, 6, or 7½ cred., depending on amount of lab.; prereq., 2 yr. coll. chem., 1 yr. coll. phys.; lect. and rec. I-II MTWThF; 115C; lab. VI-IX MTWTh; 190C. Mr. Livingston.

110f—Physical Chemistry. Short introductory course treating as non-mathematically as possible some of the principles of the subject. 3 cred.; prereq., 2 yr. coll. chem.; IV MWF; 215C. Mr. Glockler.

116f-117w-118s—Advanced Physical Chemistry. Certain topics are studied intensively and many problems are assigned in this course. 3 cred. per qtr.; prereq., 103 and calculus; hrs. ar. Mr. Glockler.

128f-129w-130s—Colloid Chemistry. 2 cred. per qtr.; prereq., 103. Mr. Reyerson.

131f-132w-133s—Colloid Chemistry Laboratory. Cred. and hrs. ar. Must be preceded or accompanied by 128, 129, or 130. Mr. Reyerson.

161f-162w—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. 2 cred. per qtr.; prereq., 103; II TTh; 111C. Mr. Lind.

171su. Elements of Radioactivity. 2 cred.; III TWThF; 115C. Mr. Lind.

175s—Photochemistry. History, development, and present status of photochemistry. 3 cred.; prereq., optics and 103; III MWF; 215C. Mr. Lind.

201f-202w-203s—Thermodynamics and Chemistry. A detailed study of the principles of thermodynamics and their application to physical and chemical phenomena. 4 cred. per qtr.; prereq., 103 and calculus. (Not offered in 1934-35.)

204f-205w-206s—Kinetic Theory and Atomistics. Kinetic theory of gases and liquids, crystal structure, structure of atom, quantum theory. 4 cred. per qtr.; prereq., 103 and calculus; II TThS; 115C. Mr. MacDougall.

211f-212w-213s—Advanced Physical Chemistry Laboratory. To accompany or follow any of the advanced courses in physical chemistry. Cred. ar.; prereq., 103. Mr. MacDougall.

221f-222w-223s—Colloid Seminar. 1 cred. per qtr. Mr. Reyerson.

251f-252w-253s—Physical Chemistry Seminar. For students taking advanced courses in physical chemistry. 1 cred. per qtr.; II M; 315C. Mr. MacDougall.

264f,w,s—Radioactivity Laboratory. Use and standardization of electroscopes, radioactive measurements, and quantitative determination of radium in ores, minerals, waters, and plant products. 1 or 2 cred. Must be preceded or accompanied by 161. Mr. Lind.

271f-272w-273s—Chemical Activation. (Seminar 1 hour per week for graduate students.) Current theories of chemical activation, including photochemical excitation, gaseous ionization, and the kinetics of cluster and of chain reactions. 1 cred. per qtr.; prereq., physics and physical chemistry. Mr. Lind.

301f,su-302w-303s—Research in Physical Chemistry, including work in electrochemistry, photo- and radio-chemistry, and colloids. Cred. ar. Messrs. Lind, MacDougall, Reyerson, Glockler, and Livingston.

CIVIL ENGINEERING

SURVEYING

11f—Surveying. Lectures and field problems; use of steel tape and transit. Computation and platting of field notes, determination of areas. 3 cred.; prereq., M.&M. 12, Dr. 2 or Arch. 23. Mr. Boon.

Lect. III Th; 21E
Lab. (1) VI-IX T, VI-VIII Th; 225E (2) VI-VIII W, VI-IX F; 225E

12w—Surveying. Lectures and drafting room. Platting of profiles and mass diagrams, computation of earthwork volume and overhaul. Public land survey. Mapping and conventional signs. 3 cred.; prereq., 11. Messrs. Cutler, Zelner, and Boon.

Lect. (1) VII T; 21E (2) III W; 21E
Lab. (1) II-IV T, VI-IX Th; 217E (2) VI-VIII M, VI-IX W; 217E

13s—Surveying. Lectures and field problems; differential and profile leveling; cross-sections, circular curves, and adjustment of instruments. 3 cred.; prereq. 12. Messrs. Cutler and Boon.

Lect. (1) VI Th; 21E (2) III Th; 21E
Lab. (1) II-IV T, I-IV S; 21E (2) VI-IX W, VI-VIII Th; 7E

14f—Surveying. Complete topographical survey, stadia method, is made and platted. 3 cred.; prereq., 13. Mr. Zelner.

(1) VI-IX TW; 217E (2) VI-IX M, I-IV S; 217E

15w—Surveying. Purpose and theory of triangulation, meridian determination, base line measurements, computations. Theory and use of the sextant. Hydrographic surveying. Aerial mapping. Applied problems. 2 cred.; prereq., 14. Mr. Zelner.

(1) II MTF; 21E; I W; 22E (2) VI T, II W, III FS; 21E

16s—Surveying. Classroom and field. Field problems with the sextant. Triangulation reading and computations. Plane table theory. Various field solutions of the "three point" problem. Plane table survey based on triangulation control. Topographic map. 2 cred.; prereq., 15. Mr. Zelner.

(1) I-II T; 22E; VI-IX M; 21E (2) II-III F; 22E; I-IV S; 7E

17f,s—Surveying. Short course including problems in chaining, transit and tape surveys; differential, trigonometric and profile leveling, computations and platting of notes, etc. Open to students other than Civil Engineers. 3 cred.; prereq., M.&M. 12. Messrs. Cutler, Zelner, and Boon.

17f Lect. (1) IV T; 21E (2) I W; 21E
Lab. (1) I-III M, I-IV W; 225E (2) II-IV W, VI-IX F; 217E
17s Lect. (1) VI F; 21E (3) I W; 21E
(2) I F; 21E
Lab. (1) VI-VIII T, VI-IX Th; 5E (3) I-IV M, II-IV W; 21E
(2) I-III Th; 21E; III-IX F; 7E

23su—Summer Camp. Six weeks immediately preceding the beginning of the senior year. Extended railroad, topographic, hydrographic, and triangulation surveys. 9 cred.; prereq., 16, 22. Fee, $25. Messrs. Cutler, Zelner, Boon.

RAILWAY ENGINEERING

21w—Railway Engineering. General survey of the problems of railway location, including grades, curvature, rise and fall, etc. 2 cred.; prereq., 14. Mr. Boon.

Lect. I Th; 205E
Lab. (1) I-IV S; 229E (2) I-IV T; 229E

22s—Railway Engineering. Study of the construction and maintenance of railway track and structures. Simple, compound, and spiral curves, and turnouts. 2 cred.; prereq., 21. Messrs. Cutler and Boon.
Lect. VI W; 22E
Lab. (1) VI-IX F; 229E (2) VI-IX M; 229E

121f—Railway Engineering. Train resistance, ruling and momentum grades, curvature, distance, rise and fall as factors in location and operation of railroads. Train loading, acceleration, retardation; locomotives and equipment. Operating costs governing grade revision. 3 cred.; prereq., 23. Mr. Cutler.
Lect. III F; 21E
Lab. (1) I-III T, VII-IX Th; 229E (2) VII-IX T, I-III Th; 227E

122w—Railway Engineering. Lectures, office work, and field inspection. Design and operation of various types of yards and terminals, and terminal facilities, including the hump, engine house, coal and water station. Signaling and interlocking. 3 cred.; prereq., 23. Mr. Cutler.

123s—Railway Engineering. Design and construction of railroad buildings and structures; culverts, wooden trestles, switches, cross-overs, crossing frogs, etc. Earthwork computation, estimates and reports. Distribution of material by mass diagram. 3 cred.; prereq., 23. Mr. Cutler.

124w—Transportation. Development of railway and inland waterway transport, railway regulation and control with special reference to the 1920 Railway Transportation Act, geographical, financial, and rate grouping of railways, Interstate Commerce Commission method of accounting, cost and value of service, present systems, and organization. 3 cred.; prereq., 121; II MWF; 107E. Mr. Cutler.

125s—Transportation. Specific illustrative problems: Twin City and Mississippi Valley traffic situation, Mississippi River experiment, New York Barge Canal, Great Lakes traffic, Panama Canal status. 3 cred.; prereq., 121. Mr. Cutler.

221f-222w-223s—Railway Administration. Analysis of railway organization and methods of management and operation. Special problems. 3 cred. per qtr.; prereq., 122. Mr. Cutler.

224f—Railway Terminals and Yards. Continuation of Course 123. 3 cred.; prereq., 122. Mr. Cutler.

STRUCTURAL ENGINEERING

31f—Stresses in Structures. Algebraic and graphic analysis of various types of bridge trusses for fixed and moving loads. 2 cred.; prereq., M.&M. 26. Mr. Parcel.
Lect. III MW; 21E
Lab. (1) I-II T; 217E (2) III-IV T; 217E

32w—Stresses in Structures. Analysis of simple span bridge trusses. Standard engine loadings and equivalent uniform loads. 3 cred.; prereq., 31, M.&M. 141. Mr. Parcel.
Lect. III M, VI F; 21E Lab. II-III Th; 229E

33s—Elementary Structural Design. Designing principles and methods. Complete designs and detail drawings of typical simple structures. 4 cred.; prereq., 32, M.&M. 128, Dr. 23. Mr. Parcel.
Lect. II M, III Th; 107E Lab. VI-VIII T, VII-IX W; 217E

37s—Structural Engineering. (Ag.E., M.E., E.E.) Analysis of stresses in simple structural frames. Roof trusses, crane girders, mill building bent. 3 cred.; prereq., M.&M. 26 or 84. Mr. Wise.
Lect. VI Th; 107E Lab. VI-IX T, VII-IX Th; 229E

38f—Stresses in Structures. (Arch.) Application of laws of equilibrium to simple structures. Special emphasis is placed on graphic methods. 3 cred.; prereq., M.&M. 93; II MWF; 104E. Mr. C. A. Hughes.

39w—Structural Design. (Arch.) General principles of structural design. Girders, columns, and roof trusses. 3 cred.; prereq., 38; II MWF; 206E. Mr. C. A. Hughes.

41s—Reinforced Concrete. (Arch.) Brief course in theory and designing methods with special reference to building. 3 cred.; prereq., M.&M. 93; II TThF; 206E. Mr. C. A. Hughes.

131w-132s—Bridge Analysis and Design. Stresses in cantilevers, arches, and continuous bridges. Design and detail of typical bridge structure. 2 cred. per qtr.; prereq., 134. Mr. Parcel.

131w VI Th; 205E; VII-IX Th; 227E
132s II W; 136E; VI-VIII Th; 227E

134f—Statically Indeterminate Structures. Theory of deflections and statically indeterminate stresses and their application to continuous girder, frames, swing bridges, and redundant members. 3 cred.; prereq., 33, M.&M. 128. Mr. Parcel.

Lect. VI TF; 205E Lab. VIII-IX M; 227E

135s—Reinforced Concrete Design. Analysis of structures as rigid frames. Application to reinforced concrete buildings. Effect of temperature and shrinkage. Effect of settlement of foundations. 4 cred.; prereq., 142 or 142a; VI-VII M, VI-IX F; 217E. Mr. Wise.

137f,w,s—Structural Laboratory. Theoretical and experimental analysis of structural members and models. 2 cred.; prereq., 134, 141. Mr. C. A. Hughes.

137f I-III ThS; Ex
137w VII-IX M, II-IV T; Ex
137s VI-VIII M, II-IV S; Ex

141f—Reinforced Concrete. Principles of reinforced concrete. Theory of beams, slabs, and columns and the application to ordinary structures. 3 cred.; prereq., M.&M. 128; VI-VII M; 227E; VI Th; 205E. Mr. Wise.

141(a)f—Reinforced Concrete. Similar to 141 with problems of special interest to students in architectural engineering. 3 cred.; prereq., M.&M. 128; VI-VII M; 229E; VI Th; 205E. Mr. Wise.

142w—Reinforced Concrete Design. Continuation of 141 with especial emphasis on the practical features of the design of buildings, bridges, retaining walls, etc. 3 cred.; prereq., 141; VI M; 205E; VI-VII T; 227E. Mr. Wise.

142(a)w—Reinforced Concrete Design. Similar to 142 with problems of special interest to students in architectural engineering. 3 cred.; prereq., 141(a); VI M; 205E; VI-VII T; 229E. Mr. Wise.

143s—Reinforced Concrete Analysis. Advanced problems in design including reinforced concrete arch. 3 cred.; prereq., 134, 142. Mr. Wise.

146f,w,s—Plain Concrete. Theory of design and control of concrete mixtures. Practice in control tests of concrete and concrete materials. Lectures and laboratory work. 3 cred.; prereq., M.&M. 141. Mr. C. A. Hughes.

146f Lect. III MW; 206E Lab. VI-IX W; Ex
146w Lect. III W, IV S; 209Ex Lab. VI-IX W; Ex
146s Lect. III MF; 209Ex Lab. VI-IX F; Ex

147w—Foundations. Design and construction of footings, cofferdams, and caissons for bridges and buildings. Piers and abutments. Underpinning of buildings. Exploration and testing of foundation sites. Excavation and removal of materials from foundation site. 2 cred.; prereq., 33, M.&M. 128; VIII-IX T; 206E. Mr. Wise.

148f-149w-150s—Advanced Concrete. Short research problems in concrete. 2 cred. per qtr.; prereq., 146; ar. Mr. C. A. Hughes.

234f-235w-236s—Advanced Theory of Structures. Application of the theory of indeterminate stresses to the more complex problems of structural analysis. Continuous and swing bridges, simple and multiple arch and suspension systems, wind stresses in tall building frames, secondary stresses. 3 to 5 cred. per qtr.; prereq., 132, 142. Mr. Wise.

237f-238w-239s—Advanced Structural Laboratory. Special problems. 3 to 5 cred. per qtr.; prereq., 137. Mr. C. A. Hughes.

245f-246w-247s—Seminar. Special topics in the higher theory of structures. 3 to 6 cred. per qtr.; prereq., 134, 142. Mr. Parcel.

HIGHWAY ENGINEERING

51f-52w—Highways and Pavements. Elementary course with field inspection, relating to the economies, location, construction, and maintenance of highways and pavements. 3 cred. per qtr.; prereq., 12. Mr. Lang.

51f Lect. (1) VI MTh; 215Ex (2) VI TF; 215Ex
Lab. (1) VII-IX M; 210Ex (3) VII-IX Th; 210Ex
(2) VII-IX T; 210Ex

52w Lect. VII F; 110Ex
Lab. (1) VI-IX T, VI-VII Th; 210Ex (3) VI-IX W, VIII-IX F; 210Ex
(2) VI-IX M, VIII-IX Th; 210Ex

55f—Public Highways. Historical development, administration and legislation pertaining to highways, also general economic problems of highway improvements. 3 cred.; no prereq.; I MWF; 215Ex. Mr. Lang.

154w—Soils Laboratory. Laboratory study of properties of soils which pertain to their stability. 1 cred.; prereq., jr. or sr.; ar.; 210Ex. Mr. Lang.

156w—Highway Transport. Development, economic field, relation to other forms of transportation. Highway transport surveys, economics of location, economics of selection of type of surface, effect of vehicle on road and road on vehicle. 3 cred.; prereq., 52. Mr. Lang.

157s—Highway Transport. Motor vehicle as a common carrier, analysis of road legislation, taxation. Principles of successful operation. Selling motor transportation. 3 cred.; prereq., 156. Mr. Lang.

251s—Highway Laboratory. Investigations in co-operation with State Highway Department. 3 to 5 cred.; prereq., 52. Mr. Lang.

252s—Highway Design. Preparing of a plan and specification for short sections of highway and city streets, also making estimates of materials and cost. 3 to 5 cred.; prereq., 52. Mr. Lang.

HYDRAULIC ENGINEERING

161f—Hydrology. Rainfall, evaporation, transpiration, percolation, run-off. Flood and low water of streams. Storage for use in water supply, water power, irrigation and navigation. Mass curves and frequency curves. 3 cred.; open to sr. only. Mr. Bass.

Lect. II MF; 22E
Lab. (1) VII-IX T; 229E (2) VII-IX Th; 227E

164f,s—Water Power. Types of low, medium, and high-head developments. Details of developments. Dams. Turbine settings and characteristics. 3 cred.; prereq., M.&M. 129. Mr. Bass.

164f Lect. IV T; 203E Lab. II-III, VI-IX W; 227E
164s Lect. II M; 136E Lab. III-IV W, VI-IX F; 227E

263s—Hydraulic Engineering Problems. Special hydraulic problems in laboratory, drafting room, and field. 3 to 5 cred.; prereq., 164.

MUNICIPAL AND SANITARY ENGINEERING

162w-163s—Water Supply and Sewerage. Sources of water supply; quality of water. Methods of testing, collection, distribution, and purification of water. Selection of pumping machinery and motive power. Sewer systems and sewage disposals works. 3 cred. per qtr.; prereq., M.&M. 129. Mr. Bass.

162w Lect. III M; 22E Lab. II-III Th, VI-VII F; 227E
163s Lect. II TF; 136E Lab. VI-VIII T, II-III Th; 227E

171w—Building Sanitation. Location and orientation of buildings; lighting, ventilation, water supply, plumbing, sewage, and refuse disposal. 2 cred.; prereq., sr. arch. only; II TF; 22E. Messrs. Bass and Martenis.

261f-262w—Water and Sewage Purification. Design of water purification and sewage disposal works. 3 to 5 cred. per qtr.; prereq., 163. Mr. Bass.

GENERAL

53s—Civil Engineering Practice. Greater problems of engineering. Interrelations of various branches of engineering in practice. Legal, financial, and business functions of the engineer. Relations of the engineer to government and public affairs. 3 cred.; open to jr. and sr. Mr. Bass.

(1) III T, II WS; 107E (2) III M; 22E; III T, II W; 107E

172s—City Planning. Physical elements of the city; topography, drainage, geology. Public works and structures. Internal and external transportation. Zoning. Subsurface structures. Esthetic features of the city. 3 to 5 cred.; prereq., 52; I MWF; 7E. Messrs. Bass and Mann.

280f-281w-282s—Civil Engineering Research. Original work in concrete, structural steel, hydraulics, municipal or transportation problems. Investigations, reports, tests, designs. 5 cred. per qtr.; by permission. Messrs. Bass, Cutler, Lang, and Parcel.

DAIRY HUSBANDRY

7f,s—Elements of Dairying. Composition of milk. Causes of variation in composition; milk constituents and their uses in dairy manufacture and as food; Babcock test; sanitary handling of milk and cream on the farm. 3 cred.; no prereq.; III MWF; 100HH(UF). Mr. Combs. (For Agr. Eng. only). Students will meet with the lecture section of Dairy Husbandry 1.

DRAWING AND DESCRIPTIVE GEOMETRY

1f,w,su-2w,s,su—Engineering Drawing. Elements of drafting including an introductory course in methods of representation, and constructive geometry. Graphs and formulas. Sketching, lettering, working drawings, conventions, standards, tracing, and blueprinting. 3 cred. per qtr.; prereq., solid geometry. Messrs. Schuck, Potter, Williams, Cruzen, and Quaid.

1f (1) VI-VII MTWF; 417C (3) III-IV TS, VIII-IX T, VI-VII Th; 417C
(2) I-II MTThS; 417C
1w (1) I-II MTThS; 455C (2) III-IV TS, VI-VII TTh; 455C
2w (1) VI-VII MWF, VIII-IX T; 417C (3) III-IV TS, VI-VII TTh; 417C
(2) I-II MTThS; 417C
2s (1) VI-VII TWThF; 455C (2) VIII-IX MTF, III-IV S; 455C

3f,w,s,su—Descriptive Geometry. Elementary course in the methods of representation, correlated in part with analytical geometry. Graphical and algebraic solutions. Lectures, demonstrations, and drafting. 3 cred.; prereq., 2, M.&M. 11. Messrs. Eggers, Levens, and Shultz.

3f (1) VIII-IX MWF, III-IV S; 201E (2) VI-VII MTThF; 455C
3w VIII-IX MWThF; 201E
3s (1) VI-VII TWThF; 417E (3) VIII-IX MTF, III-IV S; 417C
(2) I-II MWFS; 417C

4f,su-5w,su-6s,su*—Engineering Drawing and Descriptive Geometry. (Chem. and chem. engr.) 2 cred. per qtr.; prereq., solid geometry; III-IV MWF; 455C. Messrs. Williams, Schuck, and Cruzen.

7w,su-8s,su*—Engineering Drawing and Descriptive Geometry. (Chem. and chem. engr.) 3 cred. per qtr.; prereq., solid geometry. Messrs. Cruzen and Schuck.

7w III-IV MWF, VIII-IX F; 445C
8s III-IV MWF, VIII-IX Th; 445C

11f—Engineering Drawing (Mines). 4 cred.; no prereq.; III-IV MTWFS; 101E. Mr. Potter.

12w—Engineering Drawing (Mines). 2 cred.; prereq., 11; III-IV WF; 101E. Mr. Potter.

13s—Engineering Drawing (Mines). 3 cred.; prereq., 12; III-IV TWFS; 1E. Messrs. Potter and Levens.

14f—Descriptive Geometry (Mines). Not an engineering elective. 3 cred.; prereq., 13, Mine Math. 5. Messrs. Eggers, Levens, Myers, and Shultz.

(1) I MWF; 3E (2) I MWF; 139EE

15w—Drafting (Mines). 2 cred.; prereq., 14; III-IV WF; 217E. Messrs. Potter and Myers.

21f,w,s,su—Drafting (C.E.) The application of descriptive geometry to drafting room problems including working drawings. 2 cred.; prereq., 3. Messrs. French, Levens, and Myers.

21f (1) III-IV MWF; 201E (2) VI-VII MTTh; 101E
21w III-IV MWF; 201E
21s I-II MWF; 1E

22w,s,su—Drafting (C.E.). Detail, assembly, and construction drawings of steel members and simple structures. Standards, conventions, and graphical methods. 2 cred.; prereq., 21. Messrs. French, Levens, and Myers.

22w (1) III-IV MWF; 1E (2) VI-VII TThF; 1E
22s III-IV MWF; 101E

23f,s,su—Drafting (C.E.). Drafting problems in general construction work including earth work, wood, steel, and concrete. 2 cred.; prereq., 21. Messrs. French, Levens, and Myers.

23f I-II MWF; 201E
23s (1) III-IV MWF; 201E (2) VI-VII MTF; 101E

26w,s,su*—Drafting (E.E.). Applications of descriptive geometry to drafting room problems. Working drawings and tracing. 2 cred.; prereq., 3. Messrs. Eggers, Quaid, and Shultz.

26w (1) VIII-IX MWF; 101E (2) II-III M, I-II ThS; 101E
26s I-II MWF; 201E

28f,w,su*—Drafting (Aero.E.). Application of descriptive geometry to drafting room problems. Working drawings and tracing. 2 cred.; prereq., 3. Messrs. Shultz, Potter, and Williams.

28f (1) VIII-IX M, VII-VIII WF; 101E (2) VI-VII TWTh; 201E
28w VIII-IX T, VI-VII ThF; 101E

* For permissible substitute, see page 57.

29w,s,su—Drafting (Aero.E.). Application of elementary formulas in the proportioning of simple machine parts. Detail and assembly drawings. Machine and structural drafting and graphical methods. 2 cred.; prereq., 28. Messrs. Shultz, Potter, and Williams.

29w VIII-IX T, VI-VII ThF; 201E

29s (1) VI-VII MTh, I-II S; 201E (2) III-IV TS, II-III Th; 201E

34f,w,s—Lettering. Study and analysis of single stroke lettering with particular emphasis on the application to engineering drawing. 1 cred.; prereq., 1. Messrs. Quaid and Cruzen.

(1) IV T; 107E (2) II Th; 107E

37f,w,s—Lettering for Engineers. Analysis of the alphabets. Exercises in roman and Gothic lettering. Design and composition of the paragraph and the title. 2 cred.; prereq., 2; I WF; 101E. Mr. Schuck.

41f,w,s-42f,w,s-43f,w,s—Technical Drawing. (a) General course in the theory and practice of drawing. Sketching, lettering, tracing, conventions, renderings, and mechanical drawings. (b) Modification of the above course of particular interest to dental and medical students. 2 cred. per qtr.; no prereq. Mr. Brainard.

(1) I-II MWF; 411C (3) VIII-IX MWF; 411C

(2) III-IV MWF; 411C

44f,w,s—Lettering. Practical course in plain lettering. Not an engineering and architecture elective. 1 cred.; no prereq. Messrs. Levens and Schuck.

(1) IV T; 104E(f); 203E(w); 215E(s) (2) II Th; 104E(f); 106E(w); 215 E(s)

45f,w,s—Alphabets. Construction and analysis of various types of letters and their arrangement. Exercises, and reference work. Not an engineering and architecture elective. 2 cred. per qtr.; soph., jr., sr.; no prereq.; II TTh; 205E. Mr. Kirchner.

50w,s—Diagrams and Charts. Elementary course dealing with the construction of simple diagrams and charts. 2 cred.; no prereq.; I TTh; 5E. Messrs. Eggers and Cruzen.

51f,w—Graphic Representation and Computation. Types of charts and applications to the solution of problems and equations. 3 cred.; prereq., 2, M.&M. 12; III MWF; 7E. Messrs. Eggers and Levens.

52w,s—Alignment Charts or Collinear Nomograms. Straight and curved scales, and diagrams with adjustment. 3 cred.; prereq., 3, M.&M. 13; ar. Messrs. Eggers and Levens.

53s—Design of Diagrams for Formulas and Experimental Data. Empirical equations. 3 cred.; prereq., 3, M.&M. 13; ar. Messrs. Eggers, Levens, and Shultz.

64f—Graphic Arts. Introduction. Field, development, and application in art and industry. Elementary principles of design. Discussion of materials, style, and technique. Exercises including the construction of simple graphs. 2 cred.; jr., sr. in the School of Business Administration; prereq., 15 cred. in econ.; IV MW; 206E. Mr. Kirchner.

65w—Graphic Arts—Format and Layout. Analysis of the standard type faces. Study of specimens of fine printing. Exercises: simple layouts, including lettering associated with type. Open to students in the School of Business Administration. 2 cred.; prereq., 15 cred. in econ.; IV MW; 206E. Mr. Kirchner.

66s—Graphic Arts—Processes. Design and composition including the use of illustrations in black and white, line, and color. Discussion of the various processes of printing, lithography, and engraving. Exercises in planning for

text and display work. Open to students in the School of Business Administration. 2 cred.; prereq., 15 cred. in econ.; IV MW; 206E. Mr. Kirchner.

69f,w,s—Exercises in Lettering. (Nurses.) See School of Nursing bulletin. 1 cred. per qtr. Messrs. Myers, French, Potter, and Williams.

81f,w,s-82f,w,s-83f,w,s—Advanced Drawing. 3 cred. per qtr.; prereq., 43 or equivalent. Messrs. Kirchner and Brainard.

86f,w,s-87f,w,s—Anatomical Drawing. 3 cred. per qtr.; prereq., 43 or equivalent. Messrs. Kirchner and Brainard.

111f,w,s-112f,w,s-113f,w,s—Advanced Descriptive Geometry. Methods of representation; parallel and central projection. Curves and surfaces, geometrography, axonometry, and photogrammetry. 3 cred. per qtr.; prereq., 3, calculus. Messrs. Kirchner, Eggers, and Levens.

114f,w,s—Perspective. Principles and practice of perspective, including shadows, reflections, distortions, corrections, systems, methods, the practical problem, and inverse construction. 3 cred.; prereq., 63. Mr. Kirchner.

157f-158w-159s—Graphical Methods. Theory and construction of graphic charts and diagrams. Course can be entered at any quarter. 2 cred. per qtr.; prereq., soph. draw., M.&M. 26. Messrs. Kirchner, Eggers, and Levens.

157f IV MW; 5E
158w IV MF; 139EE
159s I MF; 203E

215f-216w-217s—Geometry. Pure and applied. Transformations, kinematics, stereotomy, graphic statics, graphic calculus. 3 cred. per qtr.; prereq., calculus. Mr. Kirchner.

218f,w,s-219w-220s—Nomography. Technique and theory of computing charts. Equations of three and more variables. Determination of constants of empirical equations. 3 cred. per qtr.; prereq., 3, M.&M. 128. Messrs. Kirchner, Eggers, and Levens.

ECONOMICS

3w,s—The Mechanism of Exchange. Elementary course in money and banking. Financial institutions and their relations. Relation of financial organization to economic organization. 5 cred.; no prereq. Mr. Stehman and others.

3w Lect. III TTh; BuAud
Rec. (1) I TThS; 2F (4) IV MWF; 301B
(2) II MWF; 104F (5) V MWF; 202B
(3) III MWF; 303B (6) VI MWF; 202B

3s Lect. III TTh; BuAud
Rec. (1) I MWF; 11F (7) IV MWF; 5F
(2) I TThS; 302B (8) V MWF; 102B
(3) II MWF; 9F (9) V MWF; 6B
(4) II TThS; 6B (10) VI MWF; 6F
(5) III MWF; 303B (11) VI MWF; 302B
(6) III MWF; 9F (12) VII MWF; 202B

8f-9w—General Economics. (Eng., Arch., Chem.) Principles of economics with special emphasis upon their application to current problems such as money, banking, conservation, insurance, international commerce, monopolies, transportation, labor, socialism, public ownership, and finance. 3 cred. per qtr.; no prereq. Mr. Filipetti and others.

(1) I MWF; 136E(f), 135E(w) (3) III MWF; 135E
(2) II MWF; 135E (4) IV MWF; 135E

14f,w,s†—Elements of Statistics. Elementary concepts in statistical method; averages, ratios, errors, sampling, index numbers, graphic representation, collection of material. 5 cred.; prereq., 8, 9. Messrs. Mudgett, Kozelka, and others.

14f	(1) I MTWThF; 200Pt	(3) IV MTWFS; 200Pt
	(2) III MTWThF; 11F	(4) VI MTWThF; 209B
14w	(1) III MTWThF; 11F	(3) VI MTWThF; 102B
	(2) IV MTWFS; 11F	(4) VII MTWThF; 303B
14s	(1) I MTWThF; 200Pt	(4) IV MTWFS; 209B
	(2) II MTWThF; 302B	(5) VI MTWThF; 102B
	(3) III MTWThF; 200Pt	

20f,w,s—Elements of Accounting. Fundamental principles underlying bookkeeping and accounting. Sufficient practice in technical processes will be given to serve as a background for more advanced work. Preparation and analysis of statements. Open only to Engineering Pre-Business students. Other engineering students register in 29. 3 cred.; no prereq. Mr. Heilman and others.

20f*	(1) I MWF; 302B	(5) III TThS; 302B
	(2) I TThS; 302B	(6) V MWF; 302B
	(3) II TThS; 302B	(7) VI MWF; 303B
	(4) III MWF; 302B	(8) VII MWF; 302B
20w*	(1) I TThS; 303B	(4) V MWF; 301B
	(2) III TThS; 303B	(5) VI MWF; 6B
	(3) III MWF; 301B	
20s*	(1) I MWF; 303B	(4) IV MWF; 302B
	(2) I TThS; 301B	(5) VI MWF; 303B
	(3) III TThS; 303B	

25w,s-26f,s—Principles of Accounting. Course following Econ. 20 presenting the principles underlying the accounting statements, the accounts, principles of valuation, depreciation, preparation and analysis of statements. 3 cred. per qtr.; prereq., 20. Mr. Heilman and others.

25w-26s	(1) I MWF; 302B	(4) III MWF; 302B
	(2) II MWF; 301B	(5) VI MWF; 301B
	(3) II TThS; 301B	
25s	(1) II MWF; 303B	(3) V MWF; 302B
	(2) III TThS; 301B	
26f	(1) III TThS; 303B	(2) IV MWF; 302B

28f,s—Business Law. Business law arranged for engineers, including the law of contracts, suretyship, agency, partnership, corporations, negotiable instruments, conveyance patents, and riparian rights. 3 cred.; soph., jr., sr. with 6 cred. in econ. or sr. without econ. cred.; I MWF; 135E. Mr. Palmer.

29f,s—Principles of Accounting. (Eng., Arch., Chem.) Purpose and principles of account classification; capital and revenue; accruals; valuation; depreciation; preparation and interpretation of balance sheets, income accounts, and other statement. 3 hrs. of lect. a week. 3 cred.; no prereq. Mr. Lund.

29f IV MWF; 3E
29s I MWF; 205E

149f,w,s—Business Cycles. Analysis of factors involved in business fluctuations. Comparison of theories of the cause of prosperity and depression. Introduction to the statistical data and methods of business forecasting. 3 cred.; sr., grad.; prereq., 3 and 8, 9.

149f III TThS; 209B
149w I MWF; 209B
149s III MWF; 102B

* 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 be admitted to Econ. 25.

† Credit may not be received for both Econ. 14 and B.A. 70.

161f,w,s—Labor Problems and Trade Unionism. Discussion of employment; hours; wages; extent and strongholds of unionism; open and closed shops; collective bargaining; industrial unrest; government regulation of labor disputes. 3 cred.; prereq., 8, 9. Mr. Hansen.
161f IV MWF; 202B
161w III TThS; 209B
161s III TThS; 102B

BUSINESS ADMINISTRATION

51f-52w-53s—Business Law.* 51. Contracts. 52. Agency, Partnership, Corporations. 53. Negotiable Instruments. 3 cred. per qtr.; jr., sr.; prereq., for 51, Econ. 8 and 9, for 52 and 53, B.A. 51. Mr. Dalzell.
Lect. IV T; JAud
Rec. (1) I ThS; 301F
(2) II ThS; 301F
(3) III ThS; 301F

58f,w,s§—Elements of Public Finance. Public expenditures, revenues, and debts. Special attention is given to tax principles, practices, and burdens. Condensed course given especially for business administration students. 3 cred.; jr., sr.; prereq. Econ. 8, 9. Mr. Blakey.
58f IV MWF; 209B
58w IV MWF; 102B
58s IV MWF; 202B

70f†—Statistics Survey Course. Tools and devices which facilitated the use of business data. Statistical information is collected by questionnaires, consolidated into tables, summarized in averages, and illustrated by graphic devices. Current index numbers are compared in form and application. Interpretation and limitations of statistical data. 4 cred.; prereq., Econ. 8, 9; I MWThF; 6B. Mr. Gaumnitz.

71f,w,s—Transportation: Services and Charges I. Survey of rail, highway, and water transportation facilities, services, and rates. Current transportation problems. 3 cred.; prereq., Econ. 8, 9. Mr. Crawford.
71f I MWF; 209B
71w,s VI MWF; 202B

72f—Transportation: Services and Charges II. Principles, construction, interpretation, and use of rail, highway, and water classifications, rates, and tariffs for handling freight, express, and mail shipments. Audit of transportation charges. Adjustment of rates, rules, and regulations. 3 cred.; prereq., B.A. 71; VII MWF; 6B. Mr. Crawford.

77f,s—Survey in Marketing. (An introductory course.) The principles of production economics and of price as illustrated in marketing. Commodity classifications, market functions, description of market organizations. 3 cred.; jr., sr.; not open to students who have credit for Econ. 2. Mr. Cassady.
77f I TThS; 209B
77s I TThS; 202B

89f,w,s—Production Management. Analysis of the procedure and methods of production in industrial plants, the factors involved in production management, the means of effecting control. 3 cred.; prereq., Econ. 8, 9. Mr. Filipetti.
89f II MWF; 202B
89w II MWF; 202B
89s I MWF; 209B

* No credit will be given for 51, 52, or 53 until all three are completed.
† Students may not receive credit for both Econ. 14 and B.A. 70.
§ Credit may not be received for both Econ. 191-192 and B.A. 58.

100f,w,s—Report Writing. 1 cred.; jr., sr. Mr. Heilman.
100f VI T; 202B
100w IV S; 202B
100s VI T; 202B

101f,w-102w,s‡§—Advanced General Economics. A study of some of the more important theoretical problems of economics; competitive and monopoly prices; equilibrium prices and costs; theories of valuation of producers' goods; capital earnings and interest rates; profits. 3 cred. per qtr.; sr.; prereq., Econ. 8, 9. Messrs. Garver, Schmidt, and Mudgett.
101f-102w (1) II TThS; 6B (3) III TThS; 301B
(2) III MWF; 102B
101w-102s I TThS; 102B

112f,w,s—Business Statistics. Survey and criticism of methods used in analyzing time series, with special applications to the study of cyclical fluctuations of economic phenomena. 3 cred.; jr., sr., grad.; prereq, Econ. 14 or B.A. 70. Messrs. Mudgett and Kozelka.
112f (1) II TThS; 209E (2) III TThS; 102B
112w (1) I TThS; 302B (2) II MWF; 209B
112s (1) II MWF; 6B (2) III TThS; 6B

130f,s—Cost Accounting. (General survey.) 3 cred.; prereq., Econ. 26 or 29; I TThS; 303B. Mr. Ostlund.

139f,w,s—Advanced General Accounting. A course intended particularly for the general student of business. Interpretation of accounts and statements, statement preparation, and analysis. Utilization of the statements by the executive. The use of budgets in business. Accounting methods and statements in a number of business fields. 3 cred.; jr., sr., grad.; prereq., Econ. 25, 26. Mr. Heilman.
139f IV MWF; 303B
139w VI MWF; 303B
139s IV MWF; 303B

142f,w,s—Money and Banking. Advanced Course. 3 cred.; jr., sr., grad.; prereq., Econ. 3 and 8, 9.
142f (1) II MWF; 6B (2) VI MWF; 202B
142w (1) II TThS; 209B (2) IV MWF; 303B
142s II TThS; 209B

155f,w,s—Corporation Finance. 3 cred.; prereq., Econ. 8, 9; III MWF; 202B. Mr. Stehman.

165f,w,s—Economics of Public Utilities. Economic and legal bases of classification. Relative advantages of public ownership and regulation. Central and municipal regulation. Basis of rates; relative rates; rates and service. Theories of valuation. 3 cred.; prereq., 8, 9; III TThS; 202B. Messrs. Garver and Schmidt.

167w—Personnel Administration. Managerial policy for various types of organization of labor. Job analysis, employment, incentives, and regulation of employment. 3 cred.; prereq., Econ. 161; I TThS; 202B.

180-181-182G—Senior Topics Course—Production Management. Selected problems in management; technique of executive control in manufacturing enterprises; field research and surveys in organization and management of Northwest industrial concerns. 9 cred.; prereq., B.A. 89, 130; VI MWF; 209B. Mr. Filipetti.

(For other courses see Combined Class Schedule bulletin for 1934-35, School of Business Administration section.)

‡ Credit may not be received for both B.A. 101-102 and B.A. 107.
§ The entire course must be completed before credit is received for any quarter.

ELECTRICAL ENGINEERING†

11f-13w-15s—Elements of Electrical Engineering. Introduction to the development, principles, materials, safety, and general applications of electrical engineering. 3 cred. per qtr.; prereq., reg. in phys., and not more than 1 qtr. behind in math. Mr. Todd.

11f	Lect.	(1) III TThS; 138EE	(3) I TThS; 138EE
		(2) I TThS; 238EE	
13w	Lect.	(1) I TThS; 238EE	(3) III TThS; 139EE
		(2) I TThS; 36EE	
	Lab.	(1) VI-VII M; 21EE	(4) VIII-IX Th; 21EE
		(2) VI-VII T; 21EE	(5) VIII-IX M; 21EE
		(3) VIII-IX M; 21EE	(6) VI-VII Th; 21EE
15s	Lect.	(1) III TThS; 237EE	(3) I TThS; 36EE
		(2) I TThS; 238EE	
	Lab.	(1) VIII-IX M; 21EE	(4) VIII-IX Th; 21EE
		(2) VI-VII Th; 21EE	(5) VI-VII W; 21EE
		(3) VIII-IX T; 21EE	(6) VI-VII F; 21EE

111f-113w-115s—Junior Electrical Engineering. Alternating-current circuits and machinery. 5 cred. per qtr.; prereq., 11, 13, 15.

111f	(1) I MTWFS; 237EE	(2) II MTWFS; 237EE
113w	(1) I MWThFS; 237EE	(2) II MWThFS; 237EE
115s	(1) I MTWThF; 237EE	(2) II MTWThF; 237EE

112f-114w-116s—Junior Electrical Engineering Laboratory. Taken with Courses 111, 113, 115. Experimental study of alternating-current circuits and machinery. 2 cred. per qtr.; prereq., reg. in 111, 113, 115.

112f	(1) VI-IX M; 107EE	(3) VI-IX Th; 107EE
	(2) VI-IX W; 107EE	(4) VI-IX F; 107EE
114w	(1) VI-IX M; 107EE	(3) VI-IX W; 107EE
	(2) VI-IX T; 107EE	(4) VI-IX Th; 107EE
116s	(1) VI-IX M; 107EE	(3) VI-IX Th; 107EE
	(2) VI-IX W; 107EE	(4) VI-IX F; 107EE

121f-123w-125s—Senior Electrical Engineering. Theory of alternating and direct current machinery. 3 cred. per qtr.; prereq., 115, 116.

(1) III MWF; 237EE (2) IV MWF; 237EE

122f-124w-126s—Senior Electrical Engineering Laboratory. Operating characteristics of alternating and direct current machinery. 2 cred. per qtr.; prereq., 116 and reg. in 121, 123, 125.

(1) VI-IX T; 107EE (3) VI-IX Th; 107EE
(2) VI-IX W; 107EE (4) VI-IX F; 107EE

127f-128w-129s—Transient Electrical Phenomena. Mathematical study of electric circuits during sudden changes of conditions. Classical and operational methods of analysis applied to electric circuits and machines, and use of the oscillograph in the analysis of these problems. 3 cred. per qtr.; prereq., reg. in 121, 123, 125; I TTh; 139EE; VI-VIII W; 107EE. Messrs. Bryant and Johnson.

138f-139w-140s—Slow Transients. Short-circuit currents in power networks, unbalanced loads in polyphase circuits, transformers and motors, harmonics, stability of power systems under steady state conditions. Application of relay, oil circuit breakers, and lightning arresters to power systems for protection of apparatus and service. 3 cred. per qtr.; prereq., reg. in 121, 123, or 125; II MWF; 339EE. Messrs. Bryant, Caverley, and Johnson.

† In courses continuing through three quarters, the work of each quarter is prerequisite for following quarters.

227f-228w-229s—Transients in Electrical Machinery and Transmission Lines. Theoretical and laboratory study of transients in electrical power machinery and of lightning surges and lightning protection. 3 cred.; per qtr., prereq., 127, 128, and 129. Mr. Bryant.

DESIGN

132f-134w-136s—Electrical Design. The design of direct current generators and motors, alternating current transformers, generators and synchronous motors. 2 cred. per qtr.; prereq., for 132, 125; for 134 and 136, 121; II TS; 335EE. Mr. Kuhlmann.

232w-234s-236f—Electrical Design. Special problems. 2 cred. per qtr.; prereq., 132, 134, 136. Mr. Kuhlmann.

237s—Power Transmission Line Design. Preparation of detailed plans and specifications for construction of high voltage transmission lines and distributing systems. 3 cred.; prereq., 134, 142. Mr. W. T. Ryan.

ELECTRIC POWER

36f-37w-38s—Electric Power. Similar to 43-44-45. 3 cred. per qtr.; sr. M.E.; prereq., Phys. 43, 44.

36f-37w	Lect. III MW; 238EE	
	Lab. (1) I-II W; 107EE	(2) III-IV S; 107EE(f); III-IV F; 107EE(w)
38s	Lect. III MF; 238EE	
	Lab. (1) II-III W; 107EE	(2) I-II T; 107EE

40f—Electric Wiring and Equipment. Elements of direct and alternating current circuits. Interior wiring and electrical equipment of buildings. Elements of illumination. 2 cred.; sr. arch. and arch. engr.; prereq., Phys. 43; IV MW; 139EE.

41f—Electric Power. Elementary principles of continuous and alternating currents, generators, and motors, transmission and distribution. Measurement of power. 3 cred.; sr. mines; prereq., Phys. 43.

Lect. II TTh; 138EE — Lab. I-III F; 107EE

42w,s—Electric Power. Similar to 41. Sr. C.E. 4 cred.; prereq., Phys. 43, 44.

Lect. I TThS; 138EE — Lab. III-IV T; 107EE

43f-44w-45s—Electric Power. Elementary study of the generation, distribution, measurement, and utilization of electric power. 3 cred. per qtr.; sr. Ch.E.; prereq., Phys. 43, 44.

43f-44w	Lect. III TTh; 139EE(f); 138EE(w)	
	Lab. (1) I-II T; 107EE	(2) I-II S; 107EE
45s	Lect. III TTh; 138EE	
	Lab. (1) II-III F; 107EE	(2) I-II M; 107EE

46f-47w-48s—Electric Power. Similar to 43-44-45. 3 cred. per qtr.; sr. Aero.E.; prereq., Phys. 43, 44.

	Lect. VI MF; 237EE	
46f	Lab. (1) III-IV M; 107EE	(2) II-III Th; 207EE
47w	(1) II-III M; 107EE	(2) I-II Th; 107EE
48s	VIII-IX M; 335EE	

49w—Electric Motors. Elementary principles of direct and alternating current motors. Applications to elevators and ventilation equipment. 2 cred.; sr. arch. engr.; prereq., 40; III WF; 138EE. Mr. Todd.

141f—Central Stations. Electric power generating stations and distributing systems. Load diagrams. Selection of prime movers and units. Cost of elec-

trical energy. Methods of charging. Maintenance of plants. 2 cred.; prereq., reg. in 121; III TTh; 237EE. Mr. W. T. Ryan.

142w—Electrical Transmission. Consideration involved in the designing and building of transmission lines. Kelvin's law and its limitations. Transmission line as a mechanical structure. Lightning arresters. 2 cred.; prereq., reg. in 123; III TTh; 237EE. Mr. W. T. Ryan.

144w—Railway Electrical Engineering. Principles of mechanics applied to electric train movements. 2 cred.; prereq., 42 or 45 or 48 or 115; IV T, III S; 237EE. Mr. Johnson.

145s—Railroad Electrification. Reasons for electrification. Study of European and American systems. Results of electrification. 2 cred.; prereq., 144; IV T, III S; 339EE. Mr. Johnson.

ILLUMINATING ENGINEERING

151f—Illuminating Engineering. Nature of light. Laws of vision. Principles of illumination. Photometry. Sources of light and their characteristics. Lighting equipment. Illumination requirements and calculation for various fields of use. 2 cred.; prereq., Phys. 43; IV T, III S; 237EE. Mr. Johnson.

152f—Photometric Laboratory. Photometer practice. Distribution curves of lamps and reflectors. Measurement of lighting installations. 1 cred.; prereq., reg. in 151; VI-VII Th; ar. Mr. Johnson.

153w-154s—Illumination Problems. Illumination design and specifications applied to problems in street, residence, industrial, commercial, and other kinds of lighting. 2 cred. per qtr.; prereq., 151. (Not offered in 1934-35.)

251w-253s—Illuminating Engineering. Lectures and laboratory work. Methods of determining locations, kind, and quality of lights for obtaining desired illumination. 2 cred. per qtr.; prereq., 151. Mr. Johnson.

TELEPHONE AND TELEGRAPH ENGINEERING

64f-65w-66s—Elements of Communication. Theoretical and laboratory study of communication circuits and apparatus. Simplex, duplex, multiplex telegraph systems. Speed of transmission. Magneto, common battery, manual, automatic telephone systems. 2 cred. per qtr.; prereq., reg. in 111, 113, 115. Mr. Hartig.

Lect. III M; 335EE
Lab. (1) VI-VII T; 307EE (3) VI-VII W; 307EE
(2) VIII-IX T; 307EE (4) VIII-IX W; 307EE

164f-165w-166s—Electric Communication. Telephone circuits at audio and carrier frequencies. Theoretical and laboratory study of circuits having distributed constants. Use of hyperbolic functions. Wave filters, balancing networks, equalizers, repeaters. 3 cred. per qtr.; prereq., 66. Mr. Hartig.

Lect. I MW; 138EE
Lab. (1) VI-VIII Th; 307EE (2) VI-VIII F; 307EE

267f-268w-269s—Telephone Transmission. Advanced transmission theory at communication frequencies. Class and laboratory. 2 or 3 cred.; reg. by permission. Mr. Hartig.

272f-273w-274s—Electromechanical Vibrating Systems and Engineering Acoustics. Theoretical discussion of the production of sound by electrically driven vibrating systems, sound transmission, reflection, absorption. Laboratory study of vibrating systems, pipes, horns, absorbing materials, sound pressure, articu-

lation, reverberation, resonance, sound filters. 2 cred.; open to grad. and sr. by permission; prereq., M.&M. 150. Mr. Hartig.

287f-288w-289s—Advanced Communication Laboratory and Seminar. Special problems in communication. Study and discussion of current articles on communication. 2 or 3 cred.; reg. by permission. Mr. Hartig.

RADIO ENGINEERING

161f-162w-163s—Radio Communication. Theoretical and laboratory study of radio transmitting and receiving circuits and apparatus. Amplifiers, detectors, oscillators. Electromagnetic waves in free space and on antenna systems. 3 cred. per qtr.; prereq., reg. in 121, 123, 125. Mr. Webb.

Lect. II MW; 335EE

Lab. (1) VI-VII M; 308EE
(2) VIII-IX M; 308EE
(3) VI-VII T; 308EE
(4) VIII-IX T; 308EE
(5) VI-VII W; 308EE

215f-216w-217s—Electronics. Theoretical and laboratory study of the following subjects with aspects of their engineering applications. Electron emission from hot bodies, Richardson's equation, Langmuir-Childs equation, secondary electron emission, ionization and resonance potentials, external and internal photoelectric effect, positive ion emission, shot effect, discharge of electricity through gasses, "getter" action, Barkhausen-Kurtz effect, ionization due to radioactivities, etc., Heavyside layer as a reflecting and a refracting medium, long period echo effect, electron waves, vacuum gauges, vacuum technic, etc. 2 cred. per qtr.; reg. by permission of instructor. Mr. Webb.

261f-263w-265s—Advanced Radio Communication. Theoretical study of the transmission of electromagnetic waves. Design and testing of radio transmitting and receiving apparatus. Theory of electron tubes and their use in radio circuits. High frequency measurements. Taken with 262-264-266. 2 cred. per qtr.; reg. by permission. II TTh; 339EE. Mr. Webb.

262f-264w-266s—Advanced Radio Laboratory. Special problems in radio laboratory and station, usually taken in connection with Course 261-263-265. For students specializing in electrical communication. 1 or more cred. per qtr.; reg. by permission. Mr. Webb.

270f—Radio Transmission. Design and operation of modern transmitting equipment, with special emphasis on broadcast transmission. Graduate course, open to sr. by permission of instructor. 2 cred. Mr. Webb.

271w—Radio Receiver Design. Detailed study of the problems arising in broadcast receiver design. Graduate course, open to sr. by permission of instructor. 2 cred. Mr. Webb.

RESEARCH

171w-172s—Undergraduate Thesis. Investigation of some approved problem in electrical engineering. 3 to 6 cred. per qtr.; prereq., 121.

275f-276w-277s—Electrical Engineering Research. Investigation of special problems in laboratory or library. 2 to 6 cred. per qtr.; grad.

MEASUREMENT

81w—Electrical Engineering Measurements. Principles of electrical measuring instruments, construction, limitations, sources of error, methods of calibra-

tion. Methods of measuring voltage, current, watts, watt hours, resistance, inductance, mutual inductance, capacity. 3 cred.; prereq., 111. Mr. Todd.
Lect. IV MW; 339EE Lab. VI-VII M; 107EE

181s—Communication Frequency Measurements. Vector treatment of network. Bridge circuits for measuring of resistance, inductance, and capacity of audio and radio frequencies. 2 cred.; prereq., 126. Mr. Hartig.

183f-184w-185s—Special Electrical Laboratory. Efficiency tests and special problems. 1 to 3 cred. per qtr.; 1 to 12 cred. total; prereq., jr., sr., grad. by permission.

186w,s—High Tension Testing. Low-high frequency to several million voltage, applied to study of dielectric phenomena, such as testing high tension transmission cables, transformer oil, transmission line insulators. 2 cred.; prereq., 123, 124, or reg. in 123 or 124, and by permission.

187f-188w-189s—Special Communication Laboratory. Special problems in electrical communication. Includes a weekly seminar meeting. 1 to 2 cred. per qtr.; 1 to 12 cred. total; jr., sr., grad. by permission. Mr. Hartig.

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. 2 cred. per qtr.; prereq., 126.

284w-285s-286f—Precise Electrical Engineering Measurements. Measurements of resistance, voltage, current, self-induction, and capacity; standardization of measuring instruments. 2 cred. per qtr.; prereq., 122.

GENERAL

91s,su—Inspection Trip. Personally conducted inspection of factories, power plants, and other places of engineering interest. During spring recess or in summer, costing about $50 for each person. 1 cred.; prereq., 11.

93s—Seminar. Weekly discussion of current engineering periodicals and reports on assigned topics. 1 cred.; no prereq.; jr. EE. (Not offered in 1934-35.)

156s—Vacuum Tube and Control Devices. Two, three, four, and five electrode vacuum tubes. Thyration, kenotron, grid glow, photo-electric tubes, etc. Theoretical study of apparatus and circuits with demonstrations. 2 cred.; sr. only; not open to students having credit in 161; IV MW; 139EE. Messrs. Hartig and Webb.

191f-192w-193s—Seminar. Weekly discussion of current electrical periodicals. 1 cred. per qtr.; prereq., 111.

211f-212w-213s—Advanced Circuit Analysis. Circuit analysis using Heaviside's *Operational Calculus*. 2 cred. per qtr.; grad.; prereq., M.&M. 150. Mr. Hartig.

291f-292w-293s—Graduate Seminar. Discussion problems and results of research work. 1 cred. per qtr.; prereq. 126. (Not offered in 1934-35.)

ENGINEERING ENGLISH

4f,w-5w,s-6f,s—Rhetoric and Composition. Review of grammar; principles of composition; constant practice in elementary technical exposition. Reading. 3 cred. per qtr.; no prereq. Messrs. Richardson, Becklund, Guthrie, and Haga.

4f	(1) II MWF; 107E	(7) VI MWF; 107E
	(2) II MWF; 5E	(8) VI MWF; 104E
	(3) II MWF; 7E	(9) VII MWF; 107E
	(4) IV MWF; 107E	(10) VII MWF; 104E
	(5) IV MWF; 104E	(11) VII MWF; 215E
	(6) IV MWF; 22E	
4w	V MWF; 107E	
5w	(1) III MWF; 107E	(6) VI MWF; 203E
	(2) III MWF; 203E	(7) VI MWF; 206E
	(3) III TThF; 107E	(8) IV MWF; 215E
	(4) III TThF; 203E	(9) IV MWF; 4E
	(5) VI MWF; 107E	
5s	V MWF; 107E	
6f	I MWF; 107E	
6s	(1) III MWF; 107E	(5) I TThS; 107E
	(2) III MWF; 203E	(6) I TThS; 215E
	(3) VI MWF; 107E	(7) VII MWTh; 107E
	(4) VI MWF; 215E	(8) VII MWTh; 215E

7w-8s—Explorations in Literature. An attempt to introduce world literature to the student through a study of books and their authors. 3 cred. per qtr.; credit given for either qtr.; prereq., 6; IV MWF; 107E. Mr. Richardson.

36s—Technical Writing. Training in the various types of reports, technical articles, and new stories written by engineers in the practice of their profession. 3 cred.; prereq., 6; I MWF; 107E. Mr. Haga.

37w,s—Technical Discussions. (M.E.) Oral presentation of technical papers for the purpose of developing speaking ability. Class criticism. Extemporaneous discussion. Limited to thirty students. 3 cred.; prereq., 6; III MWF; 4E(w), 135E(s). Mr. Richardson.

FORESTRY

1f—General Forestry. A brief history of the development of forestry in Europe and America; its bearing on the forestry problems of the United States; description of the United States forests. Lectures and collateral reading. 3 cred.; no prereq.; III TThS; 102Hr(UF). Mr. Cheyney.

27w—Farm Woodlots and Windbreaks. Trees and their relation to the farm. Planning and planting farm windbreaks and shelter belts. Utilization and marketing of farm grove, or woodlot products. 3 cred.; no prereq.; IV MWF; 301Hr(UF). Mr. Cheyney.

FRENCH

1f,w,s-2f,w,s—Beginning French. 5 cred. per qtr.; no prereq.

1f-2w	(1) I MWThFS; 213F	(3) VI MTWThF; 226F
	(2) IV MTWFS; 227F	
1w-2s	IV MTWFS; 202F	
1s	(1) I MWThFS; 227F	(2) IV MTWFS; 124F
2f	(1) I MWThFS; 202F	(2) VI MTWThF; 213F

3f,w,s-4f,w,s—Intermediate French. 5 cred. per qtr.; prereq., 1-2 or 2 years high school French.

3f-4w	(1) I MWThFS; 124F	(3) VII MTWThF; 213F
	(2) III MTWFS; 226F	
3w-4s	(1) I MWThFS; 202F	(2) VI MTWThF; 213F
3s	(1) I MWThFS; 213F	(3) VI MTWThF; 226F
	(2) IV MTWFS; 227F	
4f	(1) II MWThFS; 113F	(3) VI MTWThF; 202F
	(2) IV MTWFS; 124F	

GENERAL ENGINEERING

11f-12w-13s—Orientation. General lectures for vocational guidance covering the various phases of engineering and allied professions. Hygiene and first aid. Introduction to the University. Illustrated by lantern slides and motion pictures. Given by various members of the university staff. No cred.; no prereq.; required of freshmen in Engineering and Architecture. 13s is required of freshmen in Chemistry. Mr. Zelner.

11f IX Th; 100C
12w IX Th; 100C
13s VIII W; 100C

81f,w,s—Estimating. Plan reading and quantity surveying. Study of costs of concrete, brick, timber, and steel construction. Analysis of material and labor costs. 3 cred.; jr., sr., only. Mr. French.

81f IV MW; 2 hr ar; 21E
81w IV MW; 2 hr ar; 138EE
81s I MW; 2 hr ar; 139EE

101w—Contracts and Specifications. Engineering specifications. Classes of specifications; essential features; clauses, details. Bids and bidders, engineering contracts. 3 cred.; jr. and sr. only; IV MWF; 238EE. Mr. Fixen.

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. 2 cred.; sr. and grad. only; III TTh; 339EE. Mr. W. T. Ryan.

112f-113w-114s—Rates for Public Utility Properties. Determination of the rate base and depreciation amount for transportation, gas, water, electric power and telephone utilities operating expenses, the rate structure for particular utilities, service and discrimination. 3 cred. per qtr.; sr. and grad. in engineering only. Mr. Bryant.

193s—Engineering Practice. Engineering relations, legal and ethical, collaboration and consultation; technical reports, investigation and estimates. Professional employment, ownership of plans, patents and rights of invention. Day labor and contract systems of construction; public and private works, arbitration. 2 cred.; sr. only. Mr. Martenis.

(1) II F; 252ME; III Th; 254ME (2) III TTh; 254ME

GEOLOGY AND MINERALOGY

1f,w,s,su-3w,s—General Geology (Dynamic and Economic). A synoptical treatment of the materials of the earth and the origin, distribution, and occurrence of metals, non-metals, coal, and petroleum. 6 cred.; no prereq. Mr. Emmons.

1f	Lect. III TThS; 110P	Rec. III F; 110P
1w	Lect. II MWF; 110P	Rec. II S; 110P
1s	Lect. III MWF; 110P	Rec. III Th; 110P
3w	Lect. III TThS; 110P	Rec. III F; 110P
3s	Lect. II MWF; 110P	Rec. II S; 110P

Af,w,s-Cw,s—General Geology Laboratory (General and Economic). 4 cred.; no prereq.

Af	(1) III-IV MW; 220P	(2) VI-VII TTh; 220P
Aw	I-II TTh; 220P	
As	III-IV TS; 220P	
Cw	(1) III-IV MW; 220P	(2) VI-VII TTh; 220P
Cs	I-II TTh; 220P	

5f—Engineering Geology. Materials of the earth and geologic processes. Application of geology to engineering problems. Lectures, rock study, and reference work. 3 cred.; no prereq.; I MWF; 110P. Mr. Schwartz.

6w—Applied Geology for Engineers. Occurrence, properties, production, and uses of building stones, cements, clay, fuels, and road materials. Lectures and reference work. 3 cred.; prereq., 5; I MWF; 110P. Mr. Schwartz.

7s—Applied Geology for Engineers. Includes a brief survey of the occurrence of the important metals. Lecture and reference work; 3 cred.; prereq., 6; I MWF; 110P. Mr. Schwartz.

23w-24s—Elements of Mineralogy. The crystal systems; morphological, physical, and chemical characters of minerals; occurrence, genesis, and use of minerals; classification and description of common minerals, rock minerals, and common rocks. Determinative work in laboratory, blowpipe analysis, sight identification. 8 cred.; prereq., Inorg. Chem. 10. Mr. Gruner.

23w Lect. II WF; 206P
Rec. ar Th; 210P
Lab. (1) VII-VIII WF; 100P
(2) III-IV TS; 100P

24s Lect. II MWF; 206P
Rec. VII F
Lab. (1) VIII-IX MF; 100P
(2) III-IV M; VII-VIII W; 100P

67f—Mineralogy of Chemical Materials. Lectures on special laboratory methods of mineralogy, nature and identification of the chief commercial minerals, and the world's supply and market for the same. Laboratory work in identification and tests of the value of minerals. 3 cred.; prereq., 6 qtr. cred. of chemistry at University. Mr. Gruner.

121f—Crystallography. Study of crystal models and space groups. Crystal drawings and measurements. Projections and mathematical calculations. 3 cred.; prereq., M.&M. 11, and Inorg. Chem. 10. Mr. Gruner.

For other electives in the Department of Geology see the Combined Class Schedule bulletin for 1934-35, College of Science, Literature, and the Arts section.

GERMAN

24f-25w-26s—Chemical German. Pronunciation, reading, sentence analysis, and translation. 4 cred. per qtr.; no prereq.

(1) IV MTWF; 113F
(2) IV MTWF; 209F
(3) V MTWF; 207F

HISTORY

1f-2w—The Modern World. 5 cred. per qtr.; no prereq. Mr. Ford.

Lect. II TThS; BuAud
Rec. (1) I MW; 2F
(2) I MW; 5F
(3) II MW; 301F
(4) II MW; 211Bu
(5) III MW; 9F
(6) III TTh; 2F
(7) IV MW; 112Bu
(8) V MW; 112Bu
(9) V TF; 112Bu
(10) VI TTh; 2F
(11) VII MW; 2F

3s—Social and Economic History of Modern Europe. 5 cred.; prereq., 10 cred. if taken by fr. Mr. Heaton.

Lect. II TThS; BuAud
Rec. (1) I MW; 2F
(2) II MW; 2F
(3) III MW; 211Bu
(4) IV MW; 211Bu
(5) VII TTh; 2F

HORTICULTURE

6f—Fruit Growing. Fundamental principles of fruit growing. Sites, soils, nursery stock, planting and planting plans, tillage, fertilization, cover crops, pollination, frost avoidance, pruning and thinning. Lectures, recitations,

references, and laboratory. 3 cred.; no prereq.; II MWF; 102Hr(UF). Mr. Angelo.

51s—Garden Flowers. A study of the common annuals, biennials and perennial flowers, with special emphasis on plants for the perennial border and rock garden. Lectures, reference reading and laboratory. 2 cred.; I T, I-II Th; 8Hr(UF). Mr. Longley.

70su*—Plant Materials. Garden flowers, identification, classification, and landscape uses. Lectures and field trips. 3 cred.; prereq., 10 cred. Bot.; 3Hr(UF).

71f—Elementary Landscape Design and Plant Materials. A study of the elementary principles of landscape design; the identification of evergreen and deciduous trees and shrubs and vines, with special emphasis on their fall and winter characters and their uses in landscape design. Lectures, outdoor and indoor laboratories, special field trips. 3 cred.; prereq., Bot. 10 cred.; VI-VIII TTh; 8aHr(UF). Mr. Longley.

72s—Woody Plants and Garden Flowers. Deciduous and evergreen trees, shrubs and vines from their winter and spring characters, with special emphasis on their flower characters; herbaceous annuals, biennials, perennials, including bulbs and their uses in landscape planting. Lectures, indoor and outdoor laboratories, with special field trips. 2 cred.; prereq., Bot. 10 cred.; II T, I-II S; 8aHr(UF). Mr. Longley.

74w—Principles of Landscape Design. The composition of the various elements used in landscape gardening, methods of presentation. Lectures and problems. 3 cred.; prereq., Arch. 21 or Ag.E. 3 and Hort. 71; VIII T, VI-VII TTh; 107Hr(UF). Mr. Longley.

75w—Landscape Problems. Continuation of Course 74. 3 cred.; 'ar.; 107Hr(UF). Mr. Longley.

76s—Landscape Construction. Construction and maintenance of turf for lawns, golf courses, and other play areas; garden architecture, grading, planting and care, costs of construction. Lectures, field trips and reports. 3 cred.; prereq., 71; VI-VIII T, VI-VII Th; 107Hr(UF). Mr. Longley.

MATHEMATICS AND MECHANICS

MATHEMATICS

11f,w,su—College Algebra. Theory of quadratic equations, interpretation of complex results, graphical representation, indeterminate equations, ratio, proportion, variation, progressions, series, undetermined coefficients, binominal theorem, logarithms, theory of equations, Horner's method. 5 cred.; prereq., higher algebra.

11f	(1) III MWThFS; 3E	(7) I MTWThS; 4E
	(2) III MWThFS; 4E	(8) I MTWThS; 104E
	(3) III MWThFS; 5E	(9) I MTWThS; 22E
	(4) VII MTWThF; 3E	(10) VI MTWF, IV S; 3E
	(5) VII MTWThF; 4E	(11) VI MTWF, IV S; 4E
	(6) VII MTWThF; 136E	(12) VI MTWF; 106E; IV S; 107E
11w	(1) II MTWFS; 3E	(2) VIII MTWTh, VII F; 3E

12f,w,s,su—Trigonometry. Graphical representation of functions, computation by logarithms and slide rule. Trigonometric functions, plane right triangles, reduction formulas, fundamental relations, addition formulas, double angles, half angles, identities and equations, inverse functions, oblique triangles, De

* Given by special arrangement.

Moivre's theorem, spherical right triangles. 5 cred.; prereq., 11. Mr. McClintock.

12f II MTWThF; 3E

12w (1) II MTWFS; 4E
(2) II MTWFS; 7E
(3) VIII MTWThF; 4E
(4) VIII MTWThF; 106E
(5) I MTWThS; 3E
(6) I MTWThS; 4E
(7) VII MTWF, IV S; 4E
(8) VII MTWF; 205E; IV S; 203E

12s (1) II MTWThF; 4E
(2) VI MTWThF; 3E

13f,w,s,su—Analytical Geometry. Co-ordinate systems, locus and equation, straight line, circle, parabola, ellipse, hyperbola. Transformation of co-ordinates and simplification of equations. Polar co-ordinates, higher plane curves, tangents, normals. Empirical equations, solid analytic geometry. 5 cred.; prereq., 11 and 12.

13f (1) V MTWFS; 136E
(2) III MTWThF; 205E

13w I MTWThF; 21E

13s (1) II MTWThF; 3E
(2) II MTWThF; 104E
(3) III MTWThS; 3E
(4) III MTWThS; 4E
(5) VII MTWThF; 3E
(6) VII MTWThF; 4E
(7) VI MTWTh, IV S; 4E
(8) VI MTWTh; 136E; IV S; 203E

24f,w,s,su—Differential Calculus. Limit, derivative, simple applications of derivative, maxima and minima, differentials, rates, change of variables, radius of curvature, mean value, indeterminate forms, partial differentiation, series. 5 cred.; prereq., 13. Mr. Siler.

24f (1) II MTThFS; 106E
(2) IV MTWFS; 106E
(3) VII MTWThF; 106E
(4) III MTWThF; 106E
(5) I MTWThF; 106E

24w (1) VI MTWF, IV S; 104E
(2) IV MTWF, III S; 104E
(3) II MTWFS; 104E
(4) III MTWThF; 104E

24s (1) I MTWThF; 104E
(2) V MTWFS; 136E

25f,w,s,su—Integral Calculus. Expansion of functions, Taylor's theorem. Standard elementary forms, definite integral, rational fractions, integration by substitution, by parts, reduction formulas, integration a process of summation, successive and partial integration, elementary ordinary differential equations. 5 cred.; prereq., 24. Mr. Dalaker.

25f V MTWFS; 205E

25w (1) VI MTWF, IV S; 106E
(2) IV MTWF, III S; 106E
(3) II MTWFS; 106E
(4) VII MTWThF; 106E
(5) III MTWThF; 106E

25s (1) VII MTWThF; 106E
(2) II MTWThF; 203E
(3) IV MTWFS; 104E
(4) III MTWFS; 104E

91f*—Calculus (Arch., Pre-bus.). Short course, derivatives, maxima and minima, integration of simple forms, definite integrals, areas. 4 cred.; prereq., 13; III MTWF; 203E. Mr. Peebles.

150f,w,s—Differential Equations. Differential equations and their solutions. First order and first degree, first order and higher degree, singular solutions; total differential equations, linear differential equations, miscellaneous methods, system of simultaneous equations, integration in series. 3 cred.; prereq., 25; I MWF; 7E. Mr. Boehnlein.

151f-152w-153s—Advanced Calculus with Applications. 3 cred. per qtr.; prereq., 25; I MWF; 215E. Mr. Dalaker.

154f-155w-156s—Vector Analysis and Applications. 3 cred. per qtr.; prereq., 26; IV MWF; 7E(f), 5E(w,s). Mr. Brooke.

* For permissible substitute, see page 57.

157f-158w-159s—Determinants and Solid Analytical Geometry. An advanced course. 3 cred. per qtr.; prereq., 150. (Not offered in 1934-35.)

164f-165w-166s—Operational Methods and the Operational Calculus. 3 cred. per qtr.; prereq., 150 or by permission; ar. Mr. Scherberg.

254f-255w-256s—Modern Analysis. Based on Whittaker and Watson's text. 3 cred. per qtr.; prereq., 153. (Not offered in 1934-35.)

261f-262w-263s—Functions of a Complex Variable. Elliptic functions and integrals with applications. 3 cred. per qtr.; prereq., 153. (Not offered in 1934-35.)

264f-265w-266s—Advanced Topics in Functions of Complex Variable. 3 cred. per qtr.; prereq., 263. (Not offered in 1934-35.)

MECHANICS

26f,w,s,su—Technical Mechanics: Statics. Characteristics of a force, parallelogram law, moments, couples, resultant of a force system, equilibrium of a force system, frictions, centroids, moments of inertia, catenary. 5 cred.; prereq., 25. Messrs. Herrick and Doeringsfeld.

26f (1) V MTWFS; 106E (2) II MTWThF; 136E
26w III MTWThF; 3E
26s (1) VII MTWThF; 104E (3) IV MTWFS; 106E
(2) II MTWThF; 106E (4) III MTWFS; 136E

84f,s*—Technical Mechanics. (Chem., Ch.E., Ag.E., and Pre-bus.) Statics, resolution of forces, conditions of equilibrium, center of gravity, moment of inertia, stresses in framed structures, and machines, kinematics, dynamics of a particle. Newton's laws of motion, work, energy, power, impulse, and momentum. 5 cred.; prereq., 25 or 91. Mr. Doeringsfeld.

84f II MTWThF; 21E
84s III MWThFS; 215E

92w*—Mechanics for Architects. Statics, resolution of forces, conditions of equilibrium, center of gravity, moment of inertia of plane sections, stresses in framed structures. 4 cred.; prereq., 91; III MTWF; 5E. Mr. Peebles.

127f,w,s—Technical Mechanics: Dynamics. Force, mass, acceleration, translation and rotation, gyroscope, governors, work, energy, power, conservation of energy, impulse, momentum, loss of kinetic energy, conservation of momentum. 5 cred.; prereq., 26. Messrs Wilcox and Doeringsfeld.

127f (1) II MTThFS; 203E (2) I MTWFS; 205E
127w (1) II MWThFS; 203E (3) III MTWThF; 205E
(2) IV MTWFS; 205E
127s (1) IV MTWFS; 136E (3) VI MTWThF; 205E
(2) I MTWThF; 106E

161f-162w-163s—Advanced Technical Mechanics. Moving axes, Eulerian angles, Lagrange's equations, generalized co-ordinates, dynamical problems soluable in terms of circular and elliptic functions, dynamical specifications of bodies, motion of a top, theory of vibrations, Hamilton's principle. Special problems. 3 cred. per qtr.; prereq., 127. Mr. Wilcox.

161f IV MWF; 138EE
162w I MWF; 139EE
163s IV MWF; 7E

267f-268w-269s—Advanced Dynamics. Text, Routh's *Rigid Dynamics*, Vol. I. 3 cred. per qtr.; prereq., 153. Mr. Brooke.

* For permissible substitute, see page 57.

274f-275w-276s—Advanced Dynamics of a Particle. 3 cred. per qtr.; prereq., 127. Mr. Brooke.

277f-278w-279s—Advanced Statics. Text, Routh's *Analytical Statics*. 3 cred. per qtr.; prereq., 127. (Not offered in 1934-35.)

297w-298s—Vibration—Problems. 3 cred. per qtr.; prereq., 127. (Not offered in 1934-35.)

MATERIALS

85f*—Strength of Materials with Laboratory. (Ch.E. and Pre-bus.) Mechanical and elastic properties of materials of construction, beams, shafts, columns, combined stresses, dynamic stresses. 4 cred.; prereq., 84. Mr. Miller.

Lect. II MWF; 205E
Lab. (1) VIII-IX M; Ex (2) VI-VII M; Ex

93s*—Strength of Materials. (Arch.) Mechanical and elastic properties of materials of construction, design of riveted joints, beam theory, columns, arches. 4 cred.; prereq., 91 and 92; III MTWF; 206E. Mr. Peebles.

128f,w,s—Strength of Materials. Mechanical and elastic properties of materials of construction, beams, shafts, columns, combined stresses, hollow cylinder rollers, plates, curved bars, springs, dynamic stresses, true stresses. 5 cred.; prereq., 26. Messrs. Priester and Miller.

128f	(1) IV MTWFS; 136E	(2) II MTWThF; 4E
128w	(1) I MTWFS; 106E (2) II MTWThF; 136E	(3) III MTWThF; 136E
128s	(1) II MTWThF; 110Ex (2) IV MTWFS; 205E	(3) III MTWThF; 205E

141f,w,s—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. Messrs. Priester and Miller.

141f	Lect.	(1) VI F; 110Ex	(2) VI Th; 110Ex
	Lab.	(1) I-III S; Ex (2) VII-IX F; Ex	(3) VII-IX Th; Ex
141w	Lect.	(1) VI W; 110Ex	(2) VI F; 110Ex
	Lab.	(1) II-IV S; Ex (2) VII-IX F; Ex	(3) VII-IX T; Ex (4) VII-IX W; Ex
141s	Lect.	(1) VI Th; 110Ex	(2) VI W; 110Ex
	Lab.	(1) VII-IX T; Ex (2) VII-IX Th; Ex	(3) VII-IX F; Ex (4) VII-IX W; Ex

144w—Materials Testing Laboratory. (Mines.) Four laboratory hours accompanying Mine Mech. 110. VI-IX Th; Ex. Mr. Priester.

180f-181w-182s—Advanced Strength of Materials. Special problems in applied elasticity. 3 cred. per qtr.; prereq., 128; IV MWF; 203E. Mr. Priester.

184f-185w-186s—Advanced Testing Materials Laboratory. Special problems relating to the physical properties of engineering materials. 2 cred. per qtr.; prereq., 141. Mr. Priester.

294f-295w-296s—Mathematical Theory of Elasticity. 3 cred. per qtr.; prereq., 128, 153. Mr. Priester.

HYDRAULICS

86w*—Hydraulics. (Ch.E. and Ag.E.) Hydrostatics, Bernoulli's theorem, flow through orifices, pipes, and over weirs, dynamic action of jets and streams, flow of gases through pipes. 2 cred.; prereq., 84. II MF; 205E. Mr. Doeringsfeld.

* For permissible substitute, see page 57.

129f,w,s—Hydraulics. Laws of equilibrium of fluids, flow through orifices and over weirs, pressure and flow through tubes and pipes, flow in conduits and rivers, dynamic pressure of water, elementary principles of turbines and pumps. 4 cred.; prereq., 26. Messrs. Straub, Doeringsfeld, and Barker.

129f	Lect. (all sections) II Th; 335EE	
	Rec. (1) VI TWF; 215E	(3) IV TS, VI Th; 215E
	(2) IV MWF; 215E	(4) II MWF; 215E
129w	Lect. (all sections) III W; 335EE	
	Rec. (1) I MTF; 205E	(2) IV MFS; 136E
129s	Lect. (all sections) VI Th; 335EE	
	Rec. (1) I MWF; 136E	(2) I TThS; 205E

130f—Open Channel Flow. Theory of uniform and varied flow in open channels, with practical applications to the design of hydraulic structures; computations for drawdown curves, backwater curves, hydraulic jump, measuring flumes, submerged weirs, etc. 3 cred.; prereq., 129 and 143; I MWF; 206E. Mr. Straub.

132w-133s-134f—Advanced Hydraulic Problems. Special problems in hydraulic design. 2 cred. per qtr.; prereq., 130 or reg. in 130. Mr. Straub.

143f,w,s—Hydraulics Laboratory. Experimental and demonstrational work. Pressure head, Piezometer tubes, gages, stability of flotation, Bernoulli's theorem. Venturi meter, flow through orifices, over weirs, and through pipes. Open channels, gaging, impact on vanes, pumps, and hydraulic machines. 1 cred.; prereq., 86 or 129 or reg. in 86 or 129. Mr. Straub.

143f	(1) III-IV S; Ex	(4) VI-VII T; Ex
	(2) VI-VII W; Ex	(5) VIII-IX Th; Ex
	(3) III-IV W; Ex	
143w	(1) VIII-IX M; Ex	(4) VIII-IX Th; Ex
	(2) I-II S; Ex	(5) VI-VII F; Ex
	(3) VI-VII M; Ex	
143s	(1) VI-VII M; Ex	(3) III-IV T; Ex
	(2) VIII-IX Th; Ex	

191w—Hydraulic Motors and Pumps. Study of the hydraulic theory of the ram, impulse wheel, reaction turbine, and centrifugal pump. 3 cred.; prereq., 129; III TThS; 7E. Mr. Straub.

192s—Natural and Artificial Waterways. Wave motion, tides, ship resistance, transportation of sediment. Control and regulation of rivers, design of ship canals, locks, dry docks, movable dams, harbors. 3 cred.; prereq., 129 and preferably 130; I MWF; 206E. Mr. Straub.

193w—Hydraulic Measurements. Hydraulic similitude. Detailed study of the current meter. Venturi meter, weir, orifice, Parshall flume, traveling screen, chemical method of gaging, etc. 3 cred.; prereq., 129; I MWF; 206E. Mr. Straub.

194f-195w-196s—Advanced Hydraulics Laboratory. Special experimental studies concerning the characteristic of turbines, pumps, etc. Hydraulic models. 2 cred. per qtr.; prereq., 129 and 143; ar. Mr. Straub.

281f-282w-283s—Hydrodynamics. 3 cred. per qtr.; prereq., 129, 153. Mr. Brooke.

284f-285w-286s—Advanced Hydrodynamics. 3 cred. per qtr.; prereq., 283 Mr. Brooke.

MECHANICAL ENGINEERING

MACHINE CONSTRUCTION

1su—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.; I-IX MT, I-IV WF, I-II Th; ME. Mr. Richards.

2su—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.; I-IX MT, I-IV WF, I-II Th; ME. Mr. Cowie.

3su—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 to 4 cred.; no prereq.; I-IX MT, I-IV WF, I-II Th; ME. Mr. Cowie.

4su—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.; I-IX MT, I-IV WF, I-II Th; ME. Mr. Richards.

5f,w,s,su-6f,w,s,su. Woodworking and 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. Mr. Richards.

5f,s	ar
5w	II-III MWF
6f,w	ar
6s	I-III WF

7su—Advanced Machine Shop. Advanced lathe work, milling machine operation. Production work. Gear calculation and cutting. Precision grinding. Layout of typical course. 2 to 4 cred.; prereq., 3; I-IX MT, I-IV WF, I-II Th; ME. Mr. Cowie.

9f,w,s,su—General Metal Work. Special arrangements for individual needs. Care and use of metal working tools. Precision grinding, gear cutting, tool making, heat treating, and gas and electric welding. Planning equipment and projects for a high school course. 2 to 4 cred.; no prereq.; ar. Messrs. Cowie and Hughes.

10su—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.; I-IX MT, I-IV WF, I-II Th; ME. Mr. Richards.

11f,w,s,su—Pattern Practice. Study and application of methods and principles used in constructing and using patterns and core boxes in the production of castings. Shop drawings and materials used. Manipulation and care of woodworking tools and machinery. Inspection trips and reports. 2 cred.; no prereq. Mr. Richards.

11f	Lect. III Th; 202ME	Lab. I-IV F
11w	Lect. I Th; 202ME	Lab. VIII-IX M, II-III Th
11s	Lect. III Th; 202ME Lab. (1) I-IV M	(2) VI-IX Th

12f,w,s—Foundry Practice. Theory and practice in mixing, molding, and casting of ferrous and non-ferrous metals. Preparation of materials used in making cores and molds. Bench, floor, and machine molding. Inspection trips and reports. 2 cred.; no prereq. Mr. Moffett.

12f Lect. VII T; 153ME
Lab. (1) VI-IX Th (2) I-IV T

12w Lect. (1) IX T; 153ME (2) VII Th; 153ME
Lab. (1) VIII-IX M, II-III Th (3) I-IV T
(2) I-IV F

12s Lect. (1) IV W; 153ME (2) VII T; 152ME
Lab. (1) I-IV M (3) I-IV T
(2) VI-IX Th (4) VI-IX F

13f,w,s,su—Forge Practice. Lectures and discussions on modern forge and drop forge practices, industrial welding methods, steels and their treatment. Practice in welding, hardening, tempering, and die forging. Plant inspection and reports. 2 cred.; no prereq. Mr. Hughes.

13f Lect. IX M; 153ME
Lab. (1) VI-IX Th (2) I-IV T

13w Lect. (1) VII M; 153ME (2) VIII F; 153ME
Lab. (1) I-IV F (3) I-IV T
(2) VI-IX Th

13s Lect. (1) IV T; 153ME (2) III T; 153ME
Lab. (1) I-IV M (3) VI-IX F
(2) VI-IX Th

14f,w,s,su—Pattern Practice. Care and use of wood working tools and machinery; practice in making patterns, sweeps, and core boxes for various types of work; planning from blue prints the construction of patterns and core boxes for complex castings; study of paints, oils, varnishes, lacquers, and stains for finishing. 2 cred.; prereq., Chem. 5, Dr. 2. Mr. Richards.

14f Lect. VIII Th; 202ME
Lab. (1) VI-IX T (2) VI-IX F

14w Lect. (1) IV T; 202ME (2) VII F; 202ME
Lab. (1) III-IV S, VIII-IX F (3) VI-IX Th
(2) VI-IX T

14s Lect. VIII F; 202ME Lab. VI-IX T

15f,w,s—Foundry Practice. Laboratory practice in green and dry sand molding; core making; casting in iron, brass, and aluminum; testing sand for permeability, strength of bond, moisture, and hardness; cupola practice and operation of brass furnace; chemistry of melting, purifying, and alloying of metals. 2 cred.; prereq., Chem. 5, Dr. 2. Mr. Moffett.

15f Lect. (1) III Th; 153ME (2) I S; 152ME
Lab. (1) II-V S (3) I-IV W
(2) VI-IX W

15w Lect. VI M; 153ME Lab. VI-IX W

15s Lect. III W; 153ME Lab. VI-IX W

16f,w,s,su—Forging, Heat Treating, and Welding. Forging and heat treatment of metals; operation of gas, oil and electric furnaces; thermit welding, electric arc, gas and spot welding theory and operation; brazing and soldering of ferrous and non-ferrous metals. 2 cred.; prereq., Chem. 5, Dr. 2. Mr. Hughes.

16f Lect. (1) VI W; 153ME (2) III W; 153ME
Lab. (1) VI-IX F (3) IV-V M, VIII-IX W
(2) VI-IX T

16w Lect. III W; 153ME
Lab. (1) I-IV M (2) VI-IX W

16s Lect. (1) III Th; 153ME (2) VIII T; 153ME
Lab. (1) I-IV W (3) I-IV S
(2) VI-IX W

17f,w,s,su*—Machine Shop Practice. (Chem., Ch.E., and Pre-bus.). 2 cred.; no prereq. Mr. Cowie.

17f	Lect. IV T; 202ME	Lab. VI-IX Th
17w	Lect. (1) IX M; 202ME	(2) VII Th; 202ME
	Lab. (1) VI-IX Th	(2) I-IV T
17s	Lect. (1) VIII M; 202ME	(2) VIII T; 202ME
	Lab. (1) I-IV T	(2) VI-IX F

18f,w,s,su—General Woodworking. For teachers desiring elementary or advanced practice in manual training, wood turning, and pattern making. Planning and layout of projects, materials used, care and operation of woodworking tools and machinery; selection and installation of equipment. 3 cred.; no prereq.; VI-IX MW. Mr. Richards.

19s,su*—Machine Shop Practice. Elementary course in machine work arranged especially for students in electrical engineering. 2 cred.; prereq., 16. Mr. Cowie.

Lect. (1) III W; 202ME	(2) III M; 202ME
Lab. (1) VI-IX T	(3) VI-IX Th
(2) II-V S	

71f,su—Machine Shop Practice. Care and operation of machine tools; screw cutting, taper turning, and gear cutting, including spur, helical, worm, and bevel gears. 3 cred.; prereq., 14, 15, 16. Messrs. Koepke and Cowie.

Lect. (1) III F; 202ME	(3) II S; 202ME
(2) VII T; 202ME	(4) II F; 202ME
Lab. (1) VI-IX T, II-IV W	(3) VI-IX W, VI-VIII F
(2) II-V T, I-III Th	(4) II-IV, VI-IX M

72w,su—Advanced Machine Practice. Manufacturing methods, quantity production; also carbonizing and heat treatment of steel, autogenous welding and brazing. 3 cred.; prereq., 71. Messrs. Koepke and Cowie.

Lect. VI T; 202ME	
Lab. (1) VII-IX T, VI-IX F	(2) VI-VIII M, VI-IX W

76f—Survey of Shop Practice (Miners). Technique of pattern making, molding, forging, and machining. Lectures and demonstrations. 3 cred.; no prereq.; VI MWF; 202ME. Mr. Koepke.

MACHINE DESIGN

20f—Elementary Machine Design. Screws, rivets, machine keys, cottered joints and connections, hubs and rims of rotating parts. Factors of safety, drawing room systems and conventions. Lectures and drafting. 2 cred.; prereq., Dr. 2. Messrs. Martenis and Palmer.

(1) II-III T, VIII-IX WTh; 151ME	(3) IV-V T, I-II F, III-IV S; 151ME
(2) VIII-IX MTF; 151ME	

21s—Kinematics. Instant centers, centroids, point paths, gear tooth profiles, cam construction, velocity diagrams. Lectures and drafting. 2 cred.; prereq., 20. Messrs. Martenis and Palmer.

(1) VIII-IX MThF; 151ME	(3) VI-VII TWF; 151ME
(2) VI-VII M, II-III T, I-II S; 151ME	

22f—Mechanism. Motion studies. Revolving and oscillating bodies, linkages, chains, flexible connectors, gearing, wheels in trains, epicyclic gear trains, worm and wheel, screws, straight line motions, hoists, pulley blocks, ratchets, intermittent motions. Recitations and problems. 3 cred.; prereq., 21 and M.&M. 24. Mr. Martenis.

(1) I TThS; 252ME	(3) VII MWF; 252ME
(2) III MWF; 252ME	

* For permissible substitute, see page 57.

23w—Machine Design. Riveted joints, screwed fastenings, shafts and couplings, strength of gear teeth, flywheels, engine details, machine frames, steam piping, bearings. Lectures and drafting. 3 cred.; prereq., 22, and M.&M. 26. Messrs. J. J. Ryan and Palmer.

Lect. (1) II WF; 254ME (3) II TTh; 254ME
(2) I TTh; 254ME
Lab. (1) II-IV T, VII-IX W; 151ME (3) VII-IX MF; 151ME
(2) VI-VIII T, I-III S; 151ME

24s—Machine Design. Design of machines and hoisting equipment with reference to complex stresses. Lectures and recitations. 3 cred.; prereq., 23, and M.&M. 128. Mr. J. J. Ryan.

(1) II MWTh; 252ME (3) IV TS, VI W; 252ME
(2) III MWF; 252ME

26w—Mechanism and Kinematics. (E.E., Aero.E., and Ag.E.) Transmission of motion. Levers, linkwork, flexible connections, gearing, screws, cams, epicyclic trains, parallel motions, quick return motions, graphical studies of velocities. Intermittent motion, escapements. Recitations and problems. 3 cred.; prereq., M.&M. 24. Messrs. Martenis and Palmer.

(1) IV TS, VI Th; 252ME (4) II MWS; 252ME
(2) III WFS; 252ME (5) I MWF; 252ME
(3) I TThS; 252ME

27s—Machine Design. (Aero.E. and Ag.E.) Calculation of machine parts, riveted joints, screwed fastenings, rotating pieces, belted connections, gearing, bearings. 3 cred.; prereq., 26 and M.&M. 128. Mr. Ryan.

Lect. (1) VII T; 252ME (2) III Th; 252ME
Lab. (1) VII-IX MF; 255ME (2) II-IV TS; 255ME

28f,s—Machine Design (Ch.E.) Screw fastenings, riveted joints, belting, shafting, bearings, machine frames, pulleys, etc. Lectures, drafting, and problems. 3 cred.; prereq., M.&M. 85. Mr. Martenis.

28f Lect. VI F; 252ME Lab. VII-IX TF; 251ME
28s Lect. IV W; 254ME
Lab. (1) VI-VIII WF; 251ME (2) VI-VIII T, I-III S; 251ME

121f-122w-123s—Engineering Design. Problems selected to suit the student's special interest. Automatic machines; machines for quantity production; materials handling and heavy plant equipment. Drafting and problems. 2 cred. per qtr.; prereq., 24. Mr. J. J. Ryan.

121f (1) VII-IX WF; 255ME (3) VII-IX M, I-III Th; 255ME
(2) I-III T, VII-IX Th; 255ME
122w VII-IX MTh; 255ME
123s I-II, VI-IX Th; 255ME

221f-222w-223s—Advanced Mechanical Engineering Design. 3 cred. per qtr.; prereq., 121. Messrs. DuPriest, Martenis, and J. J. Ryan.

STEAM ENGINEERING

30f—Steam Engineering. Elementary study of the steam power plant, including boilers, stokers, furnaces, fuels, combustion, steam generation, and prime movers. 3 cred.; prereq., Phys. 23. Messrs. DuPriest and Easton.

(1) IV MFS; 154ME (4) III MWF; 154ME
(2) II MWF; 154ME (5) III TThS; 154ME
(3) VI MWF; 154ME

31w-32s—Thermodynamics. Heat and mechanical energy and the laws governing the operation of machines used to convert heat energy into mechanical

energy. Steam, gas, and oil engines, air compressors, refrigeration machines, and turbines. 3 cred. per qtr.; prereq., 30. Messrs. DuPriest and Easton.

31w	Lect.	(1) VI Th; 254ME	(2) VI M; 254ME
	Rec.	(1) III WF; 154ME	(4) III TTh; 154ME
		(2) I WF; 154ME	(5) II T, III S; 154ME
		(3) IV TS; 154ME	
	Lab.	(1) I-II Th; 154ME	(4) VII-VIII F; 154ME
		(2) VII-VIII Th; 154ME	(5) VII-VIII M; 154ME
		(3) II-III M; 154ME	
32s	Lect.	(1) VII Th; 254ME	(2) II F; 254ME
	Rec.	(1) III MW; 154ME	(4) III TS; 154ME
		(2) II TTh; 154ME	(5) I TTh; 154ME
		(3) II MW; 154ME	
	Lab.	(1) VIII-IX Th; 154ME	(4) VII-VIII T; 154ME
		(2) VI-VII M; 154ME	(5) VII-VIII W; 154ME
		(3) VII-VIII F; 154ME	

33f—Elementary Mechanical Laboratory. Calibration of pressure gages, anemometers, indicator springs. Use of steam calorimeters, planimeters, indicators. Calculations from indicator cards. Tests of mechanical appliances, lubricating oils. 2 cred.; prereq., reg. in 30.

(1) VI-IX F; Ex (4) VI-IX M; Ex
(2) VI-IX Th; Ex (5) VI-IX W; Ex
(3) II-V S; Ex (6) VI-IX T; Ex

34w—Mechanical Laboratory. Calibration of tachometers, pyrometers, steam flow meters. Valve setting. Flow of steam through orifices. Test of steam trap, surface condenser, simple steam engines. Inspection trip. 2 cred.; prereq., 33.

(1) VI-IX M; Ex (2) VI-IX W; Ex

35s—Elementary Steam and Power Laboratory. Friction test of oils. Test of hot air engine, centrifugal fan, injector, steam pump, steam boiler. Calibration of transmission dynamometer. Power study of industrial machines. Approximate analysis of fuels. Use of Mahler, Bomb, and Junkers calorimeters. 2 cred.; prereq., 34, and reg. in 32.

(1) I-IV S; Ex (2) VI-IX T; Ex

36f—Elementary General Laboratory. (Mines.) Calibration of pressure gages, anemometers. Use of steam calorimeters, planimeters. Steam indicator practice, card calculation, valve setting. Tests of oils, simple steam engine and steam pump. 4 hours; prereq., accompanying Mine Mech. 112; VI-IX Th. Mr. Shoop.

38w-39s—Heat Engines. (Ch.E.) Study of steam properties, steam calorimety, elementary thermodynamics, fuels, and combustion; calibration and use of instruments; valve setting; operation and testing of steam engines, boilers, compressors, stage evaporators, water heaters and purifiers, gas engines, etc. Selection of equipment for power plants. 3 cred. per qtr.; prereq., Phys. 23.

38w	Rec.	IV MWF; 110Ex	
39s	Rec.	(1) IV MF; 110Ex	(2) II TTh; 215Ex
	Lab.	(1) VI-IX M; Ex	(2) VI-IX F; Ex

40f-41w—Heat Engines. (E.E.) Properties of steam; principle of operation of steam machinery; fuels, combustion, and smoke prevention; construction, operation, and testing of engines, turbines, boilers, condensers, pumps, and power plant equipment. Selection of equipment for different types of plants. 3 cred. per qtr.; prereq., Phys. 23.

Rec. (1) IV TS; 110Ex (2) III WF; 110Ex
40f Lab. (1) VI-VIII F; Ex (3) I-III Th; Ex
(2) VII-IX Th; Ex (4) VII-IX M; Ex
41w Lab. (1) VII-IX Th; Ex (3) I-III Th; Ex
(2) VII-IX T; Ex (4) IV-VIII F; Ex

42f,w,s—Heat Engines. (C.E. and Arch.) Steam generation and properties. Fuels and combustion. Construction and operation of boilers and auxiliaries. Elementary thermodynamics. Use and calibration of engine-room instruments. Types, details, and tests of steam engines, steam turbines, gas engines, and air compressors. Performance and adaptability of power equipment. 4 cred.; prereq., Phys. 23.

42f Rec. IV MWF; 209Ex Lab. I-IV S; Ex
42w Rec. I TThS; 209Ex Lab. VI-IX W; Ex
42s Rec. I TThS; 209Ex
Lab. (1) VI-IX W; Ex (2) II-V S; Ex

138w—Advanced General Laboratory. (Mines.) (a) Tests of air compressor, steam turbine, compound steam engine, centrifugal fan, gas engines. (b) The use of hydraulic measuring devices, weirs, differential gages, etc., in tests of centrifugal pumps, hydraulic turbines and rams. 4 hours; prereq., 36; VI-IX Th; Ex. Messrs. Shoop and Straub.

141f—Power Plant Engineering. Theory, practice, and economics relating to prime movers and steam generating equipment of the modern power plant, including auxiliary units such as condensers, heaters, purifiers, pumps, fans, piping, etc. 3 cred.; prereq., 32. Mr. Shoop.

(1) II MThF; 254ME (2) IV MWF; 254ME

144w—Steam Turbines. Theory and practice applied to various types. Thermodynamics and mechanical analysis of problems involved in the design of nozzles, blades, rotors, etc. Condition of operation; systems of transmission; lubrication; economy; field of service. Laboratory investigation. 3 cred.; prereq., 32; I MWF; 209Ex. Mr. Shoop.

145w—Applied Thermodynamics. Laws of heat transmission, mean temperature difference, in condensers, boilers, brine coils, feed water heaters. Treatment of cooling towers, accumulators, multiple stills, stage evaporators, vapor refrigeration; air compressors, multi staging, intercooling, etc. 3 cred.; prereq., 32, 35; II MWF; 209Ex. Mr. Shoop.

146s—Fuels and Combustion. Fuels: classification and analyses. Hand and stoker treatment; regulation. Pulverized and liquid fuels. Types of burners, controls. Combustion: generation of heat; furnace gases; stratification; flame way; smoke prevention. Furnaces. Lectures and recitations. 3 cred.; prereq., 141; I MWF; 215Ex. Mr. Shoop.

147w—Design of Steam Machinery. Piping systems, furnace and gas passage dimensions, stokers, oil, gas, and pulverized fuel burners, superheaters, feed water heaters, and pumps, air pre-heaters, automatic controls, chimneys, etc. 2 cred.; prereq., 141; VI-VIII MTh; 251ME. Mr. Shoop.

148s—Design of Power Plant Units. Treatment of condensers, air pumps, cooling towers, stage evaporators, reheaters, etc. 2 cred.; prereq., 147; VI-VIII TW; 255ME. Mr. Shoop.

149f,w,s—Advanced Steam Laboratory. Tests of steam turbines, uniflow and compound steam engines, condensers, evaporators, and vacuum pumps. Tests of compound steam pump. Air compressor, boiler, superheater, and power plant.

Studies of fluid flow meters and air-conditioning apparatus. 2 cred.; prereq., 32 and 35. Mr. Shoop.

(1) I-IV T; Ex
(2) (w) VI-IX T; Ex
(2) (s) VI-IX Th; Ex

241s—Advanced Thermodynamics. Reversible changes of state and efflux of wet and superheated vapors. Flow of compressible fluids in mains, moving channels, into receivers, and communicating vessels. Gas mixtures, critical points, liquefaction. Power plant cycles: regenerative, reheating, and bleeding. 3 cred.; prereq., 145. Mr. Shoop.

242f-243w—Power Plant Design. Problems, designs, and estimates for power plants and central stations. Selection of motive powers, relative advantages of steam, producers, and gas plants. Choice of engines and boilers; pumps, piping, and accessories. 2 cred. per qtr.; prereq., 148. Mr. Shoop.

244s—Power Plant Management. Operation and maintenance of boilers, engines, steam turbines, and accessory apparatus. Smoke prevention, lubricants and lubrication. Power plant finance. Daily logs and power costs. Study of recent power researches. 3 cred.; prereq., 141. Mr. Shoop.

INTERNAL COMBUSTION ENGINES

50f,w,s—Auto and Airplane Engines. Principles and types. Electrical systems. Lubrication and cooling. Carburetors. Accessories. 3 cred.; soph. Messrs. Robertson and Ford.

50f (1) I TThS; 110Ex
(2) I MWF; 110Ex
(3) IV MWF; 110Ex

50w,s I MWF; 110Ex

55s—Internal Combustion Engines. (E.E.) Laws of gases; gas cycles, Otto, semi-Diesel, and Diesel engines. Carburetion, cooling, lubrication, and governing. Gas producers and power plants. 3 cred.; prereq., 41. Messrs. Robertson and Ford.

Rec. (1) I TS; 110Ex
(2) III WF; 110Ex

Lab. (1) VI-VIII M; Ex
(2) I-III Th; Ex
(3) VI-VIII W; Ex

150f—Internal Combustion Engines. Laws of gases; gas cycles. Otto, semi-Diesel, and Diesel engines. Mechanism of various types. Carburetion, governing, cooling, lubrication. Combustion. Gas producers. 3 cred.; prereq., 30, 31. Mr. Robertson.

(1) IV MWF; 252ME
(2) II MWF; 252ME
(3) II TThS; 252ME
(4) I MWF; 252ME

151w—Advanced Internal Combustion Engines. Special reference to automobile, truck, and airplane engines. Theoretical consideration of fuels, combustion, detonation, lubrication, etc. 3 cred.; prereq., 150; IV M, VI WTh; 335EE. Mr. Robertson.

152s—High Speed Engine Testing. Use of modern research instruments and methods for testing. Experiments showing effect of fuel mixture, distribution, spark timing, etc., upon general engine performance. 2 cred.; prereq., 159; VII-IX TF; Ex. Mr. Robertson.

153s—Automobile Fleet Maintenance. Study of available types of motor coaches and trucks, their design features from a maintenance viewpoint, a survey of service depot requirements with a study of fleet service methods and maintenance practice. Lectures and recitations. 3 cred.; seniors only; prereq., 150; I MWF; 209Ex. Mr. Robertson.

154w—Design of Airplane Engines. Determination of sizes of cylinder bearings and important detail parts of radial and in-line aircraft engines; inertia forces, polar diagrams, etc. 2 cred.; prereq., 27, 150. Messrs. Robertson and Ford.
(1) II-IV T, VII-IX W; 251ME (2) VII-IX TF; 251ME

156w-157s—Design of Internal Combustion Engines. Calculations of inertia forces and size of cylinders for automobile, aircraft, and stationary service. Theoretical diagrams and detail of parts. 2 cred.; prereq., 121, 150. Messrs. Robertson and Ford.
156w I-III ThS; 251ME
157s VI-VIII M, II-IV W; 251ME

158s—Aero Engine Testing. The use of modern instruments for testing gasoline, Diesel, and aircraft engines. The use of dynamometers and torque stands in determining engine performance. 2 cred.; prereq., 150. Mr. Robertson.
(1) VI-IX T; Ex; III-IV S; 209Ex (3) VI-IX Th; Ex; VII-VIII F; 209Ex
(2) VI-IX W; Ex; II-III Th; 209Ex

159f,w,s—Internal Combustion Engine Laboratory. Tests of gasoline, semi-Diesel, and Diesel engines. Power plant units and automotive engines. 2 cred.; prereq., 150 or reg. in 150. Messrs. Robertson and Ford.
(1) (f) VI-IX W; Ex (2) (f) VI-IX T; Ex
(1) (w,s) I-IV T; Ex (2) (s) VI-IX Th; Ex

250f,w,s—Dynamics of High Speed Engines. Advanced study of inertia forces; balancing high speed multi-cylinder engines; engine torque analysis; torsional vibration, etc. Conferences, assigned readings, and problems. 3 cred.; prereq., 121, 150. Mr. Ford.

251f-252w-253s—Automobile and Motor Truck Design. Theory and design of the automobile, motor truck engine and chassis, complete design of engine, transmission, and chassis. Lecture and drawing room. 2 cred. per qtr.; grad. Mr. Robertson.

254w,s—Engine Service Management. Instruments and methods used in servicing or reconditioning automobile and airplane engines. Causes of mechanical failure and wear. Permissible tolerance in worn parts. Lubrication and ignition service. 3 cred.; prereq., 151. Messrs. Robertson and Ford.

255f-256w-257s—Automobile Testing and Research. Dynamometer and road tests including over-all efficiency of cars at various speeds, fuel consumption, effect of road surface on traction, efficiencies, and general performances. Special research problems. 2 cred. per qtr.; prereq., 155 or 159. Mr. Robertson.

258s—Motor Truck and Bus Transportation. Problems involving motor truck transportation, capacity of trucks, trailers, drawbar pull. Efficiencies. Effect of road surface. Freight handling. Analysis of costs of truck operation and maintenance. Relative costs of transportation. 3 cred.; prereq., 152. Mr. Robertson.

259w,s—Diesel Engines. An advanced course in the theory, design, operation, and economics of the Diesel engine. Lectures and assigned readings. 3 cred.; prereq., 150. Mr. Robertson.
259w I MWF; 7E
259s ar

HEATING, VENTILATION, AND REFRIGERATION

63f—Heating and Ventilation. Principles of heating and ventilation. Warm air, steam, hot water, vapor, vacuum, and fan systems of heating; pipe systems; heat regulation. Ventilation and air conditioning, synthetic air chart, central

station heating. Recitations, lectures. 3 cred.; prereq., 31, M.&M. 127, 129. Mr. Rowley.

Lect. VI MTh; 209Ex
Rec. (1) III Th; 209Ex (3) VI F; 209Ex
(2) II S; 209Ex

163f—Heating and Ventilation. (Arch. E.) Principles of heating and ventilation including the design and layout of warm air, steam, hot water, vapor, vacuum, and fan systems of heating. Requirements and design of ventilating systems. General principles of central station heating. Recitation, lectures, and designs. 4 cred.; prereq., M.&M. 127, 128, 129; I TThS; 209Ex; VI-IX W; 229E. Mr. Rowley.

164s—Heating and Ventilation. (Arch.) Principles of heating and ventilation. Heating systems; furnaces, steam, hot water, vapor, vacuum and fan blast. Piping systems. Ventilation and air conditioning; humidification, synthetic air chart. Temperature regulation. 2 cred.; prereq., M.&M. 92; I TTh; 215Ex. Mr. Rowley.

165w—Advanced Heating and Ventilation. Special selected problems. 3 cred.; prereq., 63; IV MWF; 209Ex. Mr. Rowley.

166s—Refrigeration. Principles of refrigeration. Various types of refrigerating machines, refrigerants, applications to ice making, cold storage, cooling of air, liquids, and solids. Lectures and recitations. 3 cred.; prereq., 32; IV MWF; 209Ex. Messrs. Rowley and Algren.

167s—Advanced Heating and Ventilation. 3 cred.; prereq., 165; I MWF; 22E. Mr. Rowley.

168w—Heating and Ventilation Design. Design, selection, and arrangement of equipment for various types of heating and ventilating systems. 2 cred.; prereq., 63; I-III TTh; 255ME. Mr. Algren.

169f,w,s—Heating and Ventilation Laboratory. Tests of heating, ventilating, and air conditioning equipment. The determination of air qualities as required for comfort and for specific industries. Tests and studies of complete installation. 2 cred.; prereq., 35, 63 or reg. in 63. Mr. Algren.

(1) (f,s) I-IV T; Ex (2) (w) VI-IX T; Ex
(2) (s) VI-IX Th; Ex

265f,w,s—Advanced Heating and Ventilation. Taken in connection with research work in the laboratory. Cred. ar.; grad. only; prereq., 63. Mr. Rowley.

267w—Mechanical Equipment of Buildings. Selection of heating, ventilating, cooling, and plumbing systems for various types of buildings. Piping layouts, for fire protection, air, gas, and vacuum cleaning systems, elevators. Designs and layout of equipment. Lectures and drafting. 3 cred.; prereq., 63, Phys. 43. Mr. Martenis.

INDUSTRIAL ENGINEERING

70f—Mechanical Technology. Study of mechanical processes involved in various manufacturing industries and in the development and utilization of power. Lectures by various specialists. 1 cred.; open only to soph., jr., and sr.; IV MF; 305E. Mr. Richards.

73s—Non-Metal Manufacturing. Methods and processes of manufacturing goods from materials such as wood, wood and metal substitutes, asbestos, hard rubber, bakelite, and other synthetic substances. 3 cred.; prereq., 20, 72; 2 lect.; 6 hr. of lab. Messrs. Koepke and Richards.

74s—Safety Engineering. Safety of the worker; fire and other hazards; prevention of industrial accidents. Compensation laws. Fire prevention; con-

struction; automatic sprinkler systems. Effect of safety on production. Factory sanitation. Safety organization. Lectures, assigned reading, factory inspections, and reports. 3 cred.; prereq., 72. Mr. Koepke.

77s—Manufacturing Costs. Determination of factory costs as applied to quantity production. Collection, analysis, and distribution of the costs of labor, materials, and overhead, together with the factors which control costs. 3 cred.; prereq., 72; 2 lect., 3 hr. lab. Mr. Koepke.

83s—Elementary Industrial Engineering. Evolution of modern manufacturing methods and resulting changes in factory costs, labor relationships, and management problems. 3 cred.; prereq., 73, Econ. 9; 3 rec. Mr. DuPriest.

170s—Tool Design and Construction. Tools, jigs, dies, and fixtures for manufacturing interchangeable parts. 3 cred. per qtr.; prereq., 15 or 72. Mr. Koepke.

171f,w—Production Control. Principles and practice involved in economical production. Standardization. Requirements for uniformity and interchangeability. Jigs, fixtures, and special equipment; gases and inspection systems. Divisions of labor. Conveying, handling, and stores control. Fatigue elimination. 3 cred.; prereq., sr. with 15 or 71. Mr. Koepke.

171f IV MWF; 202E
171w (1) VI MWF; 202ME (2) IV MWS; 202ME

172w—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. Lighting. Sanitation. Distribution of power. Welfare features. Lectures, recitations, and drawing room practice. 3 cred.; prereq., 171; I MWF; 202ME. Mr. Koepke.

173s—Industrial Management. General principles. Taylor system; wage, bonus, and profit sharing systems. Maintenance and depreciation. Purchasing. Allocation of cost, overhead, and machine burden. Graphical representation. 3 cred.; prereq., 172; I MWF; 202ME. Mr. Koepke.

174f—Industrial Management Laboratory. Planning department. Time and motion studies; rate setting. Instruction cards. Production control. Shop practice with investigations in local factories. Lectures, assigned reading, practice, and reports. 2 cred.; prereq., 73 and reg. in 171; lect. VII W; 202ME, 3 hr. lab. ar. Mr. Koepke.

175w—Materials Handling. Equipment and facilities necessary for economical transportation and storage of materials and parts during the process of manufacture; factors affecting capital invested in inventory, hand and power trucks, conveyors, elevators, hoists, cranes, arrangement of stores, checking and issuing materials. 2 cred.; prereq., reg. in 172; 1 rec.; 3 hr. lab. Mr. Koepke.

179s—Industrial Relations. 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. 3 cred.; prereq., 174; IV MWF; 202ME. Mr. Koepke.

277f-278w-279s—Industrial Engineering Problems. Special investigations of practical problems and suggested methods of procedure. Lectures, assigned reading, shop visits, and reports. 3 cred. per qtr.; grad.; prereq., 173, 174. Mr. Koepke.

HYDRAULIC MACHINERY

189s—Hydraulic Machinery. Theory of operation, design, construction, and regulation of water turbines. Turbine testing; characteristics, selection of type. Cost of turbines and water power. 3 cred.; sr.; prereq., M.&M. 129.

RAILWAY MECHANICAL ENGINEERING

281f—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. 1 cred.; prereq., M.&M. 127, 128, 129. Mr. Martenis.

282f-283w-284s—Locomotive Design and Construction. Locomotive details. Design of boiler, cylinders, frame, springs, trucks, axles, wheels, running gear, equalizing arrangements, valve gears, lubrication. Lectures, assigned reading, and drafting. 3 cred. per qtr.; prereq., 281. Mr. Martenis.

SEMINAR AND RESEARCH

190f-191w-192s—Seminar. Reading of assigned articles in current technical press. Classroom presentation of principal features of assigned articles. 1 cred. per qtr.; jr., sr. Mr. DuPriest.

190f	(1) I S; 154ME	(2) IV T; 154ME
191w	(1) II Th; 252ME	(2) II W; 154ME
192s	(1) IV S; 154ME	(2) II S; 154ME

194w,s—Advanced Engineering Problems. Opportunity will be offered for carrying on special investigations in the various fields of Mechanical Engineering. 2 cred.; registration by permission of the division chief in charge of work. Open only to sr. M.E.

290f-291w-292s—Mechanical Engineering Research. Investigations in connection with lubrication, fuels, furnaces, boilers, steam engines, turbines, gas engines, heating and ventilation, industrial and other engineering problems. Cred. as ar. per qtr.; grads. Messrs. DuPriest, Rowley, Shoop, Martenis, Koepke, and Robertson.

METALLOGRAPHY

150f—Metallography for Electrical Engineers. Principles of metallography, including pyrometry, thermal analysis, constitution diagrams, microscopic and photomicrographic technique; study of typical alloys with special reference to electrical resistance, conductivity, magnets, etc. Laboratory work and demonstrations. 3 cred.; jr., sr. E.E. Mr. Forsyth.

Lect. I MW; 315M — Lab. VI-VIII M; 307M

151w—Advanced Metallography for Electrical Engineers. Study of iron and steel, alloy steels, metals and alloys used in electrical engineering practice. Special problems for outside reading and for research. Laboratory work. 3 cred.; prereq., 150. Mr. Forsyth.

Lect. I MW; 315M — Lab. VI-VIII M; 307M

152f—Metallography for Aeronautical Engineers. Principles; metallography of iron and steel with special references to alloy steels, and light alloys used in airplane construction. Laboratory work and demonstrations. 3 cred.; prereq., sr. Aero.E. Messrs. Dowdell and Jerabek.

Lect. I TS; 315M
Lab. (1) VII-IX M; 307M — (2) VII-IX W; 307M

156w—Metallography for Mechanical Engineers. Principles of metallography, including pyrometry, thermal analysis, constitution diagrams, microscopic and

photomicrographic technique; metallography and heat treatment of iron and steel. Laboratory work. 3 cred.; prereq., jr., sr. M.E. Mr. Dowdell.
Lect. III ThS; 315M
Lab. (1) VII-IX W; 307M (2) VII-IX F; 307M

157s—Advanced Metallography for Mechanical Engineers. Metallography of alloy steels, tool steels, high speed tool steels, and important non-ferrous alloys; metallography applied to engineering practice and specifications. Outside reading and special reports. Laboratory work. 3 cred.; prereq., 156. Mr. Dowdell.
Lect. I MW; 315M
Lab. (1) VII-IX W; 307M (2) VII-IX F; 307M

160f—Metallography. (Chem.) Principles of metallography, including constitution diagrams, preparation and standardization of thermocouples, preparation and thermal analysis of alloys, their microscopic examination and photomicrographs; typical alloy systems such as iron carbon (steel, cast iron), and some non-ferrous alloys. Lab. work; 3 cred.; prereq., Anal. Chem. 1, 2. Mr. Jerabek.
Lect. III MF
Lab. (1) VI-VIII Th; 307M (2) VI-VIII F; 307M

161w—Advanced Metallography. (Chem.) Metallography and heat treatment of iron and steel, including alloy steels, commercial uses of various steels, and engineering specifications. Lab. work; 3 cred.; prereq., 160. Mr. Jerabek.
Lect. I MF
Lab. (1) VI-VIII Th; 307M (2) Ar

162s—Advanced Metallography. (Chem.) Metallography of the non-ferrous metals with a study of the constitution diagrams, properties, and uses of important commercial alloys. Lab. work; 3 cred.; prereq., 160. Mr. Jerabek.
Lect. III MF
Lab. (1) VI-VIII Th; 307M (2) Ar

163f—Advanced Metallography. Seminar work on recent advances in metallography. Lectures and recitations, with outside reading and special reports. May be accompanied by laboratory work. 3 cred.; prereq., 6 cred. in metallography. Mr. Dowdell.

164w—Advanced Metallography. Advanced consideration of the structures, properties, and uses of metals and alloys. May be accompanied by laboratory work. 3 cred.; prereq., 6 cred. in metallography. Mr. Dowdell.

165s—Advanced Metallography. Technical metallography as applied to the automotive industry. Lectures and special reports. May be accompanied by laboratory work. 3 cred.; prereq., 6 cred. in metallography. Mr. Dowdell.

201f-202w-203s—Advanced Metallography for Graduate Students. Intended primarily for research work. Mr. Dowdell.

METALLURGY

3f—General Metallurgy. Combustion, fuels, refractory materials, furnaces, and fluxes. Lectures and recitations. 3 cred.; prereq., Inorg. Chem. 8 or equiv.; I TThS; 108M. Mr. Christianson.

4w—Metallurgy of Pig Iron. General principles of iron blast furnace practice. Construction of furnace, handling of stock and products, principles of regulations. Lect. and rec.; 3 cred.; prereq., 3; I TThS; 108M. Mr. Christianson.

5s—Metallurgy of Wrought Iron and Steel. General principles involved in the production of wrought iron and steel. Lect. and rec.; 3 cred.; prereq., 4; I TThS; 108M. Mr. Christianson.

106f—Metallurgy of the Base Metals. Lead, copper, zinc, and mercury. Consideration of smelting methods and principles involved in refining. Lect. and rec.; 4 cred.; prereq., 3; I F, III TThS; 108M. Mr. Pease.

107w—Metallurgy of the Base Metals. 4 cred.; prereq., 106; I F, III TThS; 108M. Mr. Pease.

108s—Metallurgy of the Precious Metals. Principles involved and methods used in the extraction of gold, silver, and other precious metals. Lect. and rec.; 4 cred.; prereq., 107; I F, III TThS; 108M. Mr. Pease.

109f—Metallurgy of Base Metals. (Ch.E., M.E.) Special consideration is given to mechanical appliances. Lect. and rec.; 3 cred.; prereq., Inorg. Chem. 8, 16 or equivalent; IV MWF; 108M. Messrs. Christianson and Pease.

109w—Metallurgy of Base Metals. (Chem. and E.E.) Special consideration is given to elctrical appliances. Lect. and rec.; 3 cred.; prereq., Inorg. Chem. 8, 16 or equiv; IV MWF; 108M. Messrs. Christianson and Pease.

MILITARY SCIENCE AND TACTICS

REQUIRED WORK

All physically fit male students (except foreigners) are required to take instruction in military science for three hours each week during the first two undergraduate years of their course. Previous instruction in this subject at other institutions under an officer of the regular army detailed as professor of military science and tactics exempts the student from so much of this work as the length of his prior training justifies in each case. All students taking this course are given the instruction prescribed for the Basic Course, Senior Division, R.O.T.C. Students registered in Electrical Engineering are assigned to the Signal Corps, all others in Engineering, Architecture, and Chemistry are assigned to the Coast Artillery.

ELECTIVE WORK

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 pay. Students pursuing the Advanced Course are also furnished a special uniform and receive a fixed allowance per day. The total government compensation for the two years' advanced work amounts to something over $200. Students who satisfactorily complete the Advanced Course will be commissioned in the Officer's Reserve Corps of the United States Army.

The University allows 18 credits for the two years' Advanced Course, R.O.T.C., in all units. These credits may be applied towards graduation.

The Advanced Course for the students of this college normally embraces two departments: Coast (Anti-aircraft) Artillery, and Signal Corps. The Signal Corps is open to electrical engineers only.

1f-2w-3s—First Year Basic Course, R.O.T.C.

Coast Artillery. Duties of the coast artillery soldier, with special reference to anti-aircraft equipment and methods; organization; leadership; military

history; current international situations; obligations of citizenship; courtesies and customs of the service; marksmanship; relationship of the citizen to his government. No cred.; no prereq.

1f-2w (1) I MWF; A (2) IX MWF; A

3s (1) I MF; A (3) II TTh; A
(2) I-II T; A
and one of the following
single hours:
I T or W, IX T or W

Signal Corps. Duties of the signal corps soldier; relationship of the citizen to his government; important world events of economic, political and military nature and their effect on our national policies; discipline and courtesies; sanitation and first aid; army organization; map and aerial photograph reading; leadership. No cred.; no prereq.

1f (1) I MWF; A (2) IX MWF; A

2w IX MWF; 335EE

3s (1) I MF, IX W; A (2) V T, VIII-IX W; A

4f-54w-6s—Second Year Basic Course, R.O.T.C.

Coast Artillery. Duties of non-commissioned officer of Coast Artillery; defense against chemical warfare; map sketching; signal communication; aircraft identification and characteristics; position finding and fire control for anti-aircraft artillery. No cred.; prereq., 1-2-3.

4f-5w (1) I TThS; A (2) II TThS; A

6s (1) I MF; A (4) IV MW; A (Agr. Engr. only)
(2) I TTh; A (5) I-II T; A
(3) II TTh; A
and one of the following
single hours:
I T or W; IX T or W

Signal Corps. Duties of the signal corps non-commissioned officer; radio telegraph and telephone operating; code practices and procedure in handling messages; leadership.

4f (1) III MWF; A (2) VII MWF; A

5w (1) III MWF; 321EE (2) VII MWF; 321EE

6s (1) V T, VIII-IX W; A (2) I MF, IX W; A

51f-52w-53s—First Year Advanced Course, R.O.T.C.

Coast Artillery. Duties of the coast artillery officer; aerial photographic reading; combat orders; instructional methods; leadership; basic gunnery, methods of adjusting fire principles of probability; position finding, gunnery and fire control for anti-aircraft artillery. 3 cred. per qtr.; prereq., 4-5-6. Major Potts.

51f-52w Rec. (1) IV MWF; A (3) VI MWF; A
(2) II MWF; A
Lab. (1) VIII-IX W; A (2) VIII-IX M; A

53s Rec. (1) IV MWF; A (3) VI MWF; A
(2) II MWF; A
Lab. (1) IX W, I M or F; A (4) IX W, I T or Th; A
(2) IX T, IX M or F; A (5) IX T, II T or Th; A
(3) IX T, I T or Th; A

Signal Corps. Duties of the signal corps officer; means and methods of transmitting messages; theory and laboratory instruction in military wire communication; use of codes and ciphers; installation and operation of radio sets; tactics and transmission of decisions in form of orders to

subordinates; leadership. 5 class and lab. hrs. per week, or 4 if accompanied by reg. in E.E. 64-65-66. 2 cred. per qtr.; prereq., 4-5-6.

51f IV MWF, III-IV T; 321EE
52w VI MWF, I-II T; 321EE
53s Rec. VI-VII T
Lab. (1) I MF, IX W; A (2) V T, VIII-IX W; A

54f-55w-56s—Second Year Advanced Course, R.O.T.C.

Coast Artillery. Duties of coast artillery officer; command and leadership; military history and policy; military law, surveying and orientation, field engineering; motor transport; instructional methods; artillery tactics. 3 cred. per qtr.; prereq., 51-52-53. Major Potts.

54f-55w Rec. (1) I MWF; A (3) VI MWF; A
(2) III MWF; A
Lab. (1) VIII-IX W; A (2) VIII-IX W; A
56s Rec. (1) I MWF; A (3) VI MWF; A
(2) III MWF; A
Lab. (1) VIII-IX W; A (4) IX W, I T or Th; A
(2) IX T, IX M or F; A (5) IX T, II T or Th; A
(3) IX T, I T or Th; A

Signal Corps. Duties of the signal corps officer; military law, training management; defense against chemical warfare; military history and policy; leadership; staff duties of a signal corps officer. 4 class and lab. hrs. per week. 2 cred. per qtr.; prereq., 51-52-53.

54f VI MTTh, VII T; 321EE
55w VIII M, VI TTh, IV F; 321EE
56s Rec. II Th; 321EE
Lab. (1) I MF, IX W; A (2) V T, VIII-IX W; A

PHYSICAL EDUCATION FOR MEN

The courses in sports education are offered by the Department of Physical Education to men students of the University for the purpose of providing instruction and practice in sports of a recreational nature in which men may participate in future years as a means of obtaining recreation, regular exercise, and social intercourse.

The University furnishes uniforms to students for class work or recreational play for $1 per quarter.

SPORTS EDUCATION

1f-2w-3s.†‡ Sports education courses. Include instruction and participation in the following activities:

Fall Quarter

1. Tennis, handball, and squash rackets (beginning and advanced)
2. Golf (beginning and advanced)
3. Touch football
4. Boxing
5. Swimming (beginning, advanced, and life saving)
6. Freshman team practice in football, gymnastics, wrestling, and swimming as substitution for class instruction.

‡ A fee of $1 per quarter is charged students registering for one or more of these courses.

† Course 1-2-3 may be offered as a substitute for G.E. 13.

Course 1-2-3 carries a total of three credits. The entire course may be completed before credit is received for any quarter.

Course 1-2-3 carries no credit when taken in place of military science and tactics by foreign students and others in the College of Engineering and Architecture.

Winter Quarter

1. Handball and squash rackets
2. Basket-ball and volley ball
3. Boxing
4. Gymnastics
5. Swimming (beginning, intermediate, advanced, and life saving)
6. Freshman team practice in basket-ball, gymnastics, hockey, indoor track, swimming, and wrestling as substitution for class instruction.

Spring Quarter

1. Tennis (beginning and advanced)
2. Golf (beginning and advanced)
3. Diamond ball
4. Swimming (beginning, intermediate, advanced, diving, and life saving)
5. Freshman team practice in baseball, basket-ball, football, golf, track, and tennis as substitution for class instruction.

Courses will be offered during the following periods. Definite scheduling of each activity will not be made until after a meeting at the beginning of the quarter to determine the hours which best fit the schedules of a majority of students wishing to elect each activity.

MWF II, III, IV, VI, VII
TThS II, III

NOTE.—A student may elect the same activity for only two quarters. Freshman team practices may be substituted two quarters only, except that students who can pass proficiency examinations in a sufficient number of recreational games will be allowed to substitute a third quarter. Mr. Piper will be in charge of the above courses.

4w—Freshman Hygiene. No cred.; no prereq.; IV S; 202S.

13f,14w,15‡—Individual Activities. 3 cred.; prereq., 1, 2, 3. Mr. Osell.

(1) II TThS; 264S (2) III TThS; 264S

16f,17w,18s‡—Individual Activities (drill substitute). No cred.; prereq. by petition only. Mr. Osell.

(1) II MWF; 264S (3) IV MWF; 264S
(2) III MWF; 264S (4) VII MWF; 264S (w and s only)

PHYSICAL EDUCATION FOR WOMEN

This department aims to promote the physical efficiency of the women students. It gives physical examination and advice to all on entrance; plans systematically to keep in close touch with them during their first two years of residence; gives a course in hygiene; organizes neuro-muscular activity leading toward organic strength, nervous stability, conscious motor control, correct bodily mechanics, skill in handling the body in physical recreation, and the development of that valuable social quality known as good sportsmanship; co-operates closely with the Women's Athletic Association in encouraging and organizing athletic sports, holds regular office hours for the purpose of consultation with all students who desire its advice.

Work in this department must be taken for six consecutive quarters in the freshman and sophomore years. Every student must complete Courses 1, 2, 3,

‡ A fee of $1 per quarter is charged students registering for one or more of these courses.

4, 5, 6, and 7. All students are allowed as free choice as their physical condition permits.

Physical examinations or consultations are required annually of all students.

Women students in the College of Engineering and Architecture and the School of Chemistry take physical education instead of military science and tactics in the freshman and sophomore years and without numerical credit.

Statement of fees.—There is a fee of $1.75 a quarter for all exercise courses, including swimming, for which registration is required. Maximum fee paid by a student in physical education, $3.50 a quarter.

1f,2w,3s,4f,5w,6s—General Course in Physical Education. Students must register for the 1-2-3 sequence in their first year and for the 4-5-6 sequence in their second year. No cred.; no prereq.

Archery		
1f,4f	II MW; 153WGm	
3s,6s	(1) II TTh; 153WGm	(4) VI MW; 153WGm
	(2) III TTh; 153WGm	(5) VII WF; 153WGm
	(3) IV MW; 153WGm	
Baseball		
3s,6s	(1) III TTh; 151WGm	(3) VI MW; 151WGm
	(2) IV MW; 151WGm	
Basket-Ball		
2w,5w	(1) II MW; 151WGm	(3) IV MW; 151WGm
	(2) III TTh; 151WGm	(4) VI MW; 151WGm
*Dancing, Rhythmic		
1f,4f,3s,6s	VII TTh; 151WGm	
2w,5w	VII TTh; 151WGm	
Dancing, Tap		
1f,4f,2w,5w	III MW; 151WGm	
Field Hockey		
1f,4f	VI MW; 151WGm	
Folk Dancing and Games		
1f,4f,2w,5w	I WF; 151WGm	
Fundamentals		
1f,4f,2w,5w	(1) III TTh; 153WGm	(3) VI MW; 153WGm
	(2) IV MW; 153WGm	
†Golf, Elementary		
2w,5w	II MW; 151WGm	
3s,6s	(1) I TTh; 151WGm	(3) III MW; 151WGm
	(2) II TTh; 151WGm	(4) VII TTh; 151WGm
Golf, Intermediate		
1f,4f	(1) III TTh; 151WGm	(2) VII TTh; 151WGm
3s,6s	VI MW; 151WGm	
‡Horseback Riding		
1f,4f,3s,6s	IX TTh; 151WGm	
Orthopedics		
1f,2w,3s,	(1) MW; 3WGm	(3) IV MW; 3WGm (f and w only)
4f,5w,6s	(2) III TTh; 3WGm	(4) VI MW; 3WGm
Posture		
1f,4f	(1) II MW; 151WGm	(3) VI MW; 151WGm
	(2) III TTh; 151WGm	
Recreational Gymnastics and Games		
1f,4f	I TTh; 151WGm	
2w,5w	VI TTh; 151WGm	

* The winter course in Rhythmic Dancing is not open to students who have not taken Rhythmic Dancing fall or spring quarters.

† Students must supply their own golf equipment.

‡ For horseback riding students will pay at about $1 per lesson, but not the regular physical education fee. Attendance at class hour is required for credit. Class meetings will be one hour in length. Groups will be arranged according to riding ability.

Skating
2w,5w (1) II TTh; 151WGm (2) VII WF; 151WGm
Soccer
1f,4f IV MW; 151WGm
†Swimming, Elementary
1f,2w,3s, (1) II TTh; 51WGm (4) VII WF; 51WGm
4f,5w,6s (2) IV TS; 51WGm (5) VIII TTh; 51WGm
(3) IV MW; 51WGm
Swimming, Intermediate
1f,2w,3s, (1) III TTh; 51WGm (2) VIII MW; 51WGm
4f,5w,6s
Swimming, Advanced
1f,2w,3s, VI MW; 51WGm
4f,5w,6s
Swimming, Life Saving
3s,6s (1) II MW, 51WGm (2) IX MW; 51WGm
Swimming, Diving
2s,5s III MW; 51WGm
‡Tennis, Elementary
1f,4f (1) I TTh; 151WGm (3) IV MW; 151WGm
(2) III TTh; 151WGm (4) VI MW; 151WGm
‡Tennis, Intermediate
3s,6s (1) II TTh; 151WGm (3) VIII TTh; 151WGm
(2) VII WF; 151WGm
Volley Ball
1f,4f III TTh; 151WGm
3s,6s II MW; 151WGm

7f,w,s§—Lectures in Physical Education and Health. No cred.; no prereq.
1f,4f (1) I MW; 201WGm (3) VI MW; 201WGm
(2) II TTh; 201WGm
2w,5w (1) II TTh; 201WGm (2) VI MW; 201WGm
3s,6s VI MW; 201WGm

PHYSICS

3f,w,s,su—Elements of Mechanics. Mechanics of solids and fluids. Study of the simpler fundamental principles. First part of a general course 3, 13, 23, 33, 43. Course 4 should be taken in conjunction with this course. 3 cred.; prereq., M.&M. 12 or equiv. Mr. Erikson.

3f Lect. (1) II MWF; 150Ph (2) VI MWF; 150Ph
Quiz (1) II Th; 150Ph (2) IX Th; 150Ph
3w,s Lect. VIII MWF; 150Ph Quiz IX F or ar; 150Ph

4f,w,s,su*—Elements of Mechanics Laboratory. The laboratory part supplementing Course 3. 1 cred.; prereq., 3 or reg. in 3. Mr. Erikson.

4f (1) III-IV T; 153Ph (7) I-II F; 153Ph
(2) VI-VII W; 153Ph (8) III-IV S; 153Ph
(3) VIII-IX M; 153Ph (9) I-II M; 153Ph
(4) I-II T; 153Ph (10) VI-VII Th; 153Ph
(5) I-II W; 153Ph (11) VI-VII M; 153Ph
(6) VIII-IX F; 153Ph (12) VI-VII F; 153Ph
4w,s (1) VI-VII M; 153Ph (3) I-II T; 153Ph
(2) VIII-IX T; 153Ph (4) VIII-IX Th; 153Ph

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

† Students may not enter the winter quarter of elementary swimming unless they have taken elementary swimming in the fall or spring.

‡ Students taking tennis must pay $1 for a tennis permit.

§ 7f,w,s, must be taken during the first year in residence, preferably during the fall quarter. This course should be taken at the same time as an activity course.

13w,s—Acoustics. Study of the principles and applications of sound. 3 cred.; prereq., 3; III MWF, IX M; 133Ph.

23f,w—Heat. Study of the principles underlying heat phenomena. Course 24 should be taken in conjunction with this course. 3 cred.; prereq., 3. Mr. Miller.

23f	Lect. III TThS; 150Ph	Quiz IX T; 150Ph
23w	Lect. (1) II MWF; 150Ph (2) VI MWF; 150Ph	(3) IV MWF; 150Ph
	Quiz (1) II Th; 150Ph	(2) IX Th; 150Ph

24f,w*—Heat Laboratory. Laboratory part supplementing Course 23. 1 cred.; prereq., 4, 23, or reg. in 23. Mr. Miller.

24f	(1) VI-VII M; 244Ph	(3) VI-VII T; 244Ph
	(2) VIII-IX M; 244Ph	(4) VIII-IX T; 244Ph
24w	(1) VIII-IX F; 244Ph	(7) VI-VII F; 244Ph
	(2) II-III Th; 244Ph	(8) VI-VII W; 244Ph
	(3) III-IV T; 244Ph	(9) I-II W; 244Ph
	(4) I-II M; 244Ph	(10) VI-VII M; 244Ph
	(5) I-II T; 244Ph	(11) III-IV S; 244Ph
	(6) VIII-IX M; 244Ph	(12) VIII-IX T; 244Ph

33f,w,s—Optics. Experimental demonstrations of optical phenomena and a study of the fundamental optical principles. Course 34 should be taken in conjunction with this course. 3 cred.; prereq., 3.

33f	Lect. (1) I TThS; 133Ph (2) IV MWF; 133Ph	Quiz IX F; 133Ph
33w,s	Lect. I TThS; 133Ph	Quiz IX F or ar; 133Ph(f,w), 166Ph(s)

34f,w,s*—Optics Laboratory. Laboratory part supplementing Course 33. 1 cred.; prereq., 33 or reg. in 33. Mr. Valasek and others.

34f,w,s	(1) VI-VII M; 352Ph	(3) VI-VII Th; 352Ph
	(2) VIII-IX M; 352Ph	(4) VI-VII F; 352Ph

43w,s—Electricity. Study of the principles underlying electric phenomena. Course 44 should be taken in conjunction with this course. 3 cred.; prereq., 3. Mr. Zeleny.

43w	Lect. III TThS; 150Ph	Quiz IX T; 150Ph
43s	Lect. (1) II MWF; 150Ph (2) IV MWF; 150Ph	(3) VI MWF; 150Ph
	Quiz (1) II Th; 150Ph	(2) IX Th; 150Ph

44w,s*—Electricity Laboratory. Laboratory part supplementing Course 43. 1 cred.; prereq., 4, 43, or reg. in 43. Mr. Zeleny.

44w	(1) VI-VII T; 231Ph	(2) VI-VII W; 231Ph
44s	(1) II-III Th; 231Ph	(7) VIII-IX F; 231Ph
	(2) III-IV S; 231Ph	(8) VI-VII Th; 231Ph
	(3) III-IV M; 231Ph	(9) VI-VII W; 231Ph
	(4) I-II W; 231Ph	(10) I-II F; 231Ph
	(5) VIII-IX M; 231Ph	(11) I-II S; 231Ph
	(6) III-IV T; 231Ph	(12) VIII-IX Th; 231Ph

101f-102w-103s—Theoretical Physics. An analytical survey of fundamental principles of mechanics, sound, heat, light, electricity, and magnetism, designed to supplement the general course and to prepare students for more specialized graduate courses. 5 cred. per qtr.; jr., sr., grad.; prereq., 12 cred. in phys., M.&M. 25; IV MTWFS; 145Ph. Mr. Tate.

124s*—Pyrometry. Experimental study of the principles underlying temperature. One lecture, two three-hour sessions in the laboratory a week. 3 cred.; prereq., 23, 24; VI-IX MW, or ar.; 245Ph. Mr. Miller.

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

126f,s*—Advanced Heat. Temperature standards, expansion, calorimetry. Kinetic theory of matter. Change of state and heat transfer. Lecture and laboratory. 3 cred.; prereq., 23, 24; VI-IX MW, or ar.; 245Ph. Mr. Miller.

144f*—Electricity Measurements. Devoted mainly to the study of potentiometer methods, capacitance, inductance, magnetic flux. One lecture, one quiz hour and two two-hour laboratory periods a week. 3 cred.; prereq., 43, 44. Mr. Zeleny.

Lect. I Th; 166Ph
Quiz V M; 166Ph
Lab. (1) VIII-IX TF; 231Ph
(2) III-IV TS; 231Ph
(3) VI-VII T, VIII-IX Th; 231Ph
(4) VI-VII WF; 231Ph
(5) VIII-IX M, VI-VII Th; 231Ph

For other electives in the Department of Physics see the Combined Class Schedule bulletin for 1934-35. Science, Literature, and the Arts section.

PHYSIOLOGIC CHEMISTRY

100f,su—Physiologic and Physical Chemistry. Chiefly in organic aspects. Metabolism of proteins, fats, carbohydrates in health and disease. 8 cred.; prereq., phys. and Org. Chem. 153. Messrs. McClendon, Hemingway, and Cavett.

Lect. IV MTWFS; MeS Aud
Quiz I F
Lab. (1) I-III MW; 310MH
(2) I-III MW; 310MH
(3) I-III ThS; 310MH
(4) I-III ThS; 310MH

101w,su—Physiologic Chemistry. Application of physical chemistry to physiology. 5 cred.; prereq., Physiol. 100. Messrs. McClendon, Hemingway, and Cavett.

Lect. IV TS; MeS Aud
Quiz VI F
Lab. (1) I-III MW; 310MH
(2) I-III MW; 310MH
(3) I-III ThS; 310MH
(4) I-III ThS; 310MH

POLITICAL SCIENCE

63s—Functions of Government. Services of modern government; law enforcement, regulation of business and agriculture, government and the professions, education, public welfare, highways, public works, health, conservation of natural resources, problems of personnel and finance, the place of the expert in government. 3 cred.; prereq., soph., jr., sr.; I MWF; BuAud. Mr. Field.

RHETORIC

(College of Agriculture)

22f,w,s—Public Speaking. Practical course in fundamentals of speech making. 3 cred.; prereq., 6. Mr. Routledge.

22f,s III MWF; 311En(UF)
22w (1) I MWF; 311En(UF)
(2) II MWF; 311En(UF)

23f,w,s—Public Speaking. 5 cred.; prereq., 6; IV MTWFS; 311En(UF).

SOILS

6w—Soils. Origin, formation, physical properties, moisture relations, principles of soil fertility, use of lime, commercial fertilizers, and stable manure; soil organisms and green manures; tillage. 5 cred.; no prereq.; II MTWThF; 204So(UF). Messrs. Alway and Rost.

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

108w—Physical Properties of Soils. The determination of physical constants of soils, including mechanical composition. 3 cred.; jr., sr.; prereq., 6. Mr. McMiller.

Lect. VI W; 204So(UF) Lab. VII-IX W, VI-VIII F; 201So(UF)

ZOOLOGY

14f-15w†-16s*—General Zoology. Structure, physiology, embryology, classification, and evolution of animals. Textbook, lectures, laboratory, and quizzes. 9 cred.; no prereq.; V-VII TTh; 101Z, 313Z. Mr. Dawson.

* A fee of $1 is charged each quarter.

† The entire course must be completed before credit is received for any quarter.