

# *The Bulletin of the University of Minnesota*

*Northwest School and Experiment  
Station*

*Crookston, Minnesota*

*Announcement for the Year  
1925-1926*



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1925							1926													
<b>JULY</b>							<b>JANUARY</b>							<b>JULY</b>						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	1	2	3	4	..	..	..	..	..	1	2	..	..	..	..	1	2	3
5	6	7	8	9	10	11	3	4	5	6	7	8	9	4	5	6	7	8	9	10
12	13	14	15	16	17	18	10	11	12	13	14	15	16	11	12	13	14	15	16	17
19	20	21	22	23	24	25	17	18	19	20	21	22	23	18	19	20	21	22	23	24
26	27	28	29	30	31	..	24	25	26	27	28	29	30	25	26	27	28	29	30	31
..	..	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>AUGUST</b>							<b>FEBRUARY</b>							<b>AUGUST</b>						
..	..	..	..	..	..	1	..	1	2	3	4	5	6	1	2	3	4	5	6	7
2	3	4	5	6	7	8	7	8	9	10	11	12	13	8	9	10	11	12	13	14
9	10	11	12	13	14	15	14	15	16	17	18	19	20	15	16	17	18	19	20	21
16	17	18	19	20	21	22	21	22	23	24	25	26	27	22	23	24	25	26	27	28
23	24	25	26	27	28	29	28	..	..	..	..	..	..	29	30	31	..	..	..	..
30	31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>SEPTEMBER</b>							<b>MARCH</b>							<b>SEPTEMBER</b>						
..	..	1	2	3	4	5	..	1	2	3	4	5	6	..	..	..	1	2	3	4
6	7	8	9	10	11	12	7	8	9	10	11	12	13	5	6	7	8	9	10	11
13	14	15	16	17	18	19	14	15	16	17	18	19	20	12	13	14	15	16	17	18
20	21	22	23	24	25	26	21	22	23	24	25	26	27	19	20	21	22	23	24	25
27	28	29	30	..	..	..	28	29	30	31	..	..	..	26	27	28	29	30	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>OCTOBER</b>							<b>APRIL</b>							<b>OCTOBER</b>						
..	..	..	1	2	3	..	..	..	..	1	2	3	..	..	..	..	..	..	1	2
4	5	6	7	8	9	10	4	5	6	7	8	9	10	3	4	5	6	7	8	9
11	12	13	14	15	16	17	11	12	13	14	15	16	17	10	11	12	13	14	15	16
18	19	20	21	22	23	24	18	19	20	21	22	23	24	17	18	19	20	21	22	23
25	26	27	28	29	30	31	25	26	27	28	29	30	..	24	25	26	27	28	29	30
..	..	..	..	..	..	..	..	..	..	..	..	..	..	31	..	..	..	..	..	..
<b>NOVEMBER</b>							<b>MAY</b>							<b>NOVEMBER</b>						
..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	2	3	4	5	6
1	2	3	4	5	6	7	2	3	4	5	6	7	8	7	8	9	10	11	12	13
8	9	10	11	12	13	14	9	10	11	12	13	14	15	14	15	16	17	18	19	20
15	16	17	18	19	20	21	16	17	18	19	20	21	22	21	22	23	24	25	26	27
22	23	24	25	26	27	28	23	24	25	26	27	28	29	28	29	30	..	..	..	..
29	30	..	..	..	..	..	30	31	..	..	..	..	..	..	..	..	..	..	..	..
<b>DECEMBER</b>							<b>JUNE</b>							<b>DECEMBER</b>						
..	..	1	2	3	4	5	..	..	1	2	3	4	5	..	..	..	1	2	3	4
6	7	8	9	10	11	12	6	7	8	9	10	11	12	5	6	7	8	9	10	11
13	14	15	16	17	18	19	13	14	15	16	17	18	19	12	13	14	15	16	17	18
20	21	22	23	24	25	26	20	21	22	23	24	25	26	19	20	21	22	23	24	25
27	28	29	30	31	..	..	27	28	29	30	..	..	..	26	27	28	29	30	31	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

## SCHOOL CALENDAR

1925-1926

1925			
September	28	Monday	Registration
September	29	Tuesday	Organization of classes
October	31	Saturday	Home Coming Day
November	11	Wednesday	Armistice Day exercises
November	26	Thursday	Thanksgiving Day
December	18	Friday	First term closes; Christmas recess begins
1926			
January	4	Monday	Registration of new students
January	5	Tuesday	Second term begins; organization of classes
February	8-12	Week	Northwest School Farmers' Week
March	26	Friday	Second term closes
March 29 - April 2		Week	Junior Short Course

### COMMENCEMENT WEEK

March	20	Saturday	Interclass field meet
March	21	Sunday	Baccalaureate address
March	22	Monday	Intersociety declamatory contest
March	23	Tuesday	Superintendent's reception to graduating class
March	24	Wednesday	Musical recital and class play
March	25	Thursday	Class Day exercises and commencement

THE NORTHWEST SCHOOL AND STATION  
FACULTY

Lotus D. Coffman, Ph.D., LL.D., President  
William Watts Folwell, LL.D., President Emeritus  
Walter C. Coffey, M.S., Dean of the Department of Agriculture

AT CROOKSTON

Conrad G. Selvig, M.A., Superintendent  
Arthur H. Larson, B.S., Preceptor, Registrar, Academic Subjects  
Fanny B. Lippitt, B.S., Matron, Dining Hall, Foods and Nutrition  
Retta Bede, B.S., Preceptress, Foods and Cookery  
Olga E. Nettum, Secretary  
Kate Bedard, Accountant  
Edward W. Avery, B.S., Public Speaking, Debate, Advanced Subjects  
Elmer R. Clark, B.S.A., Pure Seed Work and Home Projects  
Ray S. Dunham, B.S., Farm Crops and Soils  
Arnold M. Foker, Carpentry and Farm Engineering  
Laura Gerber, B.S., Clothing and Textiles, Assistant Preceptress  
Ruth Gurley, B.A., Music and Vocal Training  
Orville M. Kiser, B.S.A., Livestock  
Arthur J. Kittleson, Extension in Boys' and Girls' Club Work  
Delmar H. LaVoi, B.S.A., Livestock, Home Projects, Physical Training,  
Assistant Preceptor  
Thomas M. McCall, B.S.A., Horticulture  
D. Austin Milligan, B.S., Farm Motors and Mechanics, Assistant Preceptor  
Alvey M. Pilkey, Poultry  
Severin Rishovd, Farm Motors and Mechanics  
Norma Helen Rupert, B.A., English, Assistant Preceptress  
Alva Sherwood, Business Training  
Anne Simley, B.A., English  
—————, School Nurse, Home Nursing  
Reefa G. Tordoff, Piano

## GENERAL INFORMATION

*Location.*—The Northwest School of Agriculture is located at the Experiment Farm, one and one-half miles north of Crookston, Minnesota. There is a paved roadway between the school and the city, and the regular auto-bus service is maintained.

*Purposes.*—The school was organized in 1906. It offers a practical course of study designed to fit young men and young women for successful farm life, and aims to give its students the necessary preparation for useful citizenship.

The work of the school aims to interpret for the young men and the young women from the farms, the life with which they are familiar. It gives reasons for the various farm operations, and makes a scientific basis for the proper management of the farm and the home.

*Time of opening.*—The fall term of the Northwest School of Agriculture will open for registration on September 28, 1925, and classes will begin at 8:00 o'clock on Tuesday, September 29. The fall term closes on December 18, 1925.

The winter term will open for registration on January 4, and classes will begin at 8 o'clock on January 5, 1926. The winter term closes March 26, 1926.

*Three years' course.*—The course of study offered covers a wide range of subjects, and is largely technical in character. It is briefly outlined on pages 16 to 25. The regular course for both young men and young women requires three winters of six months each for completion.

The methods of instruction tend to educate students toward the farm instead of away from it, to develop in them a love for farm life by showing them its possibilities. In this respect the school has been very successful, as nearly all of its graduates continue agricultural pursuits.

*Advanced courses.*—It has been found that the eighteen months of the long course is a very short time in which to give all the work that should be included in a satisfactory course. Therefore a fourth six months of work is offered. During this fourth session, graduates of the long course may elect to specialize in one of the lines of work listed below. They may at the same time choose from the elective lists subjects that they could not obtain during their first three sessions. The major lines of work suggested for boys are dairying, beef production, farm engineering, carpentry, advanced farm management, and academic subjects. The major lines for girls are dressmaking, advanced home management, nursing, music, and business training.

*College preparatory.*—Graduates of the Northwest School of Agriculture, who have completed two summers of supervised work on their home farms, one additional school year of six months, and one additional summer's work or the equivalent thereof, will be admitted to the College of Agriculture, Forestry, and Home Economics of the University of Minnesota and state teachers' colleges.

*Department of Music.*—For those who are interested, credit courses in piano instruction are offered. Twelve half-hour and twelve group lessons per term are given with special time for practice. Fees of \$7 per term for the lessons and \$2.50 per term for piano rental are charged. Special rooms are set aside for practice, making it possible to do good, thoro work. A class in musical theory meets once a week, and instruction is also given in the history of music, ear-training, and the rudiments of harmony.

*How to get to the school.*—Check all baggage to Crookston and bring checks to the school. A charge of 25 cents is made by the school for transporting trunks at the opening of school. The same charge is made for the return of the baggage at the close of school, provided it is ready to go on the days assigned. A charge of 50 cents is made for transporting trunks at any other time.

*Admission.*—Applicants who have completed a common school course will be admitted without examination and boys must have had six months' practical experience on a farm.

Applicants who have not completed the common school course should write to the registrar for further information.

Students more than twenty-one years of age who cannot pursue the full course, either from lack of time or proper preparation, may make special arrangements for taking such projects as will be most helpful to them.

Students from city or grade schools will not be admitted before finishing eighth grade work, or until their former school records have been passed upon by the superintendent. These records must be presented at least three weeks prior to the opening of school.

State High School Board certificates are accepted for work in English, physiology, algebra, geometry, and civics, or credits of 75 per cent or more received on state teachers' examinations.

*Rooms in dormitories.*—Old or new students planning to attend the School of Agriculture should reserve rooms in advance. Write early to the registrar, asking him to reserve a room in one of the dormitories. This may be done by paying a deposit fee of \$2 which will apply on the first month's rent. If the student is unable to enter school, the deposit may be reclaimed before September 15, after which time it is forfeited. Each dormitory room is furnished with two single beds, a dresser, table, and chairs. The rooms are all lighted by electric light and heated by steam. Preferences as to roommates should be stated early and will be considered as far as possible.

*What to bring.*—Each student should come provided with sheets, blankets, quilts, one bedspread, one pillow, three pillow cases, towels, napkins, comb, brushes, one glass tumbler, and one teaspoon, and at least two nightgowns.

Each girl should bring with her, in addition to her ordinary supply of clothing, kimono and bedroom slippers, laundry bag, gymnasium suit, and gymnasium shoes. The kimono and bedroom slippers may be of any style and material; the laundry bag should be of washable material, large enough

to hold the soiled clothes of one person, and made to hang on two closet hooks; the gymnasium suit should consist of a pair of black sateen bloomers and a white middy blouse. Standard pattern No. 9225 is recommended for the bloomers. Three and one-half yards of material 36 inches wide are required for the average size. Black gymnasium or tennis shoes complete this costume. For those who are unable to make the bloomers at home, assistance will be furnished at the school.

*Expenses.*—Necessary expenses for the year do not exceed \$150. This amount does not include traveling and personal expenses.

Each student is required to pay for breakage of apparatus used in practical work, and for all damage done to school property.

Textbooks are furnished at a rental of \$2 per year to students who do not desire to purchase. A gymnasium fee of 25 cents per term is charged all students.

Music fees for private lessons are \$7 for each term. Piano rental is \$2.50 per term.

A fee of \$2.50 each term will entitle each student to attend all school functions, athletic contests, and games and entertainments.

It should be remembered that expenses for fees are for the entire term, and after the first month the only expenses are for board and room.

The cost to the student for board is the actual cost of maintaining the table (including management). Board is payable the first of each month in advance. A surcharge of 10 per cent is added to all bills delinquent more than ten days. No deduction is made for board for any absence of less than five days. No room refunds will be made for any period of less than one month. If students are compelled to be absent for that length of time, they are allowed half rates, provided they make arrangements with the accountant before leaving.

On entering the school, each student should bring sufficient money to pay for one month's board and room, and to pay for his books and fees. This will amount to from \$30 to \$35.

The following expenses are charged to all students. Fees are payable at the time of registration, and board and room at the first of each month.

Registration fee for any part of school year.....	\$ 5.00
Non-residents of Minnesota.....	10.00
Deposits as guarantee of proper treatment of school property.....	5.00
Health fee per term, required of all students except those living at home.....	2.00
Board per week (price subject to change).....	4.00
Room per week, including flat laundry (price subject to change).....	1.25
Book rent, per term.....	1.00
Student privilege ticket for all school functions, athletic contests, and games and entertainments .....	2.50

Special fees in laboratory courses are as follows: blacksmithing, \$2 a term; carpentry, engineering, farm mechanics, cooking, sewing, chemistry, corn studies, or dairying, 50 cents each a term. A rental fee of \$1 a month is charged for the use of typewriters.

*Health service.*—The health fee collected from all students is used to maintain the Students' Health Service. A fully equipped hospital is main-

tained and a full-time nurse is engaged during the school year. The health fee provides for physical examinations for all students and care by the nurse in case of sickness. *It does not provide for extra nurses or physicians in case of serious sickness, when such are necessary. A charge of 75 cents a day will be made for detention in the hospital after the first twenty-four hours.*

The requirements for graduation are as follows:

1. *Boys' and girls' regular courses.*—The completion of the prescribed course of study, including all the required work and enough elective work to make a total of 150 credit hours for the boys and 144 for the girls.

2. Honorable standing in department.

3. An essay of not less than one thousand words upon a topic connected with agriculture or home economics, typewritten on paper of approved size for binding and filing in the library.

4. For young men, practical experience in farm work during each of the two summers that come between the freshman and senior years. Students will register for the study of some definite farm problem to be studied each summer and report at stated intervals during the summer the progress made. A satisfactory standing in this summer work, or its equivalent in practical work done at the school, is required for graduation. Ten of the 150 credits are earned by home projects.

*Home life on the campus.*—The life of the student while attending the school is subject to supervision. Students residing in the school dormitories are not allowed to leave the campus without permission of the preceptor or preceptress. The home life of each student is carefully guarded and everything is done to promote a healthful and moral atmosphere. The use of tobacco is strictly forbidden.

The preceptor of the School of Agriculture has charge of the boys in their dormitory and social life, and the preceptress has charge of the girls in their dormitory and social life, under such regulations as may be approved by the superintendent. Students are required to be correct in their habits, and to observe pleasantly all directions for their government.

From 8:15 a.m. to 4:30 p.m., students not at recitation or chapel are expected to be in their rooms or in the library, studying or reading; also after 7:30 in the evening. The rooms shall at all times be quiet, especially in the evening, so that no student may be disturbed.

Anyone not in accord with these restrictions, and not willing to lend a hand toward a strong moral growth, should not come to the School of Agriculture.

*Assembly.*—On each school day at 11:40 a.m., the students assemble in the auditorium, a commodious room seating five hundred people. After the opening exercises, brief talks are given by the superintendent, members of the faculty, or invited guests.

During the year the list of speakers includes prominent men, state and national officials, business men, particularly those connected with the agricultural industries, professional men, prominent clergymen of all denominations, educators from other institutions, and successful farmers. The addresses are of great interest and value to the students.



*Lecture course.*—During the school year a lecture and entertainment course, consisting of five lectures and musical programs, will be given at a low cost. It is hoped to provide high grade lectures and programs which will furnish a pleasant relaxation from school work and be instructive as well.

*Students' literary societies.*—Societies for the purpose of improvement in elocution and debate, and for obtaining instruction in the form of lectures, give excellent opportunities for entertainment and culture. Practice in parliamentary procedure is given which will greatly benefit the students. Each student is expected to associate himself with one of these societies as early in his course as possible.

*Musical organization.*—A school band is maintained each year. A competent leader has charge of this work. A school orchestra, glee clubs, choruses, and quartets contribute greatly toward creating an interest in music.

For those who are interested, credit courses in piano and voice instruction are offered. Twelve half-hour and twelve group lessons per term are given, with special time for practice. Fees of \$7 per term for the lessons and \$2.50 per term for piano rental are charged. Special rooms are set aside for practice, making it possible to do good, thoro work. A class in musical theory meets once a week, and instruction is also given in the history of music, ear-training, and the rudiments of harmony and interpretation.

*Students' Christian associations.*—Young Men's and Young Women's Christian Associations have been formed, having for their objects social fellowship and moral spiritual development. Bible classes will be held Sunday morning at 8:45. The associations are non-sectarian. Religious exercises are held at the school each Sunday evening at 7 o'clock. Various pastors and business men address the students at these meetings. The Christian associations conduct the exercises and secure the speakers.

*Red River Aggie.*—The *Red River Aggie* is an annual published by the senior class of the school. The book gives an outline of all school and class activities, is fully illustrated, and contains, in addition to brief articles of student interest, a complete record of the development and growth of the institution.

*The Northwest Monthly.*—The *Northwest Monthly* is published by the faculty of the school. It serves as a community publication, and is a medium by which former students and alumni are kept in touch with one another and with the school. It is also published to disseminate useful information and results of station work.

*Scholarship and loan funds.*—The Northwest School of Agriculture considers itself very fortunate in being able to present the following loan fund provisions. The donors have specified the purposes for which each may be used. The general purpose, however, is to enable the school to reach a larger number, to provide the means of encouraging many to acquire the training which the school offers, and to stimulate greater effort in school work.

*The Gilfillan trust fund.*—This fund may be used by students of the Northwest School of Agriculture in accordance with the action of the Board of Regents taken September 26, 1916. The regulations governing the administration of the income from the fund may be learned by addressing the superintendent of the Northwest School of Agriculture, Crookston, Minnesota.

*Caleb Dorr cash scholarship prizes.*—By a decision made in April, 1922, by the Board of Regents of the University of Minnesota, a part of the Dorr fund is now made available to the schools of agriculture. This fund consists of \$50,000 willed by the late Caleb Dorr, of Minneapolis, the income of which will be used to promote scholarship and student activity records. Further information regarding this fund as it applies to the Northwest School of Agriculture may be obtained by writing to the superintendent.

*Fairfax-Andover Social Club loan fund.*—The Fairfax-Andover Social Club (a farm club near Crookston) provided \$150 to be used as a students' loan fund. This money will be loaned to students at 6 per cent interest as a temporary loan.

*Class of 1917 loan fund.*—The class of 1917 has provided \$140 to be used as a students' loan fund. The interest from this fund shall be awarded annually to the student who makes the greatest progress in debating.

*Special courses.*—A few students are unable to enter in the fall or unable to attend school for the three years. In order to provide for such students, the course of study for the first year has been so arranged that new students may take the regular work and complete a course of study, beginning January 4, 1926.

*Junior Short Course.*—The fifteenth annual Junior Short Course, from March 29 to April 2, 1926, is open to boys and girls from 12 to 20 years of age. With the exception of \$3 for board, there is no expense connected with the course. The course aims to deepen the interest of boys and girls in life on the farm. Special emphasis is placed on boys' and girls' club work. Instruction is given for the planning and carrying out of work in such projects and contests as gardening, corn- and potato-growing, pig-, calf-, and chicken-raising, cooking, sewing, and canning. Illustrated lectures, moving pictures of educational value, games, singing, and excursions add interest and pleasure to the course.

*Northwest School Farmers' and Women's Week.*—The exhibit of farm crops in connection with the course was the origin of the annual Red River Valley Winter Shows held at Crookston during the second week in February, which now includes farm crops, livestock, poultry, and industrial exhibits. A five days' meeting at this time held under the auspices of the Northwest School serves the purpose of the original short course.

*Experiment Station.*—The Northwest School and Station is now conducting extensive experiments in agronomy, soils, horticulture, animal husbandry, and agricultural engineering. Beginning with 1910 a special

report has been issued each year describing the progress of the work. The annual report is mailed free upon application.

*School farm.*—The farm comprises approximately 600 acres, and furnishes an extensive laboratory for the work of the school. Information concerning the methods employed on the farm is always available to the students. The classroom work is supplemented with actual practice either in the field or with crops grown on the farm.

*Station flocks and herds.*—The school now maintains an abundance of livestock, all of which is used for student work in the Animal Husbandry Department. Purebred Holstein, Guernsey, and Shorthorn cattle; grade and purebred Percheron horses; Shropshire sheep; Duroc Jersey hogs; White Leghorn, Barred Plymouth Rock, and Rhode Island Red chickens are maintained for station and school purposes. These furnish excellent opportunities for students to study intelligently the various courses in animal husbandry.

# COURSES OF STUDY

## BOYS' THREE-YEAR COURSE

Capital letters following the names of courses refer to descriptions given on pages 16 to 25.

### FIRST YEAR Required of All

<i>Fall Term</i>	<i>Spring Term</i>
Credit Hours	Credit Hours
5 English A	5 English A
5 Livestock* Farm Dairying A Poultry B	5 Livestock* Study of Breeds H Poultry B
5 Farm Crops* Plant Life A	5 Farm Crops* Cereal Crops A
5 Arithmetic A*	5 Arithmetic A*
Gymnasium and Personal Hygiene A	Gymnasium and Personal Hygiene A
1 Social Training C	1-3 Summer Home Projects
5 Elective from the following:	5 Elective from the following:
26	25
5 Blacksmithing B*	2 Spelling and Penmanship F
5 Farm Motors I	5 Carpentry C*
5 Farm Mechanics G	5 Farm Motors J
5 Industrial Geography A	5 Industrial History B
1 Music B	1 Music B
3 Typewriting G	3 Typewriting G
5 Shorthand D	5 Shorthand D

Students having a State Board certificate in arithmetic need not take that subject.

### SECOND YEAR Required of All

<i>Fall Term</i>	<i>Spring Term</i>
Credit Hours	Credit Hours
5 English B	5 English B
5 Livestock Stock-Feeding E Stock-Judging G Poultry J	5 Livestock Stock-Feeding F Stock-Judging D
5 Farm Crops Fruit and Vegetable Crops C	5 Farm Crops Soils Management D
5 Forage Crops B Gymnasium	5 Farm Accounts E Gymnasium
5 Elective from the following:	1-3 Summer Home Projects
25	5 Elective from the following:
5 Ancient History C	25
5 Mechanical Drawing E*	5 Bookkeeping A
1 Music B	3 Field Machinery H
3 Typewriting G	5 Modern History C
5 Shorthand E	1 Music B
3 Advanced Carpentry D	1 Parliamentary Law E
	3 Typewriting G
	5 Shorthand E
	3 Farm Drawing F

\* Will be offered both terms.

## COURSES OF STUDY

13

### THIRD YEAR Required of All

<i>Fall Term</i>	<i>Spring Term</i>
Credit Hours	Credit Hours
5 English C	5 English C
5 Livestock Herd Management C	5 Livestock Livestock Business Management D
5 Farm Crops Forestry D	5 Farm Crops Plant-Breeding E
Soil Fertility C	Farm Management F
Gymnasium	Gymnasium C
2 Farm Marketing C	2 Farm Marketing C
3 Rural Sociology B	3 Rural Economics A
5 Elective	5 Elective
25	25

### ELECTIVE

2 Meat-Cutting I	2 Meat-Cutting I
5 Civics D	5 Physics A
1 Music B	1 Music B

### CREDIT REGULATIONS REGARDING BOYS' 3-YEAR COURSE

In addition to the required work of the term, students must elect enough work to make a total of not less than 23 or more than 26 credit hours. Exceptions may be allowed by the Committee on Students' Work.

Students desiring to complete the business training work may elect such subjects in the second and third year in place of a required subject upon conference with the Students' Work Committee.

Credit toward graduation will be allowed for work in debate, literary societies, school athletic teams, and other student activities on a basis to be determined by the Students' Work Committee.

From one to four credits per term may be earned by approved work in instrumental or vocal music. A special fee will be charged for such courses. The same credit may be earned without the fee by membership in the orchestra by those who are competent for the work.

A class will not be maintained for less than six students.

### HOME MAKERS' COURSE

#### FIRST YEAR Required of All

<i>Fall Term</i>	<i>Spring Term</i>
Credit Hours	Credit Hours
5 English A	5 English A
3 Physiology and Public Health C	5 Arithmetic A*
4 Foods and Cookery A	2 Public Health C
3 Elementary Garment-Making P	4 Foods and Cookery A
1 Drawing and Design M	3 Garment-Making P
1 Music B	1 Music B
1 Social Training I	Physical Training D
Physical Training C	1-3 Summer Home Projects
6 Elective from the following:	4 Elective from the following:
24	24

\* Will be offered both terms.

## NORTHWEST SCHOOL AND STATION

*General and Agricultural Electives*

5 Industrial Geography A	3 Farm Dairying B*
5 Poultry L*	5 Industrial History B
4 Special Music	5 Plant Life A*
	4 Special Music

*Office Training Electives*

5 Arithmetic A*	5 Rapid Calculation C
5 Industrial Geography A	} Spelling F
} Spelling F	} Penmanship F
2   } Penmanship F	5 Shorthand D
5 Shorthand D	3 Typewriting G
3 Typewriting G	

## SECOND YEAR

Required of All

*Fall Term*

Credit Hours	
5	English B
4	Foods and Cookery B
2	Textiles R
4	Elementary Dressmaking O
2	Home Nursing E
1	Music B
	Physical Training D
1	Costume Design L
6	Electives
—	
24	

*Spring Term*

Credit Hours	
5	English B
3	House Planning and Furnishing J
2	Home Nursing E
3	Dressmaking N
1	Music B
	Physical Training E
1-3	Summer Home Projects
10	Electives
—	
24	

*General and Agricultural Electives*

5 Ancient History C	5 Mechanical Drawing E*
5 Fruit and Vegetable Crops C	5 Modern History C
2 Laundering Q	1 Parliamentary Law E
4 Special Music	4 Special Music

*Office Training Electives*

5 Bookkeeping A	5 Stenography D
5 Stenography D	3 Typewriting G
3 Typewriting G	

## THIRD YEAR

Required of All

*Fall Term*

Credit Hours	
5	English C
3	Home Management D
1	Art Needlework K
1	Music B
	Physical Training
3	Rural Sociology B
7	Electives
—	
24	

*Spring Term*

Credit Hours	
5	English C
3	Institutional Management G
2	Dressmaking N
1	Music B
	Physical Training E
3	Rural Economics A
11	Electives
—	
24	

\* Will be offered both terms.

## COURSES OF STUDY

15

### *General and Agricultural Electives*

3 Farm Forestry D	3 Farm Management F
2 Floriculture B	2 Plant-Breeding E
2 Household Accounts F	4 Special Music
2 Nutrition H	5 Physics A
4 Special Music	2 Meat-Cutting I
5 Civics D	
2 Meat-Cutting I	

### *Office Training Electives*

2 Farm Marketing C	2 Farm Marketing C
5 Shorthand E	3 Office Training B
3 Typewriting G	

## ADVANCED AND COLLEGE PREPARATORY COURSES

The work offered in this course is arranged to fit young men and women to enter the College of Agriculture, Forestry, and Home Economics, and state teachers' colleges. It will cover a period of six months, beginning and closing at the same time as the regular school classes. Students capable of carrying satisfactorily all the subjects required will be granted a certificate.

Upon the completion of two summers of supervised work in addition to this course, graduates will be admitted to the College of Agriculture, Forestry, and Home Economics and to state teachers' colleges.

Students from other schools who wish to prepare for college or university entrance may elect subjects from the school course which will meet the necessary requirements.

### OUTLINE OF COURSE

<i>Fall Term</i>	<i>Spring Term</i>
<b>Credit Hours</b>	<b>Credit Hours</b>
5 Elementary Algebra B	5 Elementary Algebra B
5 Plane Geometry C	5 Plane Geometry C
5 English D	5 English D
5 English Literature E	5 American Literature F
2 Comparative Agriculture D	2 Comparative Agriculture D

## DESCRIPTION OF COURSES

### AGRICULTURE

- A. Cereal Crops. Leading cereal crops, classes and varieties adapted to northwestern Minnesota, production and distribution, soil and climate adaptations, seed treatment, cultural practices, and control of diseases. Laboratory includes specimens of grain diseases and exercises in grain-judging. Mr. Clark.
- B. Forage Crops. Grasses, legumes, root, and tuber crops grown for livestock. Cultural directions. Laboratory work with dried and green specimens includes identification, characteristics, and habits of growth of the various crops. Mr. Dunham.
- C. Soil Fertility. A study of elementary chemistry and its application to soils and fertilizers. Laboratory experiments in elementary chemistry and soil tests. Mr. Dunham.
- D. Soil Management. Soil formation and classification. The principles of soil management are brought out in a study of soil moisture, pore space, organic matter, tillage, drainage, and crop rotations. Laboratory experiments with soils from students' farms. Mr. Dunham.
- E. Farm Accounts. Practical farm records and their uses for the Red River Valley farmer. Calculations involved in farm accounting. Special emphasis upon the requirements of the income tax law. Mr. Clark.
- F. Farm Management. Systems of farming; selection of farms; the planning of rotations suitable to the students' home farms and to farms operated under different systems. Cost of producing crops; marketing products; business methods applied to the farm. Mr. Dunham.

### AGRICULTURAL ENGINEERING

- A. Agricultural Physics. Nature of matter and force; heat; light; sound and electricity in their application to everyday use. Mr. Clark.
- B. Blacksmithing. Instruction is given in the management of the forge, in bending, shaping, and welding iron and steel, and tempering steel tools, thus familiarizing the student with operations necessary for blacksmith repair work on the farm. Mr. Foker.
- C. Carpentry. Care and use of tools taught by means of practical farm problems; methods of sharpening tools; practical application of the various carpentry tools. Mr. Foker.
- D. Advanced Carpentry. Continuation of carpentry with emphasis on building construction including foundation, framing, stair- and rafter-cutting, and selection of materials, and concrete work. Mr. Foker.
- E. Mechanical Drawing. Practice in lettering and emphasis on working drawings for the shop. Designing of smaller farm structures. Mr. Foker.



- F. Farm Drawing. Continuation of Mechanical Drawing. Specializing in the planning and arranging of various buildings on the farm. Attention is given to building materials, estimates of costs, and specifications. Mr. Foker.
- G. Farm Mechanics. Practical work in concrete construction, soldering, pipe-fitting, babbiting and bearing-scraping, rope work, belt-lacing, and harness repair. Mr. Milligan, Mr. Rishovd.
- H. Field Machinery. Care and adjustment of both horse- and tractor-drawn implements, including plows, disk harrows, binders, mowers, and other harvesting and belt machinery. Practical work in making adjustment and repairs. Mr. Milligan, Mr. Rishovd.
- I. Motors; Care and Operation. Principles, construction, and handling of stationary and traction gasoline engines, including timing, ignition, starting and lighting systems, carburetion, cooling, and lubrication. The student is given a thoro knowledge of the care and operation of the gas engine. Mr. Milligan, Mr. Rishovd.
- J. Motors; Auto and Tractor Repair. Practical work in overhauling and repairing automobiles and tractors, including complete motor and transmission overhauling; front and rear axle adjustment; and the common carburetor and electrical repairs which can be made in the farm shop. Mr. Milligan, Mr. Rishovd.

## DAIRY AND ANIMAL HUSBANDRY

- A. Farm Dairying. A study of the principles and practices of producing dairy products, including a discussion on dairy barns, silos, herd management, milk production, and testing, including record-keeping. Mr. Kiser.
- B. Farm Poultry. Poultry house construction. Feeds and feeding. Essentials for winter egg production. Killing and dressing fowls. Mr. Pilkey.
- C. Herd Management. Principles governing breeding and building up of herds, with special reference to the value of purebred sires. Problems of sanitation and disease. Mr. Kiser.
- D. Livestock Management. Study of breed associations, registration, pedigrees, advertising, sales, and markets. Mr. Kiser.
- E. Stock-Feeding. The principles of plant growth as applied to the production of feeds. Physiological functions of the organs of digestion and circulation as applied to animal nutrition. Feeding standards; characteristics of various feeding stuffs; formulation of rations. Mr. Kiser.
- F. Stock-Feeding. Prerequisite E. Feeding livestock under farm conditions. Consideration of experimental work and present practice. Practical feeding problems. Efficiency and economy in the feeding of rations. Mr. Kiser.
- G. Stock-Judging. Attention is called to desirable and undesirable qualities in the various breeds. Instruction is given in comparative judging of breeds and classes of livestock. Mr. Kiser, Mr. LaVoi.

- H. Study of Breeds. The types and breeds of horses, beef and dairy cattle, sheep, and swine are studied as to origin, history, characteristics, adaptation, and general economic importance. This course is supplemented by practice in judging horses, cattle, sheep, and hogs. The station herds are used for this purpose. Mr. LaVoi.
- I. Meat-Cutting. Slaughtering of hogs, sheep, and beeves. Judging a carcass. Study of meat cuts and meats. Mr. Kiser.
- J. Poultry Problems. Breeds and breeding of fowls. Selection and management of the laying flock, and the breeding of the flock. Natural and artificial incubation and brooding. Turkey, duck, and goose culture. Flock-culling practice. Mr. Pilkey.
- K. Poultry Diseases. Diseases of poultry, their cause, prevention, and treatment. Poultry-marketing. Mr. Pilkey.
- L. Farm Poultry. Poultry on the farm. Poultry house construction. Feeds and feeding. Management of the laying flock. Natural and artificial incubation and brooding. Common diseases of the farm flock. Mr. Pilkey.

#### PLANT LIFE AND HORTICULTURE

- A. Plant Life. Taught with special reference to plants of interest to the northern Minnesota farmer. Seeds and plants of the common weeds are studied, classified, and identified. Special emphasis is placed upon various methods of weed eradication. Mr. McCall.
- B. Floriculture. Study of flowers, with special reference to planting, growing, and propagation. Considerable time spent on grouping and planting of ornamental flowers and shrubs, and making landscape planting plans. Station greenhouses supply material for laboratory work. Mr. McCall.
- C. Fruit and Vegetable Crops.
  - Fruit-Growing.*—Importance of farm orchard and small-fruit garden is emphasized. Field work consists of a study of orchard soils, planting and cultural methods, propagation, pruning, spraying, harvesting, marketing, selection of varieties of native and hardy fruits. Mr. McCall.
  - Vegetable Gardening.*—The value of the home vegetable garden, preparation of the ground, and selection of plants and seeds are given attention. Includes tillage, rotation, transplanting, preparation and care of hotbeds, and insects dangerous to the garden. Mr. McCall.
  - Potato Culture.*—The importance of the potato as a crop for Minnesota is recognized in this laboratory course. Includes the study of potato soils; seed selection, growing the crop, harvesting, storing, marketing, diseases and their control. Mr. McCall.
- D. Farm Forestry. Why, how, when, and where to plant windbreaks and wood lots is taught; also characteristics and adaptability of the more common trees; methods of propagation, and the conservation of planted and natural forests. Mr. McCall.

- E. Plant-Breeding. The factors which cause plants to vary are studied, together with the fundamental principles underlying the breeding and development of plants. Practice work in crossing plants is given in the experiment station greenhouse. Mr. McCall.

## ENGLISH

- A. Freshman English. Oral and written compositions, with particular attention to sentence structure. Punctuation and spelling. Letter-writing. Drills for the purpose of eliminating errors. The reading of simple classics to illustrate fable, allegory, parable, myth, and ballad. Miss Rupert.  
*Public Speaking.*—One hour a week. Reading aloud, drilling upon articulation and enunciation, short talks on familiar subjects, public programs to enable the students to learn to speak clearly and easily before an audience. Miss Rupert.  
*Debating.*—One hour a week. Principles of argumentation, briefs, debating in class, in public programs, and in debating societies. Mr. Avery.
- B. Junior English. Practical business English. Paragraph and methods of paragraph development. Narration, description, and exposition in oral and written composition. Study of good literature as basis for composition work and means of increasing student's vocabulary. Miss Simley.  
*Public Speaking.*—Extemporaneous talks, longer discussions, and a little dramatic work. Miss Simley.  
*Debating.*—A development and a continuation of the first year. Mr. Avery.
- C. Senior English. Study of whole composition with reference to principles of unity, coherence, and emphasis. Exposition studied in oral and written composition work. Reading of best English writers with view of increasing students' appreciation of good literature. Miss Simley.  
*Public Speaking.*—The dramatization of scenes from literature studies, after-dinner speeches, and talks. Miss Simley.
- D. Advanced English. Oral and written composition illustrative of forms of discourse and principles of composition previously learned. Study of the novel and the short story; the drama; the essay and the oration; narrative and lyric poetry. Miss Simley.
- E. English Literature. Study of the history and development of English literature with selected readings of each period. Miss Simley.
- F. American Literature. Study of the history and development of American literature with selected readings of each period. Miss Simley.

## INDUSTRIAL HISTORY AND CIVICS

- A. Industrial Geography. Study of climate, rainfall, location, and other geographical conditions affecting the primary industries. Mr. LaVoi.
- B. Industrial History. A study of the growth of industry, commerce, labor, population, and agriculture in the United States. Mr. LaVoi.

- C. Ancient and Modern History. A study of the world's history, with particular emphasis placed on the development of institutions, states, industries, and organizations that have influenced the progress of civilization. Mr. Larson.
- D. Civics. Legislative, judicial, and executive departments and their functions. School district, township, county, state, and national government. Mr. Clark.
- E. Parliamentary Law. The essentials of parliamentary practices as necessary in conducting public meetings effectively. Mr. Avery.

### RURAL ECONOMICS AND SOCIOLOGY

- A. Rural Economics. Attention is given to the consideration of factors affecting agricultural production and farm products. Mr. LaVoi.
- B. Rural Sociology. The problems of rural communities, of rural health and sanitation, and of rural social institutions will receive attention. Mr. LaVoi.
- C. Farm Marketing. Fundamentals in connection with the problems confronting the farmer today in disposing of his products. Mr. Selvig.
- D. Comparative Agriculture. A study of the different systems of agriculture, marketing, rural credit facilities, and rural life of the principal agricultural countries of the world. Mr. Selvig.

### HOME ECONOMICS

#### FOODS AND HOME MANAGEMENT

- A. Foods and Cookery. Elementary cooking. Classification of foods and a study of the scientific principles underlying the cooking of the carbohydrate, fat, and protein foods; doughs and batters; beverages, desserts, and salads. Miss Bede.
- B. Food and Cookery. Advanced cooking. Canning and preserving; planning and serving meals. Miss Bede.
- C. Physiology and Public Health. Study of structure of human body; digestion, absorption, and metabolism of foods; fundamental principles of human nutrition. The general principles of public hygiene and sanitation are included. Miss \_\_\_\_\_
- D. Home Management. Distribution of family income; household accounts; purchasing supplies; planning and serving meals; relation of cost to income. Miss Lippitt.
- E. Home Nursing. Home care of the sick; sick room etiquette; care of children; first aid in emergencies; preparation and serving of food for the sick. Practical work is given in assisting the regular school nurse. Miss \_\_\_\_\_
- F. Household Accounts. Housekeeping as a business; the average income; the budget and its apportionments, the economic and administrative responsibility of women in regulating and controlling the cost of living through judicious expenditure. Miss Bede.

- G. Institutional Management. Study of planning, purchasing, care, and preparation of food in quantity; organization and administration, and practice house work. Miss Lippitt.
- H. Nutrition. Simple problems of nutrition with caloric values and menus worked out for the adult man and woman, and children of different ages. Planning of family dietary; cost of dietaries; food for the sick and convalescent. Miss Lippitt.
- I. Social Training. A series of lectures on proper speech; table etiquette; care of children; first aid in emergencies. Practical work is given in assisting the regular school nurse. Miss Bede.
- J. House-Planning and Furnishing. Location, construction, and planning of farm houses; heating, lighting, ventilating, and equipping house; artistic and economical furnishing with work on cost and schemes of furnishing, floor and wall coverings, curtains and pictures for each room. Miss Bede.

## CLOTHING

- K. Art Needlework. Review of principles of design and color harmony. Decorative stitches and use in original design. Artcraft work. Prerequisite, Drawing and Design. Miss Gerber.
- L. Costume Design. Principles of design as applied to dress. Special emphasis given to different types and figures. Prerequisite, Drawing and Design. Miss Gerber.
- M. Drawing and Design. Treats of the fundamental principles in designs and color harmony, with special emphasis on house furnishings. Miss Gerber.
- N. Dressmaking. Includes the more advanced problems, as modeling on the dress form. Underwear and dress for graduation are made in this course. Miss Gerber.
- O. Elementary Dressmaking. Making of wool middy; wool dress; afternoon or informal party dress, and infant's layette. Miss Gerber.
- P. Elementary Garment-Making. Hand stitches as applied to simple undergarments and household articles. Middy blouse and wash dress are additional problems of this course. Care of sewing machines. Use of commercial patterns. Miss Gerber.
- Q. Laundering. Care of laundry room and utensils, study of water, soap, starch, removal of stains, washing of woolen garments, ironing. Principles of dry cleaning. Miss Gerber.
- R. Textiles. Survey of processes concerned in the manufacture of cotton, wool, silk, and flax, and tests for adulteration and substitution. Miss Gerber.

## MATHEMATICS

- A. Arithmetic. Drill for speed and accuracy; application of principles to everyday farm problems, as measurements of materials, extension, capacity, marketing of grain, stock, and products; purchase of machinery and supplies; cash accounts, business forms, and interest. Mr. Avery.

- B. Algebra. This work covers *First Course in Algebra*, by Hawkes-Lubby-Teuton, or equivalent text, omitting ratio and proportion, graphical representation, and imaginaries. Mr. Larson.
- C. Geometry. The course in geometry covers Wentworth and Smith's *Geometry*, from Book I to Book VIII, or equivalent text, except the work in symmetry, maxima, and minima. Mr. Larson.

### MUSIC

- A. Piano and Vocal. *Piano*.—Instruction adapted to needs of each student. Technical exercises for development and control of the fingers, hands, and arms. Studies and compositions by best composers. A special fee is charged for this work. Miss Gurley, Miss Tordoff.  
*Voice*.—Exercise in breathing and tone-placing, for relaxing the throat, for formation of vowels and consonants, and for sight reading. Songs by American and foreign composers are studied. This work also requires a special fee. Miss Gurley.  
*Chorus Work*.—A glee club, chorus, and quartets are organized during the year. Students with the best voices are admitted to these. No special fee is charged. Miss Gurley.
- B. Music. In the regular course of study, there is offered one hour a week in music each year, consisting of work in ear-training, vocal development; sight reading and chorus; and appreciation of music. Miss Gurley.

### PHYSICAL TRAINING

The aim of this department is to maintain the health of the students, to give outdoor exercise and deep breathing, to stimulate functional activity, to give co-ordination and control, and to form right habits of living.

#### MEN

- A. Personal Hygiene. Importance of proper care of human body. Special attention is given to foods, water, air, narcotics, cleanliness, clothing, exercise, first aid to injured, care of sick, and care of special organs of the body. Mr. LaVoi.
- B. Gymnasium. Required of all men not excused because of physical disability. Aims to inspire pupils with desire to reach and maintain physical efficiency. Calisthenics with dumb-bells, Indian clubs, etc. Games or running follow light apparatus work. Mr. LaVoi.
- C. Social Training. Lectures and demonstrations on social conventions of home, school, and public life.

#### WOMEN

- D. Physical Training. For freshman girls not having had gym. Exercises in correct posture and walking habits. Exercises to develop quick thinking and action. Simple folk dances. Miss Bede.
- E. Physical Training. For junior, senior, and advanced girls. Exercises on light and heavy apparatus, and advanced folk dances. Miss Bede.

## BUSINESS TRAINING

- A. Bookkeeping. The principles of double entry bookkeeping are taught by means of class drills and the working out of model sets of books. In this course the student is made familiar with checks, notes, drafts, and other business papers. Miss Sherwood.
- B. Office Training. This course, given the second year, combines the work of the shorthand and typewriting classes into one; and the student receives practical office work, including dictation and letter-writing, filing, and mimeographing. Miss Sherwood.
- C. Rapid Calculation. Designed for the student who has passed arithmetic, but wishes to master shorter methods of calculating type problems, and desires to gain speed in addition, subtraction, multiplication, and division. Mr. Avery.
- D. Shorthand I. During the first year, the students complete the *Manual of Gregg Shorthand*, as well as many easy business letters. Students should write at least 75 to 80 words a minute on unfamiliar matter. Miss Sherwood.
- E. Shorthand II. The third semester of shorthand reviews the *Manual*, gives much new dictation material, including *Gregg Speed Studies*, and work from the *Gregg Writer*. The students' speed should be raised to 100 words a minute. Miss Sherwood.
- F. Spelling and Penmanship. Practical drills closely related to work in other subjects aiming to give proficiency in everyday requirements. Mr. Avery.
- G. Typewriting I and II. Proper use of the machine; accuracy in touch typing through finger drills, and writing of required exercises. Third term includes business letters and tabulating and executing legal documents. Forty to fifty words a minute required. Miss Sherwood.

## SUMMER HOME PROJECTS

## AGRICULTURAL PROJECTS

1. Dairy Herd Management. Student assumes care of dairy herd on his home farm for at least six months, making regular reports in regard to feeding and management, and keeping accurate accounts of milk production, butter fat tests, feed consumed, etc. 5 credits. Mr. Kiser.
2. Pork Production. Care and feeding of one or more litters for six months, with complete records of feeding and care, cost of production, and returns. 3 to 5 credits. Mr. Kiser.
3. Sheep-Raising. Care of farm flock for one season, with complete records of feeding and management. 1 to 2 credits. Mr. Kiser.
4. Potato Production. Production of one acre or more of potatoes for seed, and study of seed selection and treatment, control of diseases, cultural practices, cost of production, and financial returns. 3 to 5 credits. Mr. McCall.
5. Garden Production. Growing one-eighth acre or more of specified crops, with notes and cost records. 1 to 3 credits. Mr. McCall.

6. Planting Windbreak. Practical application of principles taught in forestry course, in planting windbreak of at least one hundred trees on home farm. 3 to 5 credits. Mr. McCall.
7. Corn Production. Production of one acre or more of a standard variety of corn for seed, following up-to-date methods of seed selection, curing, testing, and cultural operations as taught in the classroom. 3 to 5 credits. Mr. Dunham.
8. Pure Seed Production. Production of one acre or more of a pure standard variety of wheat, oats, or barley, with special attention to preserving purity of seed and to producing high quality seed grain. 1 to 3 credits. Mr. Clark.
9. Alfalfa, Sweet Clover, and Soybeans. Growing of one acre or more of sweet clover or alfalfa, with records of labor and other production costs, yields, and notes on observations. 1 to 3 credits. Mr. Dunham.
10. Farm Accounts. Includes the keeping of a complete system of financial accounts on the home farm, production cost, and other farm records for one season. 5 credits. Mr. Dunham.
11. Poultry Production. Feeding and care of a farm flock for egg production, with complete records of production and cost. 3 to 5 credits. Mr. Pilkey.
12. Building Construction. Planning, locating, and constructing a garage, machine shed, poultry house, or other farm building, on the home farm. 1 to 3 credits. Mr. Foker.
13. Tractor Operation. A study of the management and operation of the tractor on the home farm, including cost of fuel and oil, repairs, etc., and complete records of work done. 3 to 5 credits. Mr. Milligan.
14. Baby Beef. Care and feeding of baby beef with records for cost of production. 5 credits. Mr. Kiser.
15. Hogging Off. The growing of corn for hogging off, with records of cost of production and results. 2 to 3 credits. Mr. Kiser.
16. Ton Litter. The keeping of records of production on one litter of any breed of swine. 3 credits. Mr. Kiser.
17. Soil Fertility. The keeping of records and noting effects of fertilizers on home farm. 3 to 5 credits. Mr. Dunham.
18. Community Service. The organization and promotion of community, social, or religious organizations. 5 credits. Mr. Selvig.

#### HOME ECONOMICS PROJECTS

1. Canning Fruit and Vegetables. The canning of not less than twelve quarts of vegetables and not less than twelve quarts of fruit, with records of methods used and costs. 1 credit. Miss Bede.
2. Canning Meat. The canning of not less than twelve quarts of meat by the "oven method," with notes and cost records. 1 credit. Miss Bede.
3. Preserving. Student must make not less than six quarts of sweet or sour pickles, at least twelve glasses of jelly, and not less than six pints of preserves, jam, or conserve. 1 credit. Miss Bede.



4. Baking. Includes the baking of nine batches of yeast bread and six batches of quick breads, and reports on baking, time, and cost of materials. 1 credit. Miss Bede.
5. House Dress. Make a washable house dress for self or other member of the family. 1 credit. Miss Gerber.
6. Made-over Dress. Make over a dress for self or other member of the family. 1 credit. Miss Gerber.
7. Table Linen. Hem half dozen table napkins and a lunch cloth by hand with damask or French hem. 1 credit. Miss Gerber.
8. Embroidery. Embroider a lunch cloth or a three-piece dresser set or a buffet set on linen or Indian head. The design should be original and conventional. 1 credit. Miss Gerber.
9. Hemstitching. Hemstitching either single or double half dozen handkerchiefs or a thirty-six inch square lunch cloth. 1 credit. Miss Gerber.
10. Cooking and Serving. Cook and serve six vegetables three times each. 1 credit. Miss Bede.
11. Cake-Making. Make eight cakes. Four sponge cakes and four butter cakes. 1 credit. Miss Bede.
12. Baking Cookies. Make twelve bakings of cookies, six of which are drop cookies and six of which are rolled out. 1 credit. Miss Bede.
13. Desserts. Make and serve six hot desserts and six cold desserts. 1 credit. Miss Bede.
14. Pie-Baking. Make twelve pies, six of which are two-crust pies, and six, one-crust pies. Miss Bede.
15. Crocheting. Crochet edges for a library scarf and a dresser scarf and a towel or make tatting for each of these. In each case the lace should be sewed on to the cloth by hand. 1 credit. Miss Gerber.

## SUMMARY OF ATTENDANCE

1924-25

Regular School Course	Men	Women	Total
Advanced .....	8	7	15
Seniors .....	24	24	48
Juniors .....	47	23	70
Freshmen .....	90	40	130
Special .....	3	5	8
	<hr/>	<hr/>	<hr/>
	172	99	271
Junior Short Course, 1925.....	152	121	273
	<hr/>	<hr/>	<hr/>
	324	220	544

## STUDENTS

1924-25

### ADVANCED

Aakre, Theresa, Goodridge	Howard, Oliver, Goodridge
Balk, Howard, Guthrie	Larson, Lillian, Warroad
Davids, Robert, Bagley	Luchau, Walter, Gary
Erickson, Myrtle, Goodridge	Miller, Lydia, Roseau
Gandrud, Allen, Detroit	Miller, Wallace, Roseau
Gibbons, Helen, Crookston	Nelson, Emma, Gatzke
Hanson, James, Cass Lake	Sorenson, Stella, Plummer
Hogenson, Raymond, Winger	

### SENIORS

Amundson, Alice, East Grand Forks	Mallinger, Felix, Oslo
Amundson, Harold, East Grand Forks	Miller, Elmer, Goodridge
Anderson, Elmer, Clearbrook	Nelson, Ferdinand, Hallock
Bergh, Cecil, Halstad	Nelson, Julius, Radium
Carlson, Stella, Hallock	Nelson, Robert, Radium
Dunn, Mildred, Northcote	Neske, Theodore, Princeton
Filertson, Einer, Drayton, North Dakota	Ofstedal, Clarence, Fertile
Flekke, Helen, Thief River Falls	Onneland, Amy, East Grand Forks
Forseth, Oscar, Halstad	*Parks, Joseph, Borup
Forsness, Agnes, Greenbush	Quesnell, Lorena, Mentor
Gordon, Erling, Shevlin	Satre, Emma, St. Hilaire
Groves, Frank, Bemidji	Sharpe, Benneth, Shelly
*Gunderson, Louise, Gary	Sharpe, Jacob, Shelly
Halvorson, Kenneth, Gary	Silnes, Theodore, Helma
Hamre, Selma, McIntosh	Skaurud, James, Twin Valley
Hanisch, Violet, Stephen	Smisek, Genevieve, Fertile
Hoper, Anna, Stephen	*Sorenson, Cora, Plummer
*Jacobson, Ross, Clitheral	*Sorenson, Helga, Plummer
Johnson, Chester, Fergus Falls	Strickler, Esther, Euclid
Jones, Elizabeth, Lancaster	Strommer, Della, Clearbrook
Krogstad, Elmer, Fertile	Thompson, Cora, McIntosh
Lervold, Ellen, Halstad	Vigstol, Christine, Donaldson
Lindahl, Frances, Hallock	Walters, Cora, Beltrami
Loven, Einar, Gatzke	Woods, Margaret, Winnipeg

\* Graduate of both the advanced and three-year course.

## JUNIORS

Applequist, Alvera, Warren  
 Blegen, Orval, Gonvick  
 Boyer, John, Audubon  
 Breed, Margaret, Crookston  
 Breed, Rolland, Crookston  
 Brown, Richard, Warroad  
 Burk, Earl, Brooks  
 Carlson, Albert, Stephen  
 Covlin, John, Erskine  
 Dahl, Harvey, Golden Valley  
 Dale, Gertie, Fertile  
 Dale, Hilda, Fertile  
 Dybvik, Alfred, Thief River Falls  
 Eklund, Elwilda, Gilbert  
 Eklund, Iver, Gilbert  
 Fingalson, Myrtle, Callaway  
 Forder, Naomi, Gatzke  
 Gandrud, Karrol, Detroit  
 Gullingsrud, Tien, Thief River Falls  
 Hall, Halma, Gonvick  
 Hanson, Harry, Karlstad  
 Hornseth, Einer, Thief River Falls  
 Hoppe, Alicia, Crookston  
 Howe, Owen, Shelby, Montana  
 Hruska, Caroline, Lockhart  
 Hurner, Benjamin, Glyndon  
 Jensen, Paul, Ulen  
 Johnsrud, Odellia, Erie  
 Kotrba, Matilda, Erie  
 Kozojed, Rose, Thief River Falls  
 Larter, Mabel, Lancaster  
 Lerud, Clifford, Twin Valley  
 Letness, Lawrence, Thief River Falls  
 Lewis, Harry, Warroad  
 Lewis, Victoria, Warroad

Luchau, Earl, Gary  
 Lundberg, Violet, Kennedy  
 Mackowiak, Henry, Crookston  
 Magneson, Ray, Grygla  
 Majer, Lawrence, Strathcona  
 Mathews, Elmer, Crookston  
 McMahan, Lee, Crookston  
 Minske, Clarence, Kennedy  
 Minske, Melvin, Kennedy  
 Nelson, Claire, Radium  
 Nelson, Clarence, Gary  
 Ness, Mabel, Eldred  
 Olson, Doris, Fertile  
 Osterloh, Amber, Angus  
 Paulsrud, Sigurd, Nielsville  
 Parnow, Alice, Erie  
 Pederson, Arthur, Clearbrook  
 Person, Melvin, Ulen  
 Peterson, Edna, Grygla  
 Peterson, Oliver, Grygla  
 Quesnell, Wallace, Mentor  
 Ramse, Arthur, McIntosh  
 Sandbeck, Harry, East Grand Forks  
 Sheldrew, Wesley, Grygla  
 Skatvold, Joseph, Twin Valley  
 Spears, Lawrence, Shooks  
 Stenborg, Phinney, Clearbrook  
 Thompson, Ernest, Fosston  
 Vomacka, Henry, Ogema  
 Walhaug, Clarence, Oklee  
 Walhaug, Lilly, Oklee  
 Walters, Harold, Beltrami  
 Warnes, Bertram, Karlstad  
 Wyvell, Norman, Ogema  
 Ystenes, Theodore, Bejou

## FRESHMEN

Aakre, Arnold, Goodridge  
 Aase, Juell, Gatzke  
 Anderson, Agnes, Greenbush  
 Anderson, Alice, Greenbush  
 Anderson, Esther, Twin Valley  
 Anderson, Minnie, Lake Park  
 Anderson, Reuben, Gonvick  
 Anderson, Rolf, Fisher  
 Balstad, Marvin, Fosston  
 Barsaloux, Lawrence, Crookston  
 Beaudry, Leo, Argyle  
 Behrns, Claire, Crookston  
 Bengtson, Earl, Hallock  
 Berberich, Eugene, Erskine  
 Berg, Carl, Skime  
 Bergeron, Daniel, Argyle  
 Bernath, Max, Pembina, North Dakota  
 Blasey, Orville, Ada  
 Boehmer, Neil, Felton  
 Breiland, Sophie, Hazel

Buck, Carrie, Crookston  
 Carbonetti, Mayme, Warren  
 Chandler, Dorothy, East Grand Forks  
 Chandler, Leota, East Grand Forks  
 Christopherson, Raymond, Angus  
 Clementson, Willie, Fertile  
 Dahle, Thelma, Oklee  
 Dalos, Oliver, Grygla  
 Danielson, Alfred, East Grand Forks  
 Degerness, Hannah, Gary  
 Dubuque, Raymond, Crookston  
 Dunbar, Annie, Lancaster  
 Dunham, John, Ulen  
 Eldevik, Sigurd, Shevlin  
 Ellingson, Myrtle, Highland  
 Engman, Chester, Hallock  
 Erickson, Alfred, Lengby  
 Erickson, Laurel, Twin Valley  
 Erickson, Ralph, Goodrich  
 Essig, Chester, Radium

Flaskerud, Melvin, Fosston  
 Flom, Emil, McIntosh  
 Forsell, Roy, Kennedy  
 Garrison, Claude, Rothsay  
 Grahn, Knute, Roseau  
 Gullingsrud, Gunda, Kratka  
 Gunufson, Clara, Fertile  
 Hammer, Avery, Fertile  
 Hamrick, Ralph, Angus  
 Hanson, Arthur, Erskine  
 Hanson, Gyda, Fertile  
 Harstad, Selmer, Fertile  
 Hedstrand, Elmer, East Grand Forks  
 Hetland, Myrtle, Shelly  
 Hogenson, Mary, Fertile  
 Hole, Melvin, Dalton  
 Hovorka, Thomas, Wannaska  
 Hruska, Anna, Lockhart  
 Huartson, Gladys, Gatzke  
 Hukee, Selma, Badger  
 Huot, Henry, Crookston  
 Husby, Edwin, St. Hilaire  
 Johnson, Harold, Radium  
 Joringdal, Maynard, Thief River Falls  
 Koelling, Albert, Fertile  
 Kragero, Emma, Twin Valley  
 Krogstad, Clarence, Fertile  
 Kveste, Asbjor, Goodridge  
 Larson, Manly, Twin Valley  
 LeBlanc, Alphonse, Crookston  
 Lee, Lawrence, Ada  
 Lorentzon, Gerhard, Fosston  
 Lowry, Bernard, McIntosh  
 Lundberg, Garwin, Kennedy  
 Mandt, Alvin, Rhoda  
 Maruska, Vickie, Angus  
 Mathews, Harvey, Crookston  
 McMahan, Floyd, Crookston  
 Menke, Gerhard, Warroad  
 Myhre, Gea, Fosston  
 Nabben, Josephine, Thief River Falls  
 Nelson, Albert, Strathcona  
 Nelson, Theodore, Kennedy  
 Newhouse, Ernest, Crookston  
 Norseth, Harold, Gonvick  
 Ode, Edward, Westbury  
 Oliver, Arthur, Warroad  
 Olson, Arthur, Twin Valley  
 Ostlie, Randolph, Gully  
 Parkin, Loren, Euclid  
 Paulson, Ernest, Detroit  
 Pearson, Clarence, Warren  
 Peck, Carl, Euclid  
 Pederson, Eldor, Angus  
 Quesnell, David, Mentor  
 Radniecki, Anna, Wanke  
 Robidoux, Eliza, Brooks  
 Rynning, Ishmael, Kennedy  
 Seaton, George, Crookston  
 Sevald, Sanford, Winger  
 Severson, John, Almora  
 Shawstad, Walter, Gary  
 Short, Ella, Angus  
 Singer, Emil, Rhoda  
 Skavdahl, Ingeborg, Halstad  
 Skonovd, Theodore, Viking  
 Sletteland, Oscar, Munich, North Dakota  
 Smith, Glenn, Wadena  
 Soltis, Ruth, Tabor  
 Spangrud, Casper, Kennedy  
 Spears, Glenn, Shooks  
 Stenborg, Olaf, Clearbrook  
 Stordahl, Arthur, Gatzke  
 Story, Edna, East Grand Forks  
 Strickler, Benjamin, Euclid  
 Strickler, Nellie, Euclid  
 Suchomel, Ivan, Ogema  
 Swenson, Bernard, Fertile  
 Swenson, Bessie, Crookston  
 Swenson, Cora, Ulen  
 Swenson, Mabel, Ulen  
 Thompson, Hollis, Gonvick  
 Torvi, Juel, Crookston  
 Urtel, Paul, Warroad  
 Widseth, Carl, Gonvick  
 Wiebe, Ervin, Ottertail  
 Wold, Earl, Thief River Falls  
 Yergens, Frank, McIntosh  
 Younggren, Russel, Northcote  
 Zurn, Monica, Galloway

## SPECIAL

Aakre, Richard, Goodridge  
 Broughton, Carl, Crookston  
 Frank, Lena, Crookston  
 Gibbons, Ruth, Crookston  
 Miller, Mrs. D. A., Crookston  
 Myrfield, Alma, Buchanan, Sask.  
 Nereson, Lloyd, Gary  
 Selvig, Margaret, Crookston

# *The Bulletin of the University of Minnesota*

*West Central School and Station  
Morris, Minnesota*

*Announcement for the Year  
1925-1926*



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# WEST CENTRAL SCHOOL AND STATION

## SCHOOL CALENDAR

1925-26

1925			
September	28	Monday	First term opens; registration
September	29	Tuesday	Organization of classes
October	24	Saturday	Field Day
October	31	Saturday	Visitors' Day
November	27	Thursday	Thanksgiving Day; a holiday
December	19	Saturday	First term closes; Christmas vacation begins
1926			
January	4	Monday	Christmas vacation ends; second term opens; registration
January	5	Tuesday	Organization of classes
February	12	Tuesday	Lincoln's birthday; (special exercises)
February	22	Friday	Washington's birthday; (special exercises)
March	19	Friday	Commencement activities begin
March	25	Thursday	Junior-Senior-Alumni banquet
March	26	Friday	Commencement Day
March	29	Monday	Boys' and Girls' Club Week opens
April	1	Thursday	Boys' and Girls' Club Week closes
June	14	Monday	Short course for farm women opens
June	18	Friday	Short course for farm women closes

## FACULTY

Lotus D. Coffman, Ph.D., LL.D., President of the University  
Walter C. Coffey, M.S., Dean of the Department of Agriculture

### AT MORRIS

#### ADMINISTRATION

Paul E. Miller, M.Agr., Superintendent  
Edwin J. Volden, Registrar  
Georgia O. Moe, B.A., Preceptress  
Theodore H. Street, B.A., Preceptor  
Theodore S. Long, B.A., Librarian  
Lola M. Cremeans, M.S., Director of Dining Hall  
Lucy A. Momsen, R.N., School Nurse  
Arletta H. Ness, Accountant  
Margaret Stammes, Secretary

#### AGRICULTURAL ENGINEERING

Leonard C. Murray, Carpentry and Farm Structures  
Albert C. Heine, Agricultural Physics and Drainage  
Alex B. Rolfe, Automotive Mechanics  
Albert Anderson, Blacksmithing

#### AGRONOMY

Roy O. Bridgford, B.S., Farm Crops and Soils  
Allen W. Edson, B.S., Farm Management  
Jens C. Jensen, Assistant in Agronomy

#### HORTICULTURE

John A. Anderson, B.S.A., Botany and Horticulture  
Alfred H. Butters, Gardener

#### ANIMAL HUSBANDRY

Philip S. Jordan, B.S., Animal and Dairy Husbandry  
Allen W. Edson, B.S., Poultry and Bees  
Leslie Stock, Herdsman

#### HOME ECONOMICS

Lola M. Cremeans, M.S., Foods and Cookery  
Iva Hansen, B.S., Foods and Home Management  
Lucy A. Momsen, R.N., Nursing  
Ethel I. Jewett, B.S., Dressmaking and Millinery  
Irma Erichsen, B.S., Clothing

#### ASSOCIATED SUBJECTS

Theodore S. Long, B.A., English, Public Speaking  
Georgia O. Moe, B.A., English  
June Sampson, B.A., English  
Edwin J. Volden, Mathematics  
Theodore H. Street, B.A., History  
Martin J. Sorflaten, B.A., Music  
Edith McMillon, Business Training  
Arletta H. Ness, Penmanship

## GENERAL INFORMATION

*Purpose.*—The West Central School of Agriculture was organized in 1910 as a division of the Department of Agriculture of the University of Minnesota. It was established primarily for the training of young men for the profession of farming and of young women for the profession of home-making. It is a secondary school accepting students directly from the eighth grade and offers great opportunities to that large group of young people who desire intensive vocational training and who are limited as to the time they can give to the completion of their education. The work is planned and subjects are taught with the purpose of making the students efficient in their chosen vocations. The courses are sufficiently extended to give a fairly complete technical knowledge of the professions of farming and home-making, and a working basis for the economic and sociological aspects of farm life. The technical courses are amply supplemented by cultural subjects designed to give the students a broad and liberal viewpoint and the necessary preparation for useful citizenship.

*Location.*—The school is admirably situated to serve the west central part of the state. It adjoins the city of Morris and is situated on a natural rise of ground overlooking the Pomme de Terre Valley. The campus, with its twenty buildings, beautiful lawns, and pleasant drives, is one of the beauty spots of this section.

*Admission.*—The school will admit any young man or woman who desires a technical training in agriculture and home economics. It is desirable that prospective students should have completed the eighth grade, altho in special cases those who have not completed eighth grade work will be admitted, and opportunity will be given to complete this work. Mature young men and women who have been out of school for one or more years and desire special training in agriculture and home economics will be admitted. In certain lines of work, high school subjects will be accepted for advanced credit. Students should correspond with the registrar, West Central School of Agriculture, Morris, before coming to the school, and make the necessary preliminary arrangements for registration.

*Time of opening.*—The fall term of the School of Agriculture will open Monday, September 28, and close December 19. The winter term will open Monday, January 4, and close Friday, March 26. The school work covers a period of six months at a time when the student can best be spared from home.

*Rooms in dormitories.*—Old or new students planning to attend the School of Agriculture should write early to the registrar asking him to reserve a room in one of the dormitories. Students should reserve rooms in advance. This may be done by paying a deposit fee of \$2 which will apply on the first month's room rent. If the student is unable to enter school, the deposit may be reclaimed before September 15, after which time it is forfeited. Each dormitory room is furnished with two single beds, a dresser, table, chairs, curtains, bedspreads, pillows. Preferences as



to roommates should be stated early and will be considered as far as possible.

*What to bring.*—Each student should bring with him two comforts and blankets, towels, comb, brushes, one tumbler and teaspoon, bedroom slippers, and at least two nightgowns.

Each girl should bring with her in addition to her regular supply of clothing, kimona and bedroom slippers, laundry bag, gymnasium suit, and gymnasium shoes. The kimona and bedroom slippers may be of any style and material; the laundry bag should be of washable material, large enough to hold the soiled clothes of one person, and made to hang on two closet hooks; the gymnasium suit should consist of a pair of black sateen bloomers and a white middy blouse. Standard pattern No. 9225 is recommended for the bloomers. Three and one-half yards of material 36 inches wide are required for the average size. Black gymnasium or tennis shoes complete this costume. For those who are unable to make the bloomers at home, assistance will be furnished at the school.

*Expenses.*—Necessary expenses for the year do not exceed \$150, including board and room. This amount does not include traveling and personal expenses.

Each student is required to pay for breakage of apparatus used in practical work and for all damage done to school property.

Small fees to cover the cost of material used are charged for certain of the laboratory courses. The amount of the fee in each case will be found in the description of the course. These fees are subject to change.

Music fees for private lessons are \$7 for each term. Piano rental is \$2.50 per term.

It should be remembered that fees are for the entire term, and after the first month the only expenses are for board and room.

Board is payable the first of each month in advance. A surcharge of ten per cent is added to all bills delinquent more than ten days. No deduction is made for board for any absence of less than five days. No room rent refunds will be made for any period of less than one month. If students are compelled to be absent for that length of time they are allowed half rates provided they make arrangements with the manager of the dining hall before leaving. All students not residents of Morris are required to live in the dormitories and to board in the school dining hall. No increases will be made unless living costs necessitate an increase in the cost of board.

On entering the school each student should bring sufficient money to pay for one month's board and room, and to pay his fees. This will amount to from \$35 to \$45.

*Table of charges.*—The following expenses are charged to all students. Fees are payable at the time of registration, and board and room on the first of each month.

Registration fee .....	\$5.00
Deposit as guarantee of proper treatment of school property.....	5.00
Post-office box per term.....	.20
Health fee per term required for all students except those living at home.....	2.00
Book rental—per term.....	1.50
Board per week.....	4.00
Room per week.....	1.25

*Health service.*—The health fee collected from all students is used to maintain the Students' Health Service. A fully equipped hospital is maintained and a full-time nurse is engaged during the school year. The health fee provides for physical examinations for all students and care by the school nurse in case of illness. It does not provide for physicians' calls or extra nurses in case of serious sickness, where such are necessary, or extra costs caused by epidemics.

The following rules and regulations should be noted.

*Registration.*—No student will be allowed to register for less than 23 credit hours of work except by special permission.

All fees must be paid or arranged for at the time of registration.

No student will be allowed to register after the second week of the term except by special permission.

*Cancellation of registration.*—No student may drop a subject for which he is registered without special permission.

If a student is below grade in a subject at the time of cancellation, his record in that subject will be entered as a failure.

For each change in registration after the first week of school a charge of 25 cents will be made. All such changes must be on the proper form, which the student may obtain at the registrar's office. No changes will be made after the second week. All changes in registration must be approved by the superintendent.

No laboratory fees will be returned unless the registration is cancelled in the registrar's office, within two weeks after the opening of school.

*Absences.*—No student will be admitted to class after an absence without a pass from the preceptor or preceptress.

All work lost through absence from class must be made up.

*Classification.*—In order to be classified as a junior, a student must have not to exceed 12 credit hours less than the required number for the freshman year.

In order to be classified as a senior, a student must have not to exceed 10 credit hours less than the required number for the first two years.

*Marking system.*—The passing mark is 75 on the scale of 100.

All grades are submitted to the registrar's office at the end of each month, in percentage.

A grade of I (incomplete) at the end of any month represents that the required work of that month has not been completed and that the mark has not been determined. This incomplete must be removed during the following month.

A grade of C (condition) at the end of a term represents that the required work of the course has not been completed and that the final mark

has not been determined. The condition must be removed during the first month of the following term, otherwise it automatically becomes a failure.

Extension of time for the removal of conditions may be granted in special cases.

Students who have not been absent more than three times and who have obtained a grade of 90 or above in any subject will be excused from final examination in that subject. Three tardinesses constitute an absence.

*Eligibility.*—The following rules will govern eligibility for all inter-scholastic athletic contests:

A. The student must be enrolled in the school not less than two weeks before the contest.

B. He shall be making grade in at least four subjects for which he is enrolled. These four subjects must total 20 credit hours.

*Requirements for graduation.*—Completion of the prescribed course of study, including all required work and enough electives to make a total of 160 credit hours.

One summer of supervised home project work. Of the 160 credits necessary for graduation 5 must be home project work, and 10 will be allowed.

An honorable standing in department.

Payment of all accounts.

*Home life in the dormitories.*—The dormitory life of the students while attending the School of Agriculture is subject to supervision. Everything possible is done to promote a healthful, moral atmosphere.

The preceptors and preceptress have charge of students in their dormitories, and regulations enforced are for the good of all.

From 8:00 a.m. to 4:00 p.m. students are busy with their school work. From 4:00 to 6:00 p.m. is a recreation period in which students' time is at their own disposal. After 7:30 p.m. students are expected to be in their rooms and to be quiet so that all may study undisturbed. Students are permitted to leave the campus in the evening only upon permission of the preceptors and preceptress.

The use of profanity and tobacco is strictly forbidden. Anyone not in accordance with the restrictions and not willing to lend a hand toward strong moral growth should not come to the school.

Infraction of dormitory rules may be sufficient cause for dismissal from school. Complete dormitory rules and regulations are posted in each dormitory room.

*Buildings and equipment.*—The physical plant now includes ten modern brick and stone buildings which compose the educational group and ten frame buildings which make up the farm group. The school group includes the girls' dormitory with facilities for seventy-five girls; two boys' dormitories for accommodations for one hundred fifty boys; Agricultural Hall, with stock-judging pavilion, meat-cutting, dairy, soils, chemistry, horticulture, botany, and farm crops laboratories, and classrooms for all agricultural work; Engineering Building, with woodshop, forgeshop, farm mechanics laboratory, drafting room, and three lecture rooms; Music Hall,

with two studios and numerous practice rooms. The Business Training Department is also located in this building and includes typewriting, shorthand, business training, and penmanship rooms; Dining Hall and Gymnasium, with large, modern dining room and gymnasium; a new, modern Students' Hospital and Health Service Building equipped with twenty-seven beds, dispensary, and nurses' quarters; Home Economics Building with two foods laboratories, two sewing laboratories, laundering laboratory, home management rooms, classrooms, and departmental offices; new Administration Building with auditorium, large library, business, registrar's, and administration offices.

The equipment in all shops and laboratories is ample and sufficient for the most practical and efficient instruction.

The ten farm buildings give ample housing facilities for the herds, flocks, and farm equipment which are available for student use.

*Assembly period.*—An assembly period is held each morning except Thursday throughout the school year. Students are required to attend these assembly exercises. It is the purpose of the school to secure prominent speakers to address the student body at these morning exercises. The assembly period is also used as a forum for public discussion of the many questions and announcements of importance to the student body. The various societies and organizations also use this period for the promotion of their work. The Thursday morning period is used for conferences between instructors and students.

*Holidays.*—Lincoln's and Washington's birthdays will be appropriately observed, but classes will be held as usual. On Thanksgiving Day no classes will be held, but school will continue as usual on the Friday and Saturday following.

Among the organizations and publications are:

*Students' literary societies.*—Students are urged to join a literary society. These societies offer pleasure as well as profit. They afford a training in conducting meetings, parliamentary law, and public speaking obtainable in no other way.

The following societies hold regular weekly meetings during the school year: the Vincent Literary Society, the Agricola Literary Society, and the Ceres Club.

*Professional clubs.*—An engineering club for boys especially interested in agricultural engineering and a livestock club for students interested in this branch of agriculture are open to all students. Interesting and instructive programs are given by these societies twice each month.

*Religious welfare.*—In maintaining the highest moral and religious atmosphere and in fostering the development of complete Christian manhood and womanhood—physical, intellectual, social, and spiritual—the student body and faculty have developed a close relationship with all of the downtown churches in Morris. Students affiliate with the churches of their preference and make them their church homes while attending school. In addition to this affiliation, religious services are held each Sunday on the school campus. These exercises are under the joint direction of the

Faculty-Student Joint Religious Welfare Committee. The Young Women's Christian Association is represented on the campus by a strong and active organization.

*Musical organizations.*—The school musical organizations include a large chorus, a boys' glee club, a girls' glee club, and a school orchestra. Students especially interested in music are urged to join these organizations and receive the training which they afford. The musical clubs appear at various school functions. A public concert recital is given at the close of the school year.

*The Moccasin.*—The *Moccasin* is an annual published by the senior class of the school. The book gives an outline of all school and class activities, is fully illustrated, and contains in addition to brief articles of student interest a record of development and growth of the institution.

*West Central School News.*—The *West Central School News* is a quarterly published by the faculty of the school. It serves as a community publication, and is a medium by which former students and alumni are kept in touch with one another and with the school. It is also published to disseminate useful information and results of station work among its readers.

The following student loan funds have been established:

*The Ludden trust.*—The late Honorable John D. Ludden, of St. Paul, gave the University of Minnesota a sum of money to be held and invested by the University through its Board of Regents and the income thereof to be collected, received, and made available by the Board of Regents for the financial assistance of students attending the schools of agriculture in the University. The income from this fund is available to students of the West Central School of Agriculture. It is loaned to worthy and deserving students at the West Central School in amounts not to exceed \$75 to any one person in one year, at the rate of 5 per cent per annum. Students interested in securing a student loan should correspond with the superintendent of the West Central School of Agriculture.

*The Dorr fund.*—This fund consists of \$110,000 willed by the late Caleb Dorr, of Minneapolis, for the benefit of the Department of Agriculture of the University.

The income from \$20,000 of the fund is to be devoted to establishing and maintaining research fellowships in agriculture; the income from the remainder to be invested in scholarships, donations, and loans to worthy and needy students.

*Caleb Dorr cash scholarship prizes.*—Cash prizes amounting to \$410 are available to the students attending the West Central School of Agriculture each year and are awarded as follows: A cash scholarship of \$50 is awarded to one girl and one boy from each of the three classes and one student selected at large from the entire school at the close of each regular school year. The money is to be used for defraying a portion of the student's school expenses the following year. The awards are made on class standings, as recorded by instructors for the year's work, and on student activities and deportment. The rating for student activities is

based on the quality of leadership as indicated by a review of the activities participated in and the general deportment of the student during his attendance at school. The awards are made by a scholarship committee selected from the faculty. In addition to the above-mentioned scholarships, a prize of \$15 is awarded to the boy and the girl who have done the best student project work in any one year. A cash prize of \$5 is also awarded to each student who is a member of the school debating team.

*Interscholastic activities.*—Each year the school is represented by two debating teams which debate similar institutions.

In athletics the school is represented by both football and basket-ball teams. These teams schedule games with high schools, colleges, and agricultural schools.

*Library.*—The library is well equipped to supply the needs of the students. A large number of books has been selected to meet the requirements of the various departments. These, with the government and station reports, are available for use by instructors and students.

The librarian is always ready to give whatever assistance she can in directing students in the selection of the books they may need in the pursuit of their work.

*Experiment station.*—The West Central School and Station is now conducting extensive experiments in agronomy, soils, horticulture, animal husbandry, and agricultural engineering. Beginning with 1915 a special report has been issued each year describing the progress of the work.

*School farm.*—The farm comprises approximately 400 acres and furnishes an extensive laboratory for the work of the school. Information concerning the methods employed on the farm is always available to the students. The classroom work is supplemented with actual practice either in the field or with crops grown upon the farm.

*Station flocks and herds.*—The school now maintains an abundance of livestock, all of which is used for student work in the Animal Husbandry Department. Purebred Holstein, and Shorthorn cattle; Percheron horses; Shropshire sheep; Duroc Jersey hogs; White Leghorn and Barred Plymouth Rock chickens are maintained for station and school purposes. These furnish excellent opportunities for students to study intelligently the various courses in animal husbandry.

*Long courses.*—The regular courses cover a period of three sessions of six months each, beginning in October and closing in March. The long course for young men is so arranged as to make it possible for a student to select a large portion of his work in any one of the three lines: agronomy, animal husbandry, or agricultural engineering. The long course for young women permits of special training in home management, dress-making, teaching, music, home nursing, public speaking, business training, etc. Both young men and young women may receive credit in music in connection with any of the courses. They may also choose academic subjects in the third and fourth years, preparatory to college entrance. The main emphasis of the institution is given to its long course, and all are urged to complete the three sessions.

*Advanced courses.*—It has been found that many students desire an advanced year after completing the regular three-year course. To meet this demand a fourth year of six months of work is offered. During this advanced year, graduates of the long course may elect to specialize in one of the lines of work listed below. They may at the same time choose from the elective lists subjects that they could not obtain during their first three sessions. The major lines of work suggested for boys are dairying, beef production, farm engineering, carpentry, advanced farm management, and academic subjects. The major lines for girls are dressmaking, advanced home management, nursing, music, and business training.

*College preparatory.*—Graduates of the West Central School of Agriculture who have completed two summers of supervised work on their home farms, one additional school year of six months, and one additional summer's work or the equivalent thereof, will be admitted to the College of Agriculture, Forestry, and Home Economics of the University.

*Department of music.*—For those students desiring special courses in music, credit courses in both vocal and instrumental music are offered. Prospective students should refer to the description of the music courses on pages 25 and 26.

*Home project work.*—The purpose of this work is to promote and extend the technical work given in the classrooms and laboratories during the regular school sessions. The approved methods of agricultural practice are applied to some branch of the farming enterprise which the project is desired to cover. Reports are required throughout the season and the work it at all times in charge of supervisors who make the necessary visits to each student.

The projects for boys include swine management, corn growing, soy-beans, market gardening, fruit growing, potato growing, incubation and brooding, management of the laying flock, dairying, bees, tractor operation, and farm accounts. For girls projects include canning, bread baking, foods and cookery, garment making, clothing repair, home furnishing, home management, needlework, and clothing account.

*Boys' and Girls' Club Week.*—During the week following the close of the regular school session, will be held the tenth annual junior short course, March 29 to April 1. This course is open to all boys and girls from twelve to eighteen years of age. A charge of \$2.50 covers all expenses, including board and room for the entire week. Boys are given work in the machine shops, forge and woodwork shops, farm crops laboratories, and stock-judging pavilion. The girls are given work in sewing, cooking, and home nursing. At the close of the week, contests in corn judging and stock judging will be held for the boys, and the winner of each contest will be given a free trip to the 1925 Minnesota State Fair. For the girls, contests in bread making and canning are held, with free trips to the Minnesota State Fair as prizes. Special instruction will be given in all boys' and girls' club projects. Games, music, entertainments, and a special junior short course party will make the entire week one of special interest to all who attend. Special moving picture entertainments are given each evening.

A special circular describing this short course will be ready for distribution in February, 1926.

*Short course for farm women.*—An annual short course for farm women is held during the second week in June. The main object of this course is to provide a few days of rest and recreation for the women of the farms in west central Minnesota. Talks, lectures, and demonstrations along lines of interest to farm women will fill in part of the day. The large dormitory and dining hall will provide ample living accommodations, and part of each day will be given to rest and recreation. The fee for the entire course, including room and board, is \$4.



## COURSES OF STUDY

Figures following the names of courses indicate the number of credit hours.

One credit hour is equivalent to one class period per week devoted to recitation or two such periods devoted to laboratory work.

A class period is forty-five minutes and a laboratory period is ninety minutes.

For description of the following courses see pages 18 to 27.

See page 11 for statement with reference to credit for home project work.

### COURSES FOR BOYS

#### FRESHMAN YEAR

Required—first term	{	English I, 5 Farm Arithmetic, 5 Corn Growing, 5 Milk Testing, 1 Carpentry I, 2 Blacksmithing I, 2 Gymnasium, 1
Required—second term	{	English II, 5 Types and Breeds, 5 Carpentry II, 2 Blacksmithing II, 2 Stock Judging I, 1 Penmanship, 3 Gymnasium, 1
Eight credit hours must be chosen from this group during freshman year	{	Spelling and Penmanship, 3 Social Training, 1 Farm Records and Accounts, 3 Elementary Beekeeping, 3 Poultry Production, 3 Cereal Crops, 5 Horticulture, 5 Industrial Geography, 5 Automotive Engineering 7 Steam Tractors, 3 Automotive Electricity, 3 Farm Shop Work, 1 Piano, 2 Violin, 2 Chorus, 1 Orchestra, 1

#### JUNIOR YEAR

Required—first term	{	English III, 5 Chemistry, 4 Gymnasium, 1
Required—second term	{	English IV, 5 Physics I, 5 Gymnasium, 1

Subjects must be selected from this group or from electives not taken in freshman year to make a total of 25 credit hours with the required subjects for each term	General History I, 5 Bookkeeping I, 5 Algebra I, 5 Feeds and Feeding, 5 Garden and Orchard, 5 Corn and Grain Judging, 2 Mechanical Drawing, 2 Farm Drainage, 5 Stock Judging II, 1 Beef Production, 3 Advanced Shop Work, 2 Elementary Beekeeping, 3	}	First term only
	Management of the Laying Flock, 5 Public Speaking, 3 Piano, 2 Violin, 2 Orchestra, 1 Glee Club, ½	}	May be taken either term
	Bookkeeping II, 5 Algebra II, 5 General History II, 5 Forage Crops, 2 Pure Seed Production, 2 Horticulture, 5 Farm Structures I, 2 Stock Judging III, 1 Dairy Production, 3 Gas Welding, 2 Incubation and Brooding, 3 Farm Management, 5	}	Second term only

#### SENIOR YEAR

Required—first term	English V, 5 United States History, 5 Soils, 5 Gymnasium, 1
Required—second term	English VI, 5 Government, 5 Gymnasium, 1

Subjects must be selected from this group or from electives not taken in freshman or junior year to make a total of 25 credit hours with the required subjects for each term	Plane Geometry I, 5	}	First term only
	Farm Structures II, 2		
	Agricultural Physics II, 5		
	Animal Breeding, 3		
	Bookkeeping I, 5		
	Farm Mechanics, 5	}	May be taken either term
	Stock Judging IV, 2		
	Public Speaking, 3		
	Meats, 2		
	Management of the Laying Flock, 5		
	Piano, 2	}	Second term only
	Violin, 2		
	Orchestra, 1		
	Glee Club, ½		
	Geometry II, 5		
Bookkeeping II, 5	}	Second term only	
Agricultural Botany, 5			
Advanced Electricity, 3			
Farm Marketing, 3			
Animal Diseases, 3			
Incubation and Brooding, 3			
Bookkeeping III, 5			
Commercial Law, 5			

Two credits shall be allowed for participation in the senior class play. Two credits shall be allowed for participation in an interscholastic debate. One credit shall be allowed for membership in an interscholastic athletic team and such members will be excused from gymnasium classes. Not more than seven special credits, including credits for play, debate, and musical organizations, shall count towards graduation.

COURSES FOR GIRLS

FRESHMAN YEAR

Required—first term	English I, 5	}
	Garment Making I, 4	
	Food and Cookery I, 3	
	Drawing and Design I, 1	
	Gymnasium, 1	
Required—second term	English II, 5	}
	Garment Making II, 4	
	Foods and Cookery II, 3	
	Drawing and Design II, 1	
	Gymnasium, 1	

Eleven to 14 credit hours must be chosen from this group each term	{	Social Training, 1	}	First term only
		General Science, 5		
		Home Accounts I, 5		
	{	Home Nursing I, 3	}	Second term only
		Home Nursing II, 3		
		Horticulture, 5		
	{	Home Accounts II, 5	}	Either term
		Laundering, 2		
		Poultry, 3		
	{	Beekkeeping, 3	}	Must be taken both terms
		Glee Club, ½		
		Chorus, 1		
	{	Spelling and Penman- ship, 3	}	Must be taken both terms
		Music (instrumental or vocal), 2		
*Spelling and Penman- ship, 5				
{	Typewriting, 2	}	Must be taken both terms	

## JUNIOR YEAR

Required—first term	{	Dressmaking I, 3	}	
		Elementary Dietetics, 3		
		English III, 5		
		General History I, 5		
		Gymnasium, 1		
Required—second term	{	Dressmaking II, 3	}	
		English IV, 5		
		General History II, 5		
		Gymnasium, 1		
		Elementary Dietetics II, 3		
Four to 9 credit hours must be chosen from this group each term or from electives not taken in freshman year	{	House Planning and Decoration, 3	}	First term only
		Algebra I, 5		
		Bookkeeping I, 5		
		Shorthand I, 5		
		Typewriting, 2		
		Chemistry I, 5		
	Applied Art, 2			
	{	Textiles, 3	}	Second term only
		Nursing III, 3		
		Algebra II, 5		
		Bookkeeping II, 5		
		Shorthand II, 5		
		Typewriting, 2		
	Chemistry II, 5			
	{	Horticulture, 5	}	Either term
Public Speaking, 3				
Poultry, 3				
Beekkeeping, 3				
Glee Club, ½				
Chorus, 1				
Music (instrumental or vocal), 2				

\* Students taking business training electives will register in the five-hour course.

SENIOR YEAR

Required—first term	{	English V, 5 United States History, 5 Dressmaking III, 3 Gymnasium, 1 Millinery, 2	
Required—second term	{	English VI, 5 Government, 5 Dressmaking IV, 3 Gymnasium, 1	
Required—first or second term	{	Home Management, 5	
Seven to 12 credit hours in this group or from electives not taken in junior year	{	Nursing IV, 3	} First term only
		Geometry I, 5	
		Chemistry I, 5	
		Algebra I, 5	
		Bookkeeping I, 5	
		Business Training I, 3	
	{	Dictation I, 2	} Second term only
		Applied Art, 2	
		Millinery II, 1	
		Chemistry II, 5	
		Algebra II, 5	
	{	Geometry II, 5	} Either term
		Horticulture, 5	
		Dictation II, 5	
		Bookkeeping III, 5	
Beekeeping, 3			
		Poultry, 3	
		Public Speaking, 3	
		Glee Club, ¼	
		Chorus, 1	
		Music (instrumental or piano), 2	
		Typewriting, 2	

Through their choice of electives, girls may prepare themselves for one of several lines of work. At the time of registration, girls will be advised how to choose their work so that it will prepare them for the future work which they desire. They may prepare for business positions, for normal training work, for college entrance, or for nurses' training. A carefully planned course in home economics is the foundation of all the courses for girls.

## DESCRIPTION OF COURSES

### AGRONOMY AND FARM MANAGEMENT

- Corn Growing. A study of the corn plant; its botanical structure, relation to soil and climate; selection and testing; soil preparation; harvesting; diseases, silage, varieties, and corn judging. Rec. 5 hrs.; 5 credits; fee, 50 cents.
- Cereal Crops. A study of the principal cereal crops. Seed selection; soil and cultural requirements; harvesting. Rec. 5 hrs.; 5 credits; fee, 50 cents.
- Corn and Grain Judging. Score card practice, commercial grading and judging work, with the object in view of making the student proficient in the judging and growing of purebred seed. Lab. 2, 2 hrs.; 2 credits; fee, 50 cents.
- Forage Crops. A study of the leguminous crops, clover, alfalfa, etc., pastures and meadows, and the annual forage crops. Cultural requirements of forage crops and their importance on the farm. Lab. 2, 2 hrs.; 2 credits.
- Pure Seed Production. Methods of breeding and growing purebred seed corn and grain on the farm. The course includes a study of certification and seed registration. Lab. 2, 2 hrs.; 2 credits; fee, 50 cents.
- Soils. This course is applied to the needs of western Minnesota. Soil formation; soil types, soil physics, soil chemistry, soil tillage, and the use of fertilizers are given chief attention. Rec. 3 hrs.; lab. 2, 2 hrs.; 5 credits; fee, \$1.
- Farm Management. A study of farm organization as related to types of farming, combinations of enterprises, crop rotation, soil management, field and farmstead arrangement, and the efficient use of labor and equipment. Rec. 5 hrs.; 5 credits.
- Farm Records and Accounts. A study of farm accounts. The student keeps a practical set of books on the year's work, from the taking of the inventory to closing the accounts at the end of the year. Rec. 3 hrs.; 3 credits.
- Advanced Studies in Farm Management. Advanced work in some of the more important problems of farm management, including farm labor, cost of production, marketing, and similar subjects. Rec. 1 hr.; lab. 4, 2 hrs.; 5 credits.

### MARKETING

- Farm Marketing. A study of the present systems of distributing farm products. Special study is made of co-operative laws and co-operative marketing institutions. Rec. 3 hrs.; 3 credits.

### ANIMAL AND DAIRY HUSBANDRY

- Types and Breeds. Study of the history, development, characteristics, and adaptability of the various breeds of horses, cattle, sheep, and swine. Rec. 5 hrs.; 5 credits.

- Milk Testing. Principles of milk testing. The students are given a practical working knowledge of herd testing and record work. Lab. 1, 2 hrs.; 1 credit; fee, 50 cents.
- Stock Judging I. Study and practice in the use of score cards, showing the relation of the body structure to economical production, covering all classes of livestock. Lab. 1, 2 hrs.; 1 credit.
- Stock Judging II. Comparative judging of beef cattle, swine, and sheep. Lab. 1, 2 hrs.; 1 credit.
- Stock Judging III. Comparative judging of dairy cattle and horses. Lab. 1, 2 hrs.; 1 credit.
- Stock Judging IV. This course is given over to market classes of beef cattle, hogs, and sheep and is combined with the meats course, many of the animals going directly from the judging ring to the killing room. Lab. 1, 4 hrs.; 2 credits.
- Meats. Practice in killing, cutting, and curing of meats with lectures and demonstrations in the same. This course is combined with Stock Judging IV. Lab. 1, 4 hrs.; 2 credits.
- Feeds and Feeding. General composition of the animal body; composition and digestibility of feeds; feeding standards; methods of feeding. Rec. 5 hrs.; 5 credits.
- Animal Breeding. Theory and practice of animal breeding, including variation, heredity, selection, effect of purebred animals in improving types of stock and pedigrees. Rec. 3 hrs.; 3 credits.
- Animal Diseases. Causes, prevention, and cure of animal diseases, including emergency treatment. Rec. 3 hrs.; 3 credits.
- Beef Production. Production of beef cattle, both purebred and market stock, including from a practical standpoint, feeding and management of the herd, selection of breeding stock, and arrangement of buildings and yards. Rec. 3 hrs.; 3 credits.
- Dairy Production. An advanced course designed to fit a student for the successful management of a dairy herd. Rec. 3 hrs.; 3 credits.

#### POULTRY HUSBANDRY

- Poultry Production. Principles of general management, house construction, important commercial breeds and types, feeding and culling for egg production; common ailments and simple treatments. Rec. 3 hrs.; 3 credits.
- Management of Laying Flock. Practice in feeding and management, and marketing; a study of laying rations, and keeping accounts. Each student will care for a laying flock during the entire time of the course. Rec. 2 hrs.; lab. 6 hrs.; 5 credits.
- Incubation and Brooding. A study of the best methods of incubation and brooding, natural and artificial, includes selection of breeds, eggs for incubation, feeding and care of chicks, how to avoid losses. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits.

## BEE CULTURE

Elementary Beekeeping. Fundamentals of bee behavior throughout the cycle of the year. Fundamentals of beekeeping practice through the year. Modern equipment for beekeeping practice. Starting with bees, increase, moving, uniting, feeding. Rec. 3 hrs.; 3 credits.

## AGRICULTURAL ENGINEERING

Carpentry I. Carpentry: care, use, and sharpening of tools; laying-off work; making of joints and framing, and work designed to be especially helpful in planning, framing, and construction of farm buildings. Lab. 2, 2 hrs.; 2 credits; fee, \$1.25.

Carpentry II. Continuation of Course I. Lab. 2, 2 hrs.; 2 credits; fee, \$1.25.

Blacksmithing I. Blacksmithing; forging and welding of iron and steel, making and tempering hand tools. Work designed to be especially helpful in the repair and operation of machinery. Lab. 2, 2 hrs.; 2 credits; fee, \$1.50.

Blacksmithing II. Continuation of Blacksmithing I. Lab. 2, 2 hrs.; 2 credits; fee, \$1.50.

Farm Shop Work. A course in simple sheet metal work, soldering, harness repair work, rope work, belt lacing, use of taps and dies, pipe fitting, etc. Lab. 1, 2 hrs.; 1 credit; fee, \$1.25.

Farm Drainage. Practice with level and chain; work in leveling, ditching, locating, laying tile, running lines, figuring areas, staking out buildings, mapping, and estimating costs. Rec. 3 hrs.; lab. 2, 2 hrs.; 5 credits.

Farm Structures I. Design, location, and erection of farm buildings; study of proper pitches; roof trusses, barn frames; estimates of costs. Working models are made in the shop from these plans. Lab. 2, 2 hrs.; 2 credits.

Farm Structures II. A continuation of Farm Structures I. Designing of buildings needed on the home farm, and the working out of a general plan that will meet the builder's requirements. Lab. 2, 2 hrs.; 2 credits.

Automotive Engineering. A study of internal combustion engines with emphasis placed on tractor, truck, and automotive engines. A careful study of carburetion, ignition, lubrication, and cooling systems. Practice is given in the repair and adjustment of all automotive equipment. Rec. 3 hrs.; lab. 8 hrs.; 7 credits; fee, \$1.50.

Automotive Electricity. An elementary course in electricity, with its application to starting, lighting, and ignition systems for automotive engines. Part of the time is devoted to a study of farm lighting equipment. Rec. 3 hrs.; lab. 2 hrs.; 4 credits; fee, 50 cents.

Advanced Electricity. Prerequisites: Automotive Electricity, Physics I and II. The course is designed for students who care to go a little deeper into the study of electricity than is permissible under Automotive Electricity. Rec. 2 hrs.; lab. 2 hrs.; 3 credits; fee, 50 cents.



- Steam Tractors.** A study of the construction, operation, and repair of the steam traction engine. The course leads to the state examinations for engineer's license. Rec. 2 hrs.; lab. 2, 3 hrs.; 4 credits; fee, 50 cents.
- Mechanical Drawing.** Principles of drafting, lines, lettering, views of objects, making of working drawings, interpretation of drawings. Lab. 4 hrs.; 2 credits.
- Oxyacetylene Welding.** A study of the properties of the various metals, treatment of metals, preheating, annealing, practice with torch on actual problems. Rec. 1 hr.; lab. 2 hrs.; 2 credits; fee, \$2.
- Advanced Carpentry.** Preparation aiming to bring together in applied way earlier elements of course with such topics as designing and estimating. Final credit dependent upon eight months of actual work under approved carpenter. Lab. as arranged.
- Farm Mechanics.** Selection, use, and care of farm machinery. Farm lighting, heating, plumbing, ventilation, and sewerage disposal systems. A study is made of properties of sand, gravel, and cement, with practice in proportioning and mixing concrete. Rec. 3 hrs.; lab. 4 hrs.; 5 credits.
- Advanced Shop Work.** A course intended for those who desire more comprehensive work. Advanced work is offered in oxyacetylene welding and cutting, making and tempering of hand tools, and lathe practice. Lab. 4 hrs.; 2 credits; fee, \$3.

#### HORTICULTURE AND BOTANY

- Agricultural Botany.** A study of flowering plants, molds, mushrooms, rots or decays, and yeast. Rec. 3 hrs.; lab. 2, 2 hrs.; 5 credits; fee, 50 cents.
- Garden and Orchard.** Planning, planting, culture, value, and management of the orchard and garden on the general farm. Rec. 5 hrs.; 5 credits.
- Horticulture.** A general course including the principles of growing vegetables, fruits, flowers, and ornamental plantings. The work is taught with special emphasis upon application of the principles to the student's home conditions. Rec. 5 hrs.; 5 credits.

#### ENGLISH

- English I.** Reading, spelling, and a brief review of the principles of grammar. Considerable time is devoted to oral reports. Short written themes required. Rec. 5 hrs.; 5 credits.
- English II.** Continuation of English I. Letter writing in connection with simple sentence and paragraph structure. Several selections are memorized. Rec. 5 hrs.; 5 credits.
- English III.** Letter writing and spelling continued. Standard books and selections of interest are read. The outline is used extensively in oral and written work. Rec. 5 hrs.; 5 credits.
- English IV.** A continuation of English III. Rec. 5 hrs.; 5 credits.
- English V.** Advanced work in written composition of a narrative type. An appreciation of good literature is cultivated by extensive reading. Rec. 5 hrs.; 5 credits.

English VI. Reading and advanced composition of descriptive and argumentative types continued. Rec. 5 hrs.; 5 credits.

English VII. English literature. History of English literature with readings from masterpieces. Rec. 5 hrs.; 5 credits.

English VIII. English literature. Continuation of English VII. Rec. 5 hrs.; 5 credits.

English IX. Public speaking. Drill in voice exercise, platform deportment, and memorized selections for expression; extemporaneous speaking. Rec. 3 hrs.; 3 credits.

#### MATHEMATICS

Farm Arithmetic. Training in simple mathematical processes, applications of principles to problems requiring measurements of material, extension, capacity. Practical applications to farm and home life. Assists in the mathematics of the technical school course. Rec. 5 hrs.; 5 credits.

Home Accounts I. For girls. Similar to farm accounts for boys except that application is made to home instead of farm work. Rec. 5 hrs.; 5 credits.

Home Accounts II. A continuation of Home Accounts I. 5 hrs.; 5 credits.

Algebra I. Designed to cover the usual first year academic credit work in elementary algebra. Rec. 5 hrs.; 5 credits.

Algebra II. Continuation of Course I. Rec. 5 hrs.; 5 credits.

Plane Geometry I. Planned to cover usual academic course in plane geometry. Rec. 5 hrs.; 5 credits.

Plane Geometry II. Completion of Plane Geometry I. Rec. 5 hrs.; 5 credits.

#### PHYSICAL TRAINING

Gymnasium. (Girls.) All students will be required to take gymnasium work during their entire residence at the school. Girls will be organized into classes for exercise, calisthenics, and games. 1 credit.

Gymnasium. (Boys.) Gymnasium is required of all boys who live in school dormitories. The gymnasium with its facilities is kept open every afternoon and evening for the use of students. 1 credit.

#### SOCIAL SCIENCE

Industrial Geography. Designed to give the student a view of the broad relation of geography to commerce. Rec. 5 hrs.; 5 credits.

General History I. Designed to give the student a general outlook upon civilization in the making, and to show what nations and men have helped civilization in its onward course. Rec. 5 hrs.; 5 credits.

General History II. Continuation of Course I. Rec. 5 hrs.; 5 credits.

American History. Designed to present in a clear, concise, and connected manner the main events in the history of the American people. Rec. 5 hrs.; 5 credits.

Government and Law. Local, state, and national governmental forms and practices. A brief study of common contracts, deeds, mortgages, etc. Rec. 5 hrs.; 5 credits.

General Science. This course deals with five major topics: air, water, food, protection, and the work of the world. Each topic deals with a series of projects. Rec. 5 hrs.; 5 credits.

### PHYSICS

Agricultural Physics. A simple and practical course in physics. The work includes the mechanics of solids, fluids, heat, and sound with a few assignments from the subjects of light and electricity. Rec. 5 hrs.; 5 credits.

Physics II. A continuation of Physics I. Rec. 5 hrs.; 5 credits.

### CHEMISTRY

General Chemistry. A general introductory course in chemistry treating of the fundamental principles necessary for an understanding of common daily phenomena. Rec. 3 hrs.; lab. 2, 2 hrs.; 5 credits.

Food and Household Chemistry. Application of general principles of chemistry to food and its uses and to household problems such as textiles, dyeing, soaps, and other cleansing agents. Rec. 3 hrs., lab. 2, 2 hrs.; 5 credits; fee, \$1.

Agricultural Chemistry. A general introductory course preparatory for later work in agronomy and animal husbandry. Rec. 3 hrs.; lab. 2, 2 hrs.; 5 credits; fee, \$1.50.

### HOME ECONOMICS

#### FOODS AND HOME MANAGEMENT

Foods and Cookery I. The purpose of this course is to give experience in meal preparation, to develop scientific principles of cookery, general proportions, practical skill, and standards for finished products. Lab. 3, 2 hrs.; 3 credits; fee, \$1.

Foods and Cookery II. A continuation of Course I including the study of batters and doughs, including popovers, griddle cakes, muffins, cake, puddings, pies, and bread. Lab. 3, 2 hrs.; 3 credits; fee, \$1.

Elementary Dietetics I. A study of the needs of the body, planning of dietaries, menus, serving, meal planning, and the actual serving of meals to small groups. Lab. 2, 2 hrs.; 3 credits; fee, \$1.50.

Elementary Dietetics II. A continuation of Course I. Rec. 1; lab. 2, 2 hrs.; 3 credits; fee, \$1.50.

Home Management. Study of dietaries, problems in management, and actual management of a dining room and kitchen. Rec. 3; lab. 3 days per capita; 5 credits; fee, 75 cents.

Laundering. Includes care of laundry room and utensils, study of water, soap, starch, removal of stains, washing of woolen garments, ironing; also the principles of dry cleaning. Lab. 2; 2 credits.

- Social Training. (Girls.) Subject-matter includes proper speech, table etiquette, and dress; also conversation and social correspondence. Rec. 1; 1 credit.
- Social Training. (Boys.) Subject-matter includes introductions, social poise, relationship of boys and girls, duties of host, table etiquette, and dress. Rec. 1; 1 credit.

## CLOTHING AND RELATED ART

- Garment Making I. An apron, a holder, a chemise, and a petticoat are made in this course. Problems in darning and patching are required. Various kinds of material and their wearing qualities, simple decorative trimmings, and cost of finished garments are discussed. Lab. 4, 2 hrs.; 4 credits.
- Garment Making II. A study of cotton and linen dress fabrics. A gingham dress and a middy blouse are made. Simple problems in decorative needlework are given. Lab. 4, 2 hrs.; 4 credits.
- Drawing and Design I. Principles of design and color harmony with emphasis upon design as expressed in clothing, house furnishing, and articles in common use. Lab. 1, 2 hrs.; 1 credit.
- Drawing and Design II. Continuation of Drawing I. Lab. 1, 2 hrs.; 1 credit.
- Elementary Dressmaking I. Includes the planning and making of a wool dress. Lab. 3, 2 hrs.; 3 credits.
- Elementary Dressmaking II. An afternoon or informal party dress and an infant's layette are required in this course. Lab. 3, 2 hrs.; 3 credits.
- Advanced Dressmaking I. A silk dress is made in this course. Materials are purchased under the direction of the instructor. Lab. 3, 2 hrs.; 3 credits.
- Advanced Dressmaking II. Includes the making of underwear and dress for graduation. Lab. 3, 2 hrs.; 3 credits.
- Millinery I. Design and color harmony in hats, alteration of frames, making and trimming of simple hats. Lab. 2, 2 hrs.; 2 credits; fee, \$1.25.
- Millinery II. Continuation of Course I. This includes spring millinery. Lab. 1, 2 hrs.; 1 credit; fee, \$1.25.
- Textiles. Standard fabrics and textile fibers; tests for adulterations in fabrics; clothing in relation to health; the clothing budget. Rec. 2; lab. 1, 2 hrs.; 3 credits; fee, \$1.
- House Planning and Decoration. Location of farm buildings, types of farm dwellings, study of house plans, choice of site, exposure, plumbing, heating, interior finish, walls, floors, furniture, curtains, pictures. Rec. 1 hr.; lab. 2, 2 hrs.; 3 credits.
- Applied Art. Application of the principles of design to the making and decorating of useful household furniture. Lab. 2, 2 hrs.; 2 credits.

## HOME NURSING

- Home Nursing and Public Health I. Structure and functions of the human body; personal hygiene; bed making; bandaging. Rec. 3; 3 credits.
- Home Nursing and Public Health II. Continuation of Course I. Rec. 3; 3 credits.
- Home Nursing III. Communicable diseases, home nursing equipment, hygienic requirements during infancy, first aid in emergencies, preparation and serving of food for the sick. Rec. 3, 3 credits.
- Home Nursing IV. Continuation of Course III. Prenatal care; infant nutrition and care. Rec. 3; 3 credits.

## MUSIC

All courses in music except group organizations include a group of twelve private lessons and daily supervised practice periods. Music Hall is equipped with several private practice rooms and all students registered for music courses are assigned the use of the practice rooms. The fees charged in connection with the various courses pay for the private lessons and the use of piano for practice purposes.

- Piano I. Exercises for hand position and rhythm; two-, three-, and five-finger exercises; major scales. Studies: Gurlitt, *Technic and Melody*; Tapper, *First Piano Book*, or *Graded Studies*, Grade I. Solos: Tapper, Sartorio, etc. 2 credits; fee, \$9.50.
- Piano II. Exercises for hand and arm control; thumb exercises, major scales; transposition of five-finger exercises, two- and three-finger exercises. Studies: Streabbog's *Twelve Very Easy Studies*, Czerny's *Anthology*, Vol. I. Solos: *Graded Pieces*, Grade II. 2 credits; fee, \$9.50.
- Piano III. Scale with different rhythms, one and two notes, 80 mm., broken chords. Studies: Concone's *Twenty-four Melodious Studies*; Tapper's *Graded Studies*, Grade III; Czerny's *Anthology*, Vol. II. Solos: Beethoven, Heller, etc. 2 credits; fee, \$9.50.
- Piano IV. Scales with different touches, one, two, three, and four notes, 80 mm.; Herz exercises, arpeggios; block chords with pressure and drop arm. Foote, first-year Bach; Czerny; wrist and forearm studies. Solos: Grade III; Mozart; Sonatinas. 2 credits; fee, \$9.50.
- Piano V. Lynne's *Key Circle Exercises*, Book I. Heller, *Opus 47*; first-year Bach. Solos: easy sonatas by Haydn and Mozart. *Graded Pieces*, Grades III and IV; Tapper, *Graded Pieces*, Grade III. 2 credits; fee, \$9.50.
- Piano VI. Studies: Schmitt finger exercises; major and minor scales, hands separate, legato and staccato in varied rhythms; octave studies. Solos: pieces by Schumann, Mendelssohn, Jensen, etc. Easier Beethoven works. 2 credits; fee, \$9.50.
- Vocal Course. Graded course in voice culture and art of singing by Fred-eric Haywood is the basis for this, with selections from the following studies: Marzo, Sieber, Concone, Marchesi, Panofka, Spicker, with suitable solos in each grade. Fee, \$7.

- Violin Course. Methods and studies by Grun, Fischel, Sevcik, Dancla, Kayser, Kreutzer, Rode, Fiorillo, and solos adapted to each grade. Fee, \$7.
- Cornet Course. School and studies by Herbert Clark. Also Arban, Schöenbrück, international method with solos. Fee, \$7.
- Clarinet Course. Methods by Klose or Lazarua. Also solos. Fee, \$7.
- Other Band and Orchestral Instruments. Carefully arranged courses in each instrument. Cello, trombone, saxophone, snare drum, etc.
- Harmony and Counterpoint. Part of each lesson period devoted to playing and correcting exercises from suitable text, as Shepard, Chadwick, Foote and Spalding, Clark; or an intensive course in harmony and composition may be taken through private lessons.
- Chorus. A large assembly course will be organized at the first of the year, rehearsing daily. This chorus will furnish music for the morning exercises and special occasions, and will give concerts during the year.
- Music Analysis. For piano students. Pupils will analyze a large amount of standard music material, giving the student a clear insight into the structural features of great compositions.
- Musical Theory and Appreciation. Purpose is to study history, form, and beauty of musical composition. An acquaintance with the great music of the orchestra and its individual instruments through solos and records.
- Mandolin Club. Consists of first, second, third, and fourth mandolins. Pupils with limited time find in this club amusement and recreation. Through a few private lessons, anyone may acquire the necessary technique to become a member.

### BUSINESS

- Spelling and Penmanship I. (General.) Five hours drill per week in spelling and penmanship. This course is open to all students. Rec. 5 hrs.; 3 credits.
- Business Spelling and Penmanship I. (Business training students.) Daily drill and individual instruction in penmanship; daily drill in spelling, the use and meaning of words, and rules for spelling. Rec. 5 hrs.; 5 credits.
- Business Spelling and Penmanship II. Continuation of Course I. Rec. 5 hrs.; 5 credits.
- Typewriting. Taught throughout the course. Provides individual instruction in the use of the machine. Memorization of the keyboard and graded lessons are used. Each lesson must be done correctly before the student is advanced. 2 to 5 credits; fee, \$2.50.
- Shorthand I. Gregg system supplemented with speed studies is used. Rec. 5 hrs.; 5 credits.
- Shorthand II. Continuation of Course I. Rec. 5 hrs.; 5 credits.

- Dictation I. When students are capable of taking ordinary dictation and transcribing their notes on the typewriter, they are given office work to do and thus gain experience while still at school. Lab. 2, 2 hrs.; 2 credits.
- Dictation II. Continuation of Course I. Lab. 2, 2 hrs.; 2 credits.
- Business Training I. Duplicating and mimeographing, filing and indexing, business ethics. Rec. 5 hrs.; 5 credits.
- Business Training II. Continuation of Course I. Rec. 5 hrs.; 5 credits.
- Bookkeeping I. Purpose of accounts and principles of account classification; capital and revenue; accruals; principles of valuation; depreciation; preparation and interpretation of balance sheets, income accounts, and other business statements. Rec. 5 hrs.; 5 credits.
- Bookkeeping II. Continuation of Course I. Rec. 5 hrs.; 5 credits.
- Bookkeeping III. Continuation of Courses I and II. Rec. 5 hrs.; 5 credits.
- Commercial Law. This course aims to give the student a better knowledge of his rights, privileges, and limitations as a citizen of the United States. A thoro study is made of contracts, negotiable instruments, sales, real estate, and right of master and servant. Rec. 5 hrs.; 5 credits.

THE UNIVERSITY OF MINNESOTA  
WEST CENTRAL SCHOOL OF AGRICULTURE

Please read the bulletin carefully, noting the paragraphs headed Admission, Time of Opening, Rooms in Dormitories, What to Bring, and Expenses. If you plan to enter the school, fill out the application blank below and mail it to the registrar, West Central School of Agriculture, Morris, Minnesota. Send with this application \$2 made payable to the West Central School for a room reservation in one of the dormitories. This \$2 will be applied on your first month's expenses on entering school. In case your application is received after all space has been assigned, you will be so notified. In case you cannot enter school after making application, you should notify the registrar as soon as possible. If this is done prior to fifteen days before the opening of school, the money will be returned, otherwise it will not. Students are strongly urged to reserve rooms in advance.

One hundred fifty dollars will pay the entire expenses for six months.

.....  
Mail the following application to the registrar, West Central School of Agriculture, Morris, Minnesota:

To the Registrar:  
West Central School of Agriculture,  
Morris, Minnesota.

I am enclosing \$2 for a room reservation in one of the dormitories.

I wish to room with the following person.....

.....(state preference if any). I expect

to enter school about.....

Name .....

Home address: R. F. D.....Post-office.....



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

*The Law School*  
*Announcement for the Years*  
*1924-1926*



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*Member of the Association of American  
Law Schools*

# UNIVERSITY CALENDAR

1924-25

1924			
September	18	Thursday	Payment of fees closes, except for new students
September	18-20		Entrance examinations
September	22-26		Examinations for removal of conditions
			Physical examinations for all new students
			Registration period, <sup>2</sup> colleges of Science, Literature, and the Arts, Agriculture, Forestry, and Home Economics, and Education
September	22	Monday	First semester evening extension classes begin <sup>3</sup>
September	25-26		Registration days <sup>2</sup> for all colleges not included above
September	26	Friday	Payment of fees for new students closes
September	29	Monday	Fall quarter begins, 8:30 <sup>1</sup> a.m.
October	23	Thursday	Senate meeting, 4:30 p.m.
November	1	Saturday	Home Coming Day; classes dismissed the third and fourth hours
November	4	Tuesday	Election Day; a holiday
November	11	Tuesday	Armistice Day; a holiday
November	27	Thursday	Thanksgiving Day; a holiday
December	4	Thursday	State Day Convocation
December	17-20		Final examination period
December	18	Thursday	Commencement Convocation
			Senate meeting, 4:30 p.m.
December	20	Saturday	Fall quarter ends, Christmas vacation begins, 5:20 p.m.
1925			
January	5	Monday	Christmas vacation ends, winter quarter begins, 8:30 <sup>1</sup> a.m.
January	30	Friday	First semester evening extension classes close
February	2	Monday	Second semester evening extension classes begin <sup>3</sup>
February	12	Thursday	Lincoln's Birthday; a holiday
February	19	Thursday	Charter Day Convocation
			Senate meeting, 4:30 p.m.
March	16-19		Final examination period
March	21	Saturday	Winter quarter ends, spring vacation begins, 5:20 p.m.

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

<sup>2</sup> Registration subsequent to the date specified will necessitate the approval of the college concerned. See also penalty fees for late registration, page 10.

<sup>3</sup> This date does not refer to correspondence study courses which may be started at any time during the year.

March	30	Monday	Spring vacation ends, spring quarter begins, 8:30 <sup>1</sup> a.m.
April	10	Friday	Good Friday; a holiday
May	14	Thursday	Cap and Gown Day Convocation
May	21	Thursday	Senate meeting, 4:30 p.m.
May	29	Friday	Second semester evening extension classes close
May	30	Saturday	Memorial Day; a holiday
June	10-13		Final examination period
June	13	Saturday	Spring quarter closes, 5:20 p.m.
June	14	Sunday	Baccalaureate service
June	15	Monday	Fifty-third annual commencement
June	19-20		Summer Session first term begins, registration and payment of fees
June	22	Monday	Classes begin, 8:00 a.m.
July	4	Saturday	Independence Day; a holiday
August	1	Saturday	First term Summer Session closes Registration and payment of fees for second term closes
August	3	Monday	Second term classes begin
September	5	Saturday	Second term Summer Session closes

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 and peculiar circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

## FACULTY

Letta De'ta Coffman, Ph.D., LL.D., President  
William Watts Folwell, LL.D., President Emeritus  
Everett Fraser, B.A., LL.B., Dean and Professor of Law  
Cephas D. Ailin, M.A., LL.B., Professor of Political Science  
Henry W. Ballantine, B.A., LL.B., Professor of Law  
Wilbur H. Cherry, B.A., LL.B., Professor of Law  
Henry J. Fletcher, LL.M., Professor of Law  
Henry L. McClintock, S.J.D., Assistant Professor of Law  
R. Justin Miller, B.A., LL.B., J.D., Professor of Law  
James Paige, M.A., LL.M., Professor of Law  
Henry Rottschaefer, B.A., J.D., S.J.D., Professor of Law  
Ernest C. Carman, LL.B., Instructor in Practice  
Rex H. Kitts, B.A., LL.B., Instructor in Law  
McKeor U. S. Kjørlaug, B.A., LL.B., Instructor in Practice

### PROFESSORIAL LECTURERS

Howard S. Abbott, B.L., Minneapolis  
Homer B. Dibell, B.A., LL.B., Associate Justice of the Supreme Court of  
Minnesota

### SPECIAL LECTURERS

Rome G. Brown, B.A., Minneapolis  
Charles W. Bunn, B.S., St. Paul  
Bert Fesler, Duluth, Judge of the District Court  
Edward Lees, Commissioner of the Supreme Court of Minnesota  
Hugh V. Mercer, LL.M., D.C.L., Minneapolis  
Thomas D. O'Brien, St. Paul, formerly Justice of the Supreme Court of  
Minnesota

## GENERAL INFORMATION

### OBJECT AND METHOD OF INSTRUCTION

The Law School of the University of Minnesota was established in 1888.

The object of the Law School is to provide a thoro training in the law and to prepare students for practice in any jurisdiction where the Anglo-American legal system prevails. Particular emphasis is laid upon the statutes, the special doctrines of law, and the rules of practice that obtain in the state of Minnesota.

Instruction is given by the use of the "case system." This method of teaching law, which has been approved by experience and which is now employed in the leading law schools of the country, has the twofold merit of enabling the student to acquire a thoro and practical knowledge of legal principles, and to become familiar with those processes of legal reasoning which have determined the form and character of our jurisprudence, and will govern its future development.

The faculty is composed chiefly of resident professional law teachers who devote their entire time and energy to teaching. The courses in practice are taught by men experienced in practice at the Minnesota bar. In addition, courses of lectures on special topics are given by distinguished lawyers and judges, selected primarily from the bar of Minnesota.

### ADMISSION

#### *Regular Students*

Candidates for admission to the Law School must have completed at least two years of work with an average, for all work completed, one grade above the passing mark in the College of Science, Literature, and the Arts of the University of Minnesota, or some other accredited college or university. The minimum requirement is 90 credits and 90 honor points. Such candidates may be admitted upon presenting their diplomas or other credentials showing the completion of such college work to the registrar of the University. Altho two years of college education satisfy the Law School's entrance requirements, prospective law students are urgently advised to take a full college course or at least three years if possible.

#### *Special Students*

A limited number of applicants who are twenty-one years of age and have preliminary education sufficient at least to entitle them to admission to the College of Science, Literature, and the Arts<sup>1</sup> may, on petition to the faculty, be admitted to the Law School as special students. The petitioner should state age, education, grades, occupation since leaving school, reason for not qualifying as a regular student, and should present all

<sup>1</sup> These requirements are stated in full in the current bulletin of the College of Science, Literature, and the Arts.

evidence to enable the faculty to determine his fitness for the study of law. Special students can qualify for bar examinations, but cannot qualify for a degree.

#### ADVANCED STANDING

No credit is given for time spent in private reading or for study in a law office. The candidate for graduation must spend three years in residence, either at this Law School or at some other school which is a member of the Association of American Law Schools. A student coming from such other law school must possess the preliminary education required for admission to this school and must spend at least one year in attendance at this school before he can qualify for a degree. Attorneys-at-law, however, who have been admitted to practice in the state of Minnesota and who have had two years of academic work in college, may enter the third year law class without examination upon presentation to the registrar of their certificates of admission to the bar, and shall be entitled to the degree of bachelor of laws upon satisfactorily completing such courses, aggregating 36 credits (one year's work), as the law faculty may designate.

#### REGISTRATION

New students should register on or before the opening of the first term.<sup>1</sup> Such students will not be permitted to enter the Law School at the beginning of the second or third term unless entitled to advanced standing. Lectures in all subjects begin promptly on the opening day of the term, and those who join their classes later will necessarily be seriously handicapped in their work. No student will be admitted to classes unless he registers within ten days after the opening of the term, except by special action of the faculty and for good cause shown. (See Tuition and Other Fees, post page 10.)

#### COMBINED SIX-YEAR COURSE LEADING TO DEGREES OF BACHELOR OF ARTS AND BACHELOR OF LAWS

A student in the College of Science, Literature, and the Arts of this University who has by the end of his junior year secured not less than 135 credits selected in accordance with the regulations of that college and 135 honor points, may take during his senior year the first year law course, and upon its completion receive the degree of bachelor of arts. Upon completion of the work of the remaining two years in law, such student will receive the degree of bachelor of laws, thus obtaining both degrees in six years. Several Minnesota colleges also permit students who have completed three years' work to transfer to this Law School and accept the first year of law in completion of the requirements for their B.A. degree.

#### RECOMMENDED PRE-LEGAL COURSES

The College of Science, Literature, and the Arts requires students preparing to enter the Law School after two or more years in that college

<sup>1</sup> See page 10 for the provisions as to penalty for late registration.

to comply with its rules. The following course, available under these rules, is recommended by the faculty of the Law School:

- |                                |                            |
|--------------------------------|----------------------------|
| 1. Latin, 0 to 20 credits      | 4. Political Science 1     |
| 2. Rhetoric, English A-B-C     | 5. Philosophy 2, and 50-51 |
| 3. Natural science, 10 credits | 6. History 31-32 and 33-34 |
|                                | 7. Economics 3-4           |

Other subjects recommended for pre-legal students are Psychology 1-2; Public Speaking 45-46, 55-56-57; Economics 1-2, 54, 143-144, and 167-168; History 146-147, and 116-117-118; Philosophy 1, 3, 124, and 129; Political Science 7, 11, 15, 121-122, 123, and 161.

#### REGULATIONS GOVERNING CLASS WORK, EXAMINATIONS, GRADES, AND PROMOTIONS

Every student registered in the Law School is required to attend with regularity all lectures, whether special or in course, that may be prescribed for his class, to prepare all papers and other class exercises that may be assigned, and to perform all services in connection with the practice court that may be required of him. These requirements apply to all special students as well as to candidates for graduation. Serious delinquency in discharging these requirements may be regarded by the faculty as sufficient reason for requiring the delinquent student to withdraw from the school.

Final examinations are held only as the several courses are completed, whether they extend through one, two, or three terms, and credit is given only for an entire course and not for any part thereof. The ratings given, A, B, C, and D, signify passing grades of varying degrees of merit, A being the honor mark. E signifies a condition and F a failure. I signifies that the course has not been completed because of illness or a similar reason.

A student who fails to pass the regular final examinations of his class in more than two subjects cannot return to the school, except by special permission of the faculty granted on petition showing cause.

A student, who at the end of any term, receives conditions or failures in more than two subjects may by vote of the faculty be denied the privilege of continuing in the Law School.

A student who is denied the privilege of continuing in the school or is required to repeat the entire work of the year, is not entitled to examinations to remove conditions.

A student who fails in a subject must repeat the subject in course.

A student who receives a condition in a subject is entitled to one examination only to remove such condition. Examinations for the removal of conditions are held only during the week prior to the beginning of the fall term. All conditions must be removed before entering upon the work of the next year. If not removed at that time they become failures and the student must repeat the subjects in course.

Candidates for graduation the following June in Arts or Law may take examinations on the day following the spring recess to remove not more than two conditions in the first term subjects, or during the examination period at the end of the third term to remove not more than two



conditions in second term subjects. Any student desiring to take examinations under this provision is required to give notice in writing of his intention, specifying the subjects in which the examinations are desired, such notice to be filed in the office of the dean not less than three weeks before the date of the examination requested.

A student who is absent from the school two consecutive years must satisfy the requirements in force when he returns.

#### ELECTIVES IN OTHER DEPARTMENTS OF THE UNIVERSITY

Students in the Law School may be permitted, after completion of the work of the first year, and under proper regulations to elect, without extra charge, courses offered in other departments of the University, provided that such election does not interfere with their law studies; but such election of courses in other departments may be made only with permission of the law faculty. Among the subjects which may be profitably selected are English composition, English and American constitutional history, public speaking and debating, political science, economics, and sociology.

#### LIBRARIES

The library of the Law School contains more than thirty-nine thousand volumes, including all the American reports, state and federal, Interstate Commerce and other commission reports, nearly all the English, Australian, New Zealand, Indian, and Canadian reports, the English, federal, and state statutes (with a few exceptions), the standard digests, encyclopedias, legal periodicals, and textbooks. To this collection substantial additions, particularly in foreign law, are constantly being made. Further library facilities are afforded by the generous action of the Bar Association of Minneapolis in granting to the students the free use of its library located in the Court House. Besides the University and Bar Association libraries, the State Law Library, located at the Capitol in St. Paul, is accessible to students.

#### STATE AND UNITED STATES COURTS

The University is located within easy reach of both the federal and state courts. The United States courts are in session in St. Paul and Minneapolis during the greater part of the school year. The Supreme Court of Minnesota, sitting at St. Paul, the district courts of Ramsey and Hennepin counties, and the municipal courts of St. Paul and Minneapolis are open and in session almost constantly, and afford the student abundant opportunity for witnessing the trial of actual cases and hearing the argument of appeals.

#### EXPENSES

Careful estimates of the expenses of a student attending the Law School, together with other general information useful to students, are to be found in the bulletin of general information, to be had upon application to the registrar of the University.

## FEES

Tuition fees (per quarter)	
Residents of Minnesota .....	\$30.00
Nonresidents .....	40.00
Tuition fees (per credit hour)	
Residents of Minnesota .....	2.75
Nonresidents .....	3.75
Deposit* (first quarter only) .....	5.00
Health fee (per quarter) .....	2.00
Minnesota Union or Shevlin Hall (per quarter) .....	1.00
Special fees:	
Examination for removal of conditions .....	1.00
Special examinations .....	5.00

## Penalty Fees:

*Registration penalties.*—A penalty fee for late registration, late change of registration, or late payment of fees shall be two dollars (\$2) and one dollar (\$) additional for each day of delay after classes begin, provided that no student shall pay more than twelve dollars (\$12) of penalty in any given quarter.

## INQUIRIES

Further particulars as to any phase of the work of the Law School not given herein, or in the bulletin of general information, will be cheerfully given upon request. Communications addressed at any time to the dean of the Law School of the University of Minnesota, Minneapolis, Minnesota, will receive prompt attention.

## SUMMER SESSION

A limited amount of work will be offered by the Law School faculty during the summer quarter, June 22 to September 5, 1925. The quarter will be divided into two terms, the first from June 22 to August 1, the second from August 3 to September 5. The work of each term is complete in itself. This summer work is designed to enable students to lighten the burden of the regular academic year, or to supplement the course required for a degree. The courses will be announced in a separate bulletin, which will be sent on application.

\* The following charges are made against the general deposit for each student in addition to such charges as may be incurred for lockers, library penalties, laboratory breakage, etc.:

<i>Minnesota Daily</i> , per quarter .....	\$0.50
Post-office box, per quarter .....	.20
<i>University Address Book</i> .....	.35

## COURSES OF STUDY

The curriculum leading to the degree of bachelor of laws covers a period of three academic years. To qualify for graduation, a student must complete the entire work of the first and second years and the required work of the third year, together with a sufficient number of electives to aggregate 12 hours of work during each term of the third year.

Students, unless they be of exceptional ability and industry, who find it necessary to devote a considerable portion of their time and energy to work not connected with their law studies are strongly advised to limit their work in the Law School to not more than ten hours in the classroom per week, and thus extend the period of their study of law over four years. The credit hour tuition fee enables students to extend the period of study at slight additional expense.

No student, unless permitted by special action of the faculty, will be allowed to carry more than the regularly prescribed work for the year, or proportional work for any term.

Attendance upon all special lectures scheduled is required; and all students in the Law School may be required to serve as jurors or witnesses in any proceedings before the practice court.

All the courses offered by the Law School are given between the hours of 8:30 a.m. and 5:30 p.m.

### FIRST YEAR COURSES

Contracts. Offer and acceptance; consideration; contracts under seal; the Statute of Frauds; rights of beneficiaries and assignees; joint and several contracts; conditions; illegality; impossibility; and discharge of contracts. Corbin, *Cases on Contracts*. Three hours. Mr. Ballantine.

Property I. Real and personal property distinguished; possessory rights, liens, pledges; title to personal property by accession, confusion, gift, and finding. Theory of feudal land tenure; rights incident to ownership; profits; easements; licenses; covenants running with land. Warren, *Cases on Property*. Three hours. Mr. Fraser.

Torts. General principles underlying law of civil liability for wrongful conduct; specific wrongs of deceit, defamation, malicious prosecution, interference with contracts and trade, etc. Ames and Smith, *Cases on Torts* (edition of 1909-10), Vols. I and II. Three hours. Mr. Paige.

Common Law Actions and Equity I. The several forms of action at common law. Relation of forms of action to substantive law. Introduction to equity. Morgan, *Lectures*. Cook and Hinton, *Cases on Common Law Pleading*. Cook, *Cases on Equity Jurisdiction*, Vol. I. Two hours. Mr. McClintock.

- Criminal Law and Procedure. The common and statutory law of crimes; criminal procedure. Mikell, *Cases on Criminal Law and Criminal Procedure*. Two hours. Mr. Miller.
- Agency. Principal and agent, master and servant—their rights and obligations, mutually and as to third persons. Goddard, *Cases on Agency*. Two hours. Mr. Rottschaefer.

### SECOND YEAR COURSES

- Constitutional Law. Nature of American constitutional system; legislative, executive, and judicial departments; fundamental rights; due process of law; police power; taxation; eminent domain; the Federal government and its general powers; interstate commerce. Hall, *Cases on Constitutional Law*. Two hours. Mr. Rottschaefer.
- Equity II. Nature of equity jurisdiction; injunctions; bills of peace; interpleader; specific performance; bills for account. Ames, *Cases on Equity*, Vols. I and II. Two hours. Mr. McClintock.
- Private Corporations. The nature, creation, and citizenship of corporations; *ultra vires* contracts and acts; stock issues; rights and liabilities of stockholders, officers and agents of corporations; rights of creditors. Richards, *Cases on Private Corporations*. Two hours. Mr. Ballantine.
- Property II and Decedents' Estates. (1) Titles and conveyancing; the execution of deeds and estates created thereby; executive sales and priorities; actions concerning real property. Dibell, *Cases on Real Property*. (2) Testamentary capacity; execution, revocation, and republication of wills; descent; probate of wills and administration of estates. Dibell, *Cases on Wills and Descent*. Two hours. Mr. Dibell.
- Negotiable Instruments. Formal and essential requirements of negotiable instruments, and the nature of the liability of the respective parties thereto; acceptance; endorsement; transfer; presentment; notice of dishonor; the Negotiable Instruments Law. Colson's Huffcutt, *Cases on Negotiable Instruments*. Two hours. Mr. Paige.
- Sales. Contracts resulting in the transfer of title to personal property, and the special rights and remedies of the buyer and seller. Williston, *Cases on Sales* (second edition). Two hours. Mr. Fletcher.
- Trusts. Nature and incidents of the trust relationship; methods of creating trusts; rights and obligations of trustees and beneficiary; constructive trusts, charitable trusts. Scott, *Cases on Trusts*. Two hours. Mr. Fraser.
- Brief-Making and Drafting. Practical exercises in the writing of briefs and in the preparation of legal documents. Examination of abstracts of title. One hour. Mr. Ballantine, Mr. Kitts.

### THIRD YEAR COURSES

- Practice and Practice Court (required). This course deals with the various proceedings in an action from the commencement thereof, through trial and appellate courts, to final satisfaction of judgment, including

- work in the practice course. Sunderland, *Cases on Trial and Appellate Practice* (1924 edition). Three hours. Mr. Cherry, Mr. Miller, Mr. Carman, Mr. Kjørlaug.
- Evidence (required). Burden of proof; judicial notice; admission and exclusion of evidence; competency, privilege, and examination of witnesses; hearsay rule and recognized exceptions; opinions and conclusions; circumstantial evidence; best evidence rule; parole evidence rule. Hinton, *Cases on Evidence*. Two hours. Mr. Cherry.
- Pleading. Common Law and Code Pleading (required). Demurrers, pleas, replications, departure, new assignment, amendment, set-off and counterclaim. Relation of code to common law pleading, parties, splitting and joinder of causes, the complaint, answer, demurrer, reply, motions, bills of particulars, amendment, and aider. Cook and Hinton, *Cases on Common Law Pleading*. Hinton, *Cases on Code Pleading* (2nd edition). Two hours. Mr. Miller.
- Property III. Conditional and future interests in land: reversion and remainders; executory limitations by way of use and devise; powers; rule against perpetuities; conditions in restraint of alienation. Minnesota restrictions on future interests and trusts. Kales, *Future Interests*, American Casebook Series, and selected cases. Two hours. Mr. Fraser.
- Conflict of Laws. The rules applied by courts in enforcing rights acquired under the law of a sister state or a foreign country. Lorenzen, *Conflict of Laws* (2nd edition). Two hours. Mr. McClintock.
- Mortgages. Legal and equitable mortgages of realty and chattels; rights of mortgagor and mortgagee at law and in equity; foreclosure, redemption, extension, assignment, and discharge of mortgages. Dibell, *Cases on Mortgages*. One hour. Mr. Dibell.
- International Law. (1) International Relations in Time of Peace; territorial jurisdiction; jurisdiction on the high seas; nationality. (2) International Relations as Modified by War; measures short of actual war; effect of war as between enemies; relation between belligerents and neutrals. Scott, *Cases on International Law*. Two hours. Mr. Allin.
- Damages. Exemplary damages; nominal damages; direct and consequential damages; elements of injury; function of court and jury; liquidated damages; entire and prospective damages; limitations of interest; aggravation and mitigation. Special applications. Beale, *Cases on Damages* (third edition). Two hours, half year. (Not given in 1924-25.)
- Insurance. Nature and requisites of the contract; premiums and assessments; insurable interests; concealment; representations and warranties; waiver and estoppel; rights under the policy; beneficiaries, assignees, and creditors; construction of the policy. Vance, *Cases on Insurance*. Two hours, half year. (Not given in 1924-25.)
- Municipal Corporations*. Legislative control; officers and agents; power to incur indebtedness, to pass ordinances, to grant franchises, to levy taxes, to issue securities, to own and operate public utilities; municipal

- liability for torts. Abbott, *Cases on Municipal Corporations*. Two hours, first half year. Mr. Abbott.
- Public Utilities. Origin of common callings, peculiar duties and liabilities incident thereto, the modern law applicable to those engaged in public service, particularly common carriers, with special reference to the Interstate Commerce Act and similar state statutes. Textbook to be announced. Two hours, first half year. Mr. Rottschaefer.
- Taxation. This course deals only with the legal questions arising in connection with the assessment of property and the levying and collection of taxes. Beale, *Cases on Taxation*. Two hours, second half year. Mr. Rottschaefer.
- Partnership. The nature and formation of the partnership relation; the rights and liabilities of the partners, both *inter se* and as to third parties. Gilmore, *Cases on Partnership*. Two hours, second half year. Mr. Paige.
- Suretyship. The surety distinguished from the guarantor, the guaranty insurer, and the endorser; surety's defenses against creditor; surety's rights to subrogation, indemnity, contribution, and exoneration; creditor's rights to surety's securities. Ames, *Cases on Suretyship*. Two hours, first half year. Mr. Fletcher.
- Quasi Contracts. Nature and scope of quasi contracts, benefits voluntarily conferred by mistake, in partial performance of a contract, in the absence of a contract; benefits conferred under duress; waiver of tort. Thurston, *Cases in Quasi Contracts*. Two hours, half year. (Not given in 1924-25.)
- Bankruptcy. Origin, history, and nature of the bankruptcy law; jurisdiction of the courts; acts of bankruptcy; practice; receivers; claims, preferences; assets, trustees; liens; adverse claimants; summary jurisdiction; crimes, composition, discharge. Selected cases. Two hours, second half year. Mr. Fletcher.
- Persons. Marriage and divorce; parent and child; guardian and ward; property law peculiar to the marriage relation; rights and liabilities of persons under the disabilities of coverture, infancy, insanity, etc. Paige, *Cases on Domestic Relations*. Two hours, first half year. Mr. Paige.

#### WORK IN PRACTICE

Members of the third year class, in addition to classroom instruction in practice, engage in the exercises of the practice court. Each student is assigned a number of cases in which he is required to draw the necessary pleadings, to see to the service of process and pleadings, and to prepare for and conduct the trial. In at least one of the cases so assigned, the student must take steps to secure or oppose a provisional or extraordinary remedy. Each student also serves as a witness in several cases. The trial is followed by a discussion of the conduct of the case, led by the instructor who has acted as judge.

Students prepare three sets of papers, which include all papers ordinarily used in the prosecution and defense of a civil action in the District Court and on appeal to the Supreme Court. The papers are explained and discussed in class.

Members of the third year class are required to serve as assistants in the office of the Legal Aid Society and to attend at the office of the society during the periods assigned for such service.

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.

INFANTRY COURSES

No.	Title	Hour	Day	Bldg.	Instructor
51f-52w	First Year Adv. Course.....	II	MWF	A	Ar
		III	MWF	A	Ar
		VI	MWF	A	Ar
		VIII	MWF	A	Ar
		I, II	TThS	A	Ar
		III, IV	TThS	A	Ar
		VI, VII	TTh	A	Ar
		VIII, IX	TTh	A	Ar
53s	First Year Adv. Course.....	VII, VIII,			
		IX	T or W	A	Ar
		IV	TS	A	Ar
54f-55w	Second Year Adv. Course.....	II	MWF	A	Ar
		III	MWF	A	Ar
		VI	MWF	A	Ar
		VIII	MWF	A	Ar
		I, II	TThS	A	Ar
		III, IV	TThS	A	Ar
		VI, VII	TTh	A	Ar
		VIII, IX	TTh	A	Ar
56s	Second Year Adv. Course.....	VII, VIII,			
		IX	T or W	A	Ar
		IV	TS	A	Ar

ATTENDANCE FOR 1923-24

Third year class .....	126
Second year class .....	85
First year class .....	72
<b>Total .....</b>	<b>283</b>

\* Must be legally eligible for enrolment in R.O.T.C. Consult P.M.S.&T.

The following resolution was adopted by the American Bar Association, September 1, 1921. It was approved by a national conference of state and local bar associations, February 24, 1922, and by the Minnesota State Bar Association, September 1, 1922.

“(1) The American Bar Association is of the opinion that every candidate for admission to the bar should give evidence of graduation from a law school complying with the following standards:

(a) It shall require as a condition of admission at least two years of study in a college.

(b) It shall require its students to pursue a course of three years' duration if they devote substantially all of their working time to their studies, and a longer course, equivalent in the number of working hours, if they devote only part of their working time to their studies.

(c) It shall provide an adequate library available for the use of the students.

(d) It shall have among its teachers a sufficient number giving their entire time to the school to insure actual personal acquaintance and influence with the whole student body.

The Council on Legal Education and Admission to the Bar is directed to publish from time to time the names of those law schools which comply with the above standards and of those which do not and to make such publications available so far as possible to intending law students.”

The University of Minnesota Law School is the only school in the state of Minnesota approved by the council.



*The Bulletin*  
of the University of  
Minnesota

*The Medical School*  
Announcement for the Years  
1925-1927



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1925							1926																
<b>JULY</b>							<b>JANUARY</b>							<b>JULY</b>									
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa			
..	..	..	1	2	3	4	..	..	..	..	..	1	2	..	..	..	..	1	2	3			
5	6	7	8	9	10	11	3	4	5	6	7	8	9	4	5	6	7	8	9	10			
12	13	14	15	16	17	18	10	11	12	13	14	15	16	11	12	13	14	15	16	17			
19	20	21	22	23	24	25	17	18	19	20	21	22	23	18	19	20	21	22	23	24			
26	27	28	29	30	31	..	24	25	26	27	28	29	30	25	26	27	28	29	30	31			
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<b>AUGUST</b>							<b>FEBRUARY</b>							<b>AUGUST</b>									
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9	10	11	12	13	14	15	14	15	16	17	18	19	20	8	9	10	11	12	13	14			
16	17	18	19	20	21	22	21	22	23	24	25	26	27	15	16	17	18	19	20	21			
23	24	25	26	27	28	29	28	..	..	..	..	..	..	22	23	24	25	26	27	28			
30	31	..	..	..	..	..	..	..	..	..	..	..	..	29	30	31	..	..	..	..			
<b>SEPTEMBER</b>							<b>MARCH</b>							<b>SEPTEMBER</b>									
..	6	7	8	9	10	11	12	..	7	8	9	10	11	12	13	..	5	6	7	8	9	10	11
13	14	15	16	17	18	19	14	15	16	17	18	19	20	12	13	14	15	16	17	18			
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..	4	5	6	7	8	9	10	..	4	5	6	7	8	9	10	..	3	4	5	6	7	8	9
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18	19	20	21	22	23	24	18	19	20	21	22	23	24	17	18	19	20	21	22	23			
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<b>NOVEMBER</b>							<b>MAY</b>							<b>NOVEMBER</b>									
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8	9	10	11	12	13	14	9	10	11	12	13	14	15	14	15	16	17	18	19	20			
15	16	17	18	19	20	21	16	17	18	19	20	21	22	21	22	23	24	25	26	27			
22	23	24	25	26	27	28	23	24	25	26	27	28	29	28	29	30	..	..	..	..			
29	30	..	..	..	..	..	30	31	..	..	..	..	..	..	..	..	..	..	..	..			
<b>DECEMBER</b>							<b>JUNE</b>							<b>DECEMBER</b>									
..	6	7	8	9	10	11	12	..	6	7	8	9	10	11	12	..	5	6	7	8	9	10	11
13	14	15	16	17	18	19	13	14	15	16	17	18	19	12	13	14	15	16	17	18			
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..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			

# UNIVERSITY CALENDAR

1925-26

## FALL QUARTER

September	17	Thursday	Payment of fees closes, except for new students
September	17-19		Entrance examinations
September	21-25		Examinations for removal of conditions
			Physical examinations for all new students
			Registration period, <sup>2</sup> colleges of Science, Literature, and the Arts, and Education
September	24-25		Registration days <sup>2</sup> for all colleges not included above
September	25	Friday	Payment of fees for new students closes
September	28	Monday	Fall quarter begins, 8:30 <sup>1</sup> a.m.
			First semester extension classes <sup>3</sup> begin
October	15	Thursday	Senate meeting, 4:30 p.m.
November	11	Wednesday	Armistice Day; a holiday
November	14	Saturday	Homecoming Day
November	26	Thursday	Thanksgiving Day; a holiday
December	3	Thursday	State Day Convocation
December	16-19		Final examination period
December	17	Thursday	Commencement Convocation
			Senate meeting, 4:30 p.m.
December	19	Saturday	Fall quarter ends, Christmas vacation begins, 5:20 p.m.
December	23	Wednesday	Payment of fees closes for all students in residence fall quarter. <sup>3</sup>

## WINTER QUARTER

December	31	Thursday	} Registration days for new students in all colleges
January	2	Saturday	
January	4	Monday	Christmas vacation ends, winter quarter begins, 8:30 <sup>1</sup> a.m.
January	30	Saturday	First semester extension classes close
February	1	Monday	Second semester extension classes begin
February	12	Friday	Lincoln's Birthday; a holiday
February	18	Thursday	Charter Day Convocation
			Senate meeting, 4:30 p.m.
March	17-20		Final examination period
March	18	Thursday	Payment of fees closes for all students in residence winter quarter. <sup>3</sup>
March	20	Saturday	Winter quarter ends, spring vacation begins, 5:20 p.m.

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

<sup>2</sup> Registration subsequent to the date specified will necessitate the approval of the college concerned. See also penalty fees for late registration, page 17.

<sup>3</sup> New students must pay fees on dates announced for registration.

## THE MEDICAL SCHOOL

## SPRING QUARTER

March	26-27		Registration days for new students in all colleges
March	29	Monday	Spring vacation ends, spring quarter begins, 8:30 <sup>1</sup> a.m.
April	2	Friday	Good Friday; a holiday
May	13	Thursday	Cap and Gown Day Convocation
May	20	Thursday	Senate meeting, 4:30 p.m.
May	29	Saturday	Second semester extension classes close
June	9-12		Final examination period
June	12	Saturday	Spring quarter closes, 5:20 p.m.
June	13	Sunday	Baccalaureate service
June	14	Monday	Fifty-fourth annual commencement

## SUMMER SESSION

June	18-19		Summer Session first term begins, registration and payment of fees
June	21	Monday	Classes begin, 8:00 a.m.
July	31	Saturday	Registration and payment of fees for second term closes
			First term Summer Session closes
August	2	Monday	Second term classes begin
September	4	Saturday	Second term Summer Session closes

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

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Carl J. Olson, D.D.S., Instructor in Oral Hygiene and Periodontia  
Frederick A. Olson, M.S., M.D., Instructor in Surgery  
Orlena Ordahl, R.N., Instructor in Nursing  
Thomas A. Peppard, M.D., Instructor in Medicine  
William T. Peyton, B.S., M.A., M.D., Instructor in Anatomy  
Kenneth A. Phelps, M.D., Instructor in Ophthalmology and Oto-Laryngology
- Lawrence F. Richdorf, B.S., M.D., Instructor in Pediatrics  
Emil C. Robitshek, M.D., Instructor in Surgery  
William A. Samatsky, B.A., B.S., M.D., Instructor in Medicine  
Frederick H. K. Schaaf, M.D., Instructor in Medicine  
Albert C. Schulze, M.D., Instructor in Obstetrics  
W. Ray Shannon, B.S., M.D., Instructor in Pediatrics  
David M. Siperstein, M.A., M.D., Instructor in Pediatrics  
Samuel B. Solhaug, B.S., M.D., Ph.D., Instructor in Obstetrics and Gynecology
- Robert L. Starkey, Ph.D., Instructor in Bacteriology  
Marian M. Stewart, B.S., Instructor in Dietetics  
G. Elmer Strout, M.D., F.A.C.S., Instructor in Ophthalmology and Oto-Laryngology
- Clayton A. Swanson, D.D.S., Instructor in Oral Surgery  
Theodore H. Sweetser, B.S., M.D., Instructor in Pathology  
Marion A. Tebbets, B.A., Instructor in Social Service and Director of Division of Social Service
- Gertrude I. Thomas, Instructor in Dietetics  
Barbara Thompson, R.N., Instructor in Nursing and Assistant Superintendent of Nurses
- Dale D. Turnacliff, B.S., M.D., Instructor in Medicine  
Carl W. Waldron, M.D., D.D.S., L.D.S., Instructor in Medicine  
Roscoe C. Webb, B.A., M.D., F.A.C.S., Instructor in Surgery  
Samuel A. Weisman, B.S., M.D., Instructor in Medicine  
Anton G. Wethall, B.S., M.D., Instructor in Urology  
Thurston W. Weum, B.S., M.D., Instructor in Obstetrics and Gynecology

- Frank W. Whitmore, M.D., Instructor in Medicine  
 Arthur A. Wohlrabe, M.D., Instructor in Medicine  
 Herbert M. N. Wynne, B.S., M.D., Instructor in Obstetrics and Gynecology  
 Lauritz S. Ylvisaker, B.A., M.D., Instructor in Medicine  
 Arthur A. Zierold, D.D.S., M.D., Ph.D., Instructor in Surgery  
 Thomas Ziskin, M.D., Instructor in Medicine  
 Richard S. Ahrens, B.S., M.D., Assistant in Nervous and Mental Diseases  
 Walter C. Andrews, B.S., M.D., Assistant in Nervous and Mental Diseases  
 Melvin P. Baken, B.A., M.D., Assistant in Obstetrics and Gynecology  
 Jacob H. Bendes, M.D., Assistant in Medicine  
 Joseph F. Bieck, B.S., M.D., Assistant in Obstetrics and Gynecology  
 Harold S. Boquist, B.A., B.S., M.D., Assistant in Medicine  
 Arthur F. Bratrud, B.S., M.D., Assistant in Surgery  
 Eva H. Burggren, R.N., Head Nurse and Assistant in Nursing  
 Laurence H. Cady, B.A., M.D., Assistant in Preventive Medicine and  
 Public Health  
 Daniel R. Clark, D.D.S., Assistant in Dentistry  
 Woodard L. Colby, B.S., M.D., Assistant in Pediatrics  
 Harry B. Dornblaser, M.A., M.D., Assistant in Obstetrics and Gynecology  
 Howard L. Eder, B.S., M.D., Assistant in Pediatrics  
 David E. Ellison, M.D., Assistant in Dermatology and Syphilis  
 Irwin A. Epstein, D.D.S., Assistant in Dentistry  
 Harold H. Fesler, M.D., Assistant in Medicine  
 C. Alford Fjelstad, B.A., M.S., M.D., Assistant in Ophthalmology and  
 Oto-Laryngology  
 Albert E. Flagstad, B.S., M.D., Assistant in Orthopedic Surgery  
 Agnes Fleming, R.N., Assistant in Nursing  
 Aaron Friedell, B.A., B.S., M.D., Assistant in Pediatrics  
 John D. Geissinger, M.D., Assistant in Pediatrics  
 Hendrie W. Grant, M.D., M.S., Assistant in Ophthalmology and Oto-  
 Laryngology  
 George K. Hagaman, M.D., Assistant in Pediatrics  
 Ernest W. Hancock, B.A., M.D., Assistant in Pediatrics  
 Hewitt B. Hannah, B.A., M.D., Assistant in Nervous and Mental Diseases  
 Everett C. Hartley, B.A., M.D., Assistant in Obstetrics and Gynecology  
 Victor P. Hauser, B.S., M.D., Assistant in Surgery  
 Jean Carrie Hawley, R.N., Assistant in Nursing  
 James M. Hayes, M.D., M.S., F.A.C.S., Assistant in Surgery  
 Ruth Hjermstad, R.N., Assistant in Nursing  
 Max H. Hoffman, B.S., M.D., Assistant in Medicine  
 William H. Howard, M.D., Assistant in Ophthalmology and Oto-Laryn-  
 gology  
 Mary James, R.N., Assistant in Nursing  
 Griffith M. Jones, M.D., Assistant in Pediatrics  
 Gordon R. Kamman, B.S., M.D., Assistant in Nervous and Mental Diseases  
 Harry Levin, D.D.S., Assistant in Dentistry

Paul G. Lilja, D.D.S., Assistant in Dentistry  
 George F. Lindig, D.D.S., Assistant in Dentistry  
 Rudolph C. Logefeil, B.S., M.D., Assistant in Medicine  
 Glenn R. Matchan, M.D., Assistant in Pediatrics  
 Leo T. Murphy, B.S., M.D., Assistant in Surgery  
 Daniel F. Noonan, B.A., M.D., Assistant in Pediatrics  
 Axel N. Noran, M.D., Assistant in Pediatrics  
 Warner Ogden, B.A., M.D., Assistant in Surgery  
 Ada Marie Olsen, R.N., Surgical Nurse and Assistant in Nursing  
 Willard C. Peterson, B.S., M.D., Assistant in Surgery  
 Blanche M. Pinkus, R.N., Assistant in Nursing  
 Erling S. Platou, B.S., M.D., Assistant in Pediatrics  
 Leo G. Rigler, B.S., M.D., Assistant in Medicine  
 Chester C. Roach, D.D.S., Assistant in Dentistry  
 Edwin F. Robb, B.A., M.D., Assistant in Pediatrics  
 Harold J. Rothschild, M.D., Assistant in Ophthalmology and Oto-Laryngology  
 Everett Rowles, B.A., Assistant in Anatomy  
 George N. Ruhberg, B.S., M.D., Assistant in Neurology  
 J. Martin Sansby, B.S., M.D., Assistant in Pediatrics  
 Virgil J. Schwartz, B.S., M.D., Assistant in Ophthalmology and Oto-Laryngology  
 Harold P. Skelton, B.A., Assistant in Physiology  
 Adam M. Smith, B.S., M.D., Assistant in Medicine  
 Frank Woodford Stevenson, B.A., M.D., Assistant in Medicine  
 Alexander Stewart, M.D., C.M., Assistant in Pediatrics  
 O. Evelyn Tessum, B.S., Assistant in Nursing  
 Maurice B. Visscher, B.A., M.S., Assistant in Physiology  
 William Henry von der Weyer, M.D., Assistant in Orthopedic Surgery  
 Eugene F. Warner, M.D., Assistant in Pediatrics  
 Clarence E. Willcutt, M.D., Assistant in Obstetrics and Gynecology  
 Oswald S. Wyatt, B.S., M.D., Assistant in Surgery  
 Daniel E. Ziskin, D.D.S., Assistant in Dental Diseases

## TEACHING FELLOWS

R. Bernard Allen, B.S., Teaching Fellow in Anatomy  
 Raymond N. Bieter, B.S., M.D., Teaching Fellow in Pharmacology  
 Egbert J. Borgeson, B.S., M.D., Teaching Fellow in Ophthalmology and Oto-Laryngology  
 Orwood J. Campbell, B.S., M.D., Teaching Fellow in Surgery  
 Harry Gauss, M.S., M.D., Teaching Fellow in Medicine  
 Milton J. Geyman, B.S., M.D., Teaching Fellow in Radiology  
 Raymond L. Gregory, M.A., Teaching Fellow in Pharmacology  
 David J. Lewis, B.S., M.B., Teaching Fellow in Medicine  
 Milo M. Loucks, B.S., Teaching Fellow in Physiology  
 Irwin A. Montank, M.A., Teaching Fellow in Bacteriology

Charles D. Sneller, B.S., M.D., Teaching Fellow in Ophthalmology and  
Oto-Laryngology  
Roy E. Swanson, B.S., M.D., Teaching Fellow in Obstetrics and Gynecology  
William W. Swanson, B.A., M.B., M.S., Teaching Fellow in Pediatrics  
Owen H. Wangensteen, B.A., B.S., M.D., Teaching Fellow in Surgery  
Charles H. Watkins, B.A., Teaching Fellow in Anatomy  
Cecil J. Watson, B.S., Teaching Fellow in Pathology  
Macnider Wetherby, B.S., M.D., Teaching Fellow in Medicine

## COMMITTEES

## STUDENTS' WORK COMMITTEE

F. H. Scott, Chairman and Sophomore Adviser	E. T. Bell, Junior Adviser
C. J. V. Pettibone, Secretary and Freshman Adviser	J. C. McKinley, Senior Adviser The dean, ex officio

## COMMITTEE ON HONORS STUDENTS

Richard E. Scammon, Chairman	A. D. Hirschfelder
J. F. McClendon	The dean, ex officio

## INTERNESHIP COMMITTEE

J. C. Litzenberg, Chairman	H. L. Ulrich
L. B. Baldwin	The dean, ex officio

## GENERAL INFORMATION

The Medical School is conducted on the four-quarter system. Beginning students are received at the opening of the fall quarter. Students with advanced standing may be received at the beginning of any quarter for work for which they are prepared, provided there is a vacancy.

### REQUIREMENTS FOR ADMISSION

Ninety quarter credits of college work, carrying 90 honor points, and including rhetoric, 9 credits; chemistry, 20 credits; physics, 12 credits; and zoology, 12 credits; a reading knowledge of French or German; subject to detailed requirements and rules governing limited registration. A candidate's record also must show a number of honor points in rhetoric, chemistry, physics, and biology equal to the total number of credits in these subjects taken collectively.

1. *Rhetoric*: 9 quarter (6 semester) credits. At Minnesota this requirement is met by Rhetoric 4-5-6 (9 credits) or by English-Rhetoric A-B-C (15 credits).

2. *Chemistry*: 20 quarter (13 semester) credits, including general chemistry, qualitative and quantitative analysis, and organic chemistry with laboratory work. At Minnesota, Courses 4-5 (or 1, 2, 3) 11, 27, 31-32 are necessary. Students are advised to take chemistry in high school.

3. *Physics*: 12 quarter (8 semester) credits, covering mechanics, sound, heat, light, electricity, and magnetism, with proper laboratory work. At Minnesota, Courses 1 and 2, 21 and 22, 31 and 32, 41 and 42 (a total of 16 credits) meet the requirement. Students are advised to complete them all, but, if desired, Course 35 may be substituted for 31 and 32. See bulletin of the College of Science, Literature, and the Arts for description of these courses and statement of prerequisites.

4. *Zoology*: 12 quarter (8 semester) credits, including proper laboratory work. At Minnesota, Animal Biology 5-6-7, meets this requirement.

5. *Foreign language*: Sufficient high school or college training to insure a reading knowledge of French or German medical literature. This requirement is fulfilled as regards French:

(a) By passing any two of Courses 8, 9, 10 in Scientific French in the Department of Romance Languages of this University or by acceptable courses covering similar work done elsewhere;

or (b) By passing an examination conducted by the Department of Romance Languages. The minimum preparation demanded for admission to this examination is 15 credits of French with an average mark of C, or satisfactory equivalent.

The language requirement is fulfilled as regards German:

(a) By passing in Course 31-32, Department of German, in this University or by acceptable credits covering similar work done elsewhere;

or (b) By passing an examination in Scientific German conducted by the Department of German. The usual requirement for admission to this examination is two college years of German, or satisfactory equivalent.

*Advised Subjects*

Pre-medical students are advised to secure preparation in some or all of the following: Latin (high school or college), mathematics, psychology, sociology, drawing, comparative anatomy, additional work in biology and chemistry.

## UNCLASSED STUDENTS

Students prepared for particular courses in departments of the Medical School may be admitted as unclassified students. Such students receive subject credit for courses satisfactorily completed but are not entitled to time credit toward the bachelor or doctor of medicine degree.

## SPECIAL STUDENTS

The term "special student" is applied to a medical graduate who desires to register for a time in the Medical School but who does not wish to work toward an advanced degree.

## REGISTRATION LIMITED

On account of the limited capacity of the school, the incoming (third year or freshman) class will be limited to one hundred. Application blanks may be obtained from the dean's office.

The last day for receiving applications for the freshman year will be June 15. If college work was done elsewhere than at the University of Minnesota, detailed credentials, showing subjects, credits, and grades, must be presented by July 1.

Subject to recommendations as to character, ability, and personal qualities, candidates will be accepted in the order of their scholastic rating as indicated by the record of their previous work, as detailed above under Requirements for Admission. The entire one hundred candidates will be accepted as soon after July 1 as possible. Candidates will be notified of their acceptance or rejection by July 15.

Accepted applicants will receive a bill for a preliminary fee of \$10. This must be paid within ten days, in order to hold a place in the limited registration. The above fee will not be returnable should the student fail to enter.

Other qualifications being equal, residents of Minnesota will be given preference in selecting students for the Medical School.

The fourth (sophomore) year is limited to one hundred students.

The fifth and sixth (junior and senior) years are limited to one hundred and twelve in each class, in divisions of twenty-eight students. Division A begins the work of the fifth year in the summer quarter. Divisions B, C, and D in the fall quarter. Students desiring to enter the junior year from other schools should bear these facts in mind in making applications for admission.

## ADMISSION WITH ADVANCED STANDING

Honorably dismissed students of Class A medical schools may be received into advanced classes provided vacancies occur. Such a student must submit credentials covering pre-medical and medical studies, showing that



the student had the pre-medical requirements and has maintained the standard of scholarship required in this school.

As a rule notebooks and other evidences of laboratory work must be presented. The amount of advanced standing in any subject to be granted a student from another school is decided by the respective department in conference with the Students' Work Committee. Subject credit, but not legal time credit, may be given for studies pursued other than in medical schools.

For six- and seven-year combined courses in Arts or Science and Medicine, see the bulletin of the College of Science, Literature, and the Arts.

### FEEES

The quarterly fee in the Medical School is \$60 for residents of Minnesota and \$70 for nonresidents, payable at the beginning of each quarter. No fee is charged in the Medical School for the final hospital or advanced laboratory year.

In addition to tuition, each student is charged an incidental fee of \$4 each quarter.

A deposit of \$10 each year is required as a caution fee, against which certain charges are made. Any balance remaining from this deposit will be returned to the student at the close of each year.

Students who take less than the regular course of study may arrange their fees at the rate of \$2.50 (nonresidents \$3) for each weekly clock hour per quarter.

Repetition of work in course demands the repetitional payment of fees.

A fee of \$1 is payable for a condition examination; and one of \$5 for a special examination.

After January 1, 1926, a graduation fee of \$10 will be charged for each degree conferred.

*Registration penalties.*—The penalty fee for late registration, late change of registration, or late payment of fees will be \$2 and \$1 additional for each day of delay after classes begin, provided that no student shall pay more than \$12 of penalty in any given quarter.

### MICROSCOPES

Each student must be provided, by purchase or rental, and throughout the entire four-year course, with a microscope of approved quality and equipment.

In the fifth and sixth years each student is required to provide himself with a hemocytometer and a stethoscope of approved form.

### THE SUMMER SESSION

A full summer quarter is conducted in the Medical School.

For courses of instruction offered and schedule of fees for special courses see bulletin of the Summer Session.

## MARKING SYSTEM AND SCHOLARSHIP RULES

See bulletin boards for rules on marking and scholarship.

PHYSICAL EXAMINATIONS AND PROPHYLACTIC  
INOCULATION

Registration in the Medical School in particular quarters is not complete until the student has undergone certain physical examinations, tests, and vaccinations. See bulletin boards for rules on this subject.

## CLINICAL OPPORTUNITIES

## THE UNIVERSITY HOSPITAL AND DISPENSARY

The University Hospital includes the Elliot Memorial Building, the Cancer Institute, and the Todd Memorial Hospital, and has a capacity of 300 beds.

## AFFILIATED HOSPITALS

The Minneapolis General Hospital and the Ancker Hospital of St. Paul are affiliated with the Medical School. One half of their clinical service is under the direction of the faculty. The combined resources of these two hospitals total some fourteen hundred beds.

The State Hospital for Crippled and Deformed of over 200 beds at Phalen Park, St. Paul, and the Hennepin County Tuberculosis Sanatorium at Glen Lake, an institution of over 400 beds, are used for clinical instruction.

The Miller Hospital, St. Paul, of about 200 beds, and attached Wilder Dispensary are used regularly for required and elective section clinics.

Section clinics are held in other institutions, as Pillsbury House and Margaret Barry House.

## MILITARY SCIENCE AND TACTICS

There is a Medical Reserve Officers' Training Corps in connection with the Medical School to which the Army Medical Corps details an officer to serve as professor. See the departmental statement of this department.

## THE GRADUATE SCHOOL IN MEDICINE

The Graduate School includes the opportunities for study and research offered by the Mayo Foundation for Medical Education and Research, at Rochester, Minnesota, as well as those of the Medical School at Minneapolis.

Further information may be found in the announcement of the Graduate School or in the circular of information on graduate work in medicine.

Fellowships in the pre-clinical sciences pay \$900 the first year, \$1200 the second year, and \$1500 the third year. In the clinical departments the stipends are \$600 the first year, \$750 the second year, and \$1000 the third year. About 150 fellowships are available each year at Rochester and Minneapolis.

OTHER COURSES

The School of Nursing and courses in public health, including work for public health nurses, are conducted in the Medical School. Short courses for physicians and a course for embalmers are conducted by the Extension Division, in the Medical School. A course in medical technology is conducted jointly by the College of Science, Literature, and the Arts, and the Medical School. Circulars descriptive of any of these courses will be sent on request.

# CURRICULUM

## THE CURRICULUM FOR THE M.B. DEGREE

### OPTIONAL COURSES OF STUDY

Candidates for the M.B. degree may:

a. Pursue the regular curriculum outlined below, or  
 b. Follow the regular curriculum with modifications in the direction of special work in some particular department. Such students may register, if desired, during certain quarters in the Graduate School; and such registration if major work is done in a Medical School department may be transferred later to the Medical School to count toward a medical degree. Such students may qualify for advanced degrees such as M.S. and Ph.D. See paragraph on irregular course students.

c. In special cases students may receive the M.B. degree in the honors course, description of which is found on page 23.

### REGULAR CURRICULUM

#### DEPARTMENTAL HOURS

	Clock hours		Clock hours
Physical chemistry.....	99	Medicine .....	866
Anatomy, gross and microscopic...	704	Surgery .....	478
Bacteriology .....	176	Obstetrics .....	273
Physiology, including physiologic chemistry .....	440	Pediatrics .....	231
Pathology .....	363	Ophthalmology and Oto-Laryngology	134
Preventive Medicine and Public Health .....	57	Roentgenology .....	11
Pharmacology .....	187	Elective .....	264
		Total .....	4283

#### ARRANGEMENT OF COURSES

Department and Course	Third (Freshman) Year			Fourth (Sophomore) Year		
	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	5th qtr.	6th qtr.
Anat. 5, 6, 7 (Dissection)....	15	15	..	..	..	..
Anat. 103 (Histology).....	..	..	15	..	..	..
Anat. 107 (Embryology).....	..	..	9	..	..	..
Chem. 143 (Physical Chem.)*	9	..	..	..	..	..
Physiol. 100-101 (Physiol. Chem.)	..	9	9	..	..	..
Bact. 1 (Gen. Bact.)*.....	..	9	..	..	..	..
Anat. 111 (Neurology).....	..	..	..	10	..	..
Physiol. 103-104 (Physiology)	..	..	..	14	8	..
Bact. 101 (Spec. Bact.).....	..	..	..	7	..	..
Path. 101-102 (Pathology)...	..	..	..	..	15	15
Pharm. 102-104 (Gen. & Exp. Pharm.) .....	..	..	..	..	2	9†
Med. 20, 21, 22 (Phys. Diag.)	..	..	..	..	4	5
Surg. 20 (Bandaging).....	..	..	..	1	..	..
Ped. 20 (Ped. Diag.).....	..	..	..	..	..	1
Electives .....	..	..	..	..	6	6
Total clock hours per week.	24	33	33	32	35	36

\* Half the class takes physical chemistry in the winter and general bacteriology in the fall.

† In 1926 pharmacology will be placed in the junior year and clinical chemistry and microscopy will be placed in the sophomore year.

APPROXIMATE ARRANGEMENT OF JUNIOR AND SENIOR STUDIES—Figures indicate hours per week.

	Summer	Fall				Winter				Spring				Summer	Fall			Winter				Spring		
	A	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	B	C	D	C	D			
Pharm. 105-106 (Pharmacology and Therapeutics).....	2	2	2	2	2	2	2	2																
Pharm. 108 (Prescription-Writing).....	1		1	1	1																			
P. M. and P. H. 100 (Hygiene).....		3	3	3	3																			
P. M. and P. H. 101 (Field Work).....																								
Path. 109 (Clinical Pathological Conference).....														I	I							I	I	
Med. 23, 24 (Principles and Practice of Medicine)....	3	3	3	3	3	3	3	3																
Med. 25 (Physical Diagnosis and Case-Taking).....	4	2	2	2	2	2	2	2																
Med. 26 (Clinical Chemistry and Microscopy).....	6									6	6	6												
Med. 28 (Practical Therapy).....						1	1			1	1	1												
Med. 29, 30 (Clinic in Medicine).....	I	I	I	I	I	I	I	I	I	I	I	I		I	I	I	I	I	I	I	I	I	I	
Med. 31, 32 (Mouth Infections and Med. Jurisprudence)										2	2	2	2											
Med. 34 (Ancker, Clinic in Medicine).....	I		I					1				1												
Med. 40 (Neurology and Neurologic Diagnosis).....						3	3	3	3															
Med. 41 (Psychiatry).....																2	2						2	2
Med. 42 (Ancker, Clinic in Neurology and Psychiatry)	1		I					1		1														
Med. 46 (Dermatology and Syphilis).....						3	3				3	3												
Surg. 21 (Principles of Surgery).....		3	3	3	3						3	3												
Surg. 22 (General Surgery).....		3	3	3	3																			
Surg. 23-24 (Regional Surgery).....						2	2	2	2	2	2	2	2											
Surg. 25 (Fractures and Dislocations).....						2												2	2	2				
Surg. 26 (Diagnostic Clinic).....	I	I	I	I	I		1	1	1															
Surg. 27 (Ancker, Diagnostic Clinic).....	I		1					1				I												
Surg. 40 (Phalen, Orthopedic Surgery).....		2		2		2				2														
Surg. 42 (Orthopedic Surgery).....																I	I						I	I
Surg. 46 (Genito-Urinary Diseases).....						1½											1½	1½	1½					
Hosp. 79 (Roentgenology).....														1	1									
Obst. 20, 21 (Obstetrics).....	3	3	3	3	3	3	3	3						1	1									
Obst. 22 (Operative Obstetrics).....														1	1								1	1
Obst. 23 (Gynecology).....	I		I	I	I																			
Obst. 24 (Gynecology).....						2	2	2	2					2	2								2	2
Obst. 25 (Obstetrics and Gynecology).....																2	2						2	2
Obst. 28 (Clinics in Obstetrics and Gynecology).....	I			1			1					I												
Ped. 21, 22 (Diseases of Children).....						2	2	2	2	3	3	3	3											
Ped. 23 (Ancker, Clinic in Pediatrics).....	I		I					1			I													
Ped. 24 (Clinics in Contagious Diseases).....	I		I				1				I													
Ped. 29 (Pediatric Clinic).....						2	2	2	2	2	2	2	2	I		I								
Oph. and Otol. 20, 21, 22 (Ophthalmology, Otology, etc.)														22		22							22	
Med. 33 (Clinical Clerkship).....														18		18						18		
Surg. 28 (Clinical Clerkship).....																								
Obst. 26 { Clinical Clerkship }										12				12								12		
Ped. 27 { Clinical Clerkship }																								
Dispensary.....										18				8	18	12	12	8	18	12	8	18	12	8
Electives, average.....	4	4	4	4	4	4	4	4	4	4	4	4	4											
Total, average.....	33	33				33				33				35	35			35				35		

## PLAN OF CLINICAL CURRICULUM

In order to utilize the clinical facilities of the school throughout the year the junior and senior classes are each divided into four divisions of not more than 28 students each, known as A, B, C, and D.

Division A will begin junior work in the summer quarter succeeding their sophomore year. They will attend six quarters consecutively and may be candidates for the M.B. degree at the December commencement.

Division B will begin junior studies in the fall quarter following their sophomore year, will attend six quarters consecutively, and may be candidates for the M.B. degree at the March commencement.

Divisions C and D will begin junior studies in the fall after the sophomore year. Division C will take a vacation in the next succeeding summer and Division D in the next succeeding fall quarter. Both these divisions may be candidates for the M.B. degree at the June commencement.

Students who have successfully completed the work of the first two years of the medical course are given a choice of these divisions in the order of their scholarship ranking, subject to the right of the Students' Work Committee, for sufficient reason, to place a given student in such division as will best foster his educational interests. A student may change from one division to another only on petition approved by the Students' Work Committee.

In the senior year each student will have a six weeks' clerkship in obstetrics and gynecology and a six weeks' clerkship in pediatrics. In order of scholarship students may choose, to the limit of seven students to a section, either (a) a thirteen weeks' clerkship in medicine and an eleven weeks' clerkship in surgery, or (b) an eleven weeks' clerkship in medicine and a thirteen weeks' clerkship in surgery. The clerks on long clerkships are responsible for histories and physical examinations at the hospitals during vacations between quarters. See special schedule of clerkships.

The approximate order of studies for the respective divisions of the junior and senior classes is given in the preceding table.

In special cases on petition to the Students' Work Committee students may arrange to take obstetric and pediatric clerkships of four weeks each and medical and surgical clerkships of eight weeks each, thus leaving a large amount of time free in one quarter to be devoted to special work.

## IRREGULAR COURSE STUDENTS

While the course of studies in this school is arranged on the traditional four-year plan, it is believed by the faculty that a rigid class system is not desirable and that many students will find it wise to extend their medical education over a longer period. It is to be understood that the required courses set forth only the minimum fundamental information in the various branches of medical science and only the minimum of practical experience with which a graduate may begin to practice. Attention is directed to the elective courses scheduled in the various departments and to the oppor-

tunities offered by the Graduate School. Able students are urged to undertake advanced work and research in some chosen field, to the end alike of advancing medical knowledge and of preparing themselves to fill teaching positions or to carry the investigative spirit into their medical practice. The Committee on Honors Students will advise with such students on the progress of their studies, and will assist ambitious students to lay out a program suitable to their needs. Petitions for reasonable substitutions in the required curriculum will be considered.

### HONORS COURSE

To the further end of developing independence and initiative in promising students the following regulations have been adopted:

A superior student, with the endorsement of the Committee on Honors Students, may petition the Administrative Board to readjust his curriculum. Such petition shall set forth the educational record and plans of such student, and shall name a major department in which the student desires to do intensive work, and some faculty member who is willing to act as adviser for such student.

Students whose petitions are approved shall be known as "Honors Students" and may pursue medical studies in such order and manner as they may determine, subject to the approval of their respective advisers. Each year a program of work, approved by the adviser, shall be made out and filed with the Committee on Honors Students.

Each department shall determine the minimum of practical work which honors students must perform before they may qualify for examination in such department.

To qualify for the M.B. degree honors students must fulfill the legal time requirements, and must pass general written and oral examinations in the several departments of the Medical School. The examinations in anatomy and physiologic chemistry (including physical chemistry) may be taken after not less than three quarters' registration in the Medical School; those in physiology and bacteriology after five quarters; those in public health, pathology, and pharmacology, after six quarters, and those in clinical departments after ten quarters' attendance. The examination in the major department shall be taken after not less than twelve quarters' attendance.

Satisfactory completion of the examination in any department shall entitle an honors student to credit on the registrar's books for a number of hours equivalent to those assigned to such department in the regular curriculum.

An honors student, with the approval of his adviser, shall have the option of fulfilling the requirements of any department except the major department by registering for, and passing examinations in, the required courses of said department.

As a result of the general work, the various examinations, and the research of an honors student and by vote of the Administrative Board on recommendation of the Committee on Honors Students, the M.B. degree may be granted with any of the usual distinctions.

At any time during his course of study, by vote of the Administrative Board, on recommendation of the Committee on Honors Students, an honors student may be required to return to the regular curriculum.

### REQUIREMENTS FOR THE M.B. DEGREE

Good moral character; compliance with the admission requirements; the attainment of the degree of bachelor of arts or bachelor of science, to which one year in medicine for the Arts degree, and two years in medicine for the Science degree, may contribute; the completion of a full four-year period of work in the Medical School in compliance with the scholarship rules are the essentials for the bachelor of medicine degree.

## CURRICULUM FOR THE M.D. DEGREE

Students who have attained the M.B. degree may qualify for the M.D. degree

- a. By completion of one year of internship in a hospital approved by the Internship Committee, or
- b. By completion of one year's work of advanced character in an approved laboratory, or
- c. By an approved year of advanced study or work in public health.

The degree M.D. *cum laude* is granted to a student who in addition to the above requirement presents an acceptable thesis.

## COURSES FOR PHYSICIANS

Physicians who desire to attend medical lectures and clinics for a limited period of time may obtain a visitor's ticket from the dean. They may enter for regular lecture and clinical courses in the Medical School upon payment of the usual Medical School fees. They may arrange for special courses of study in anatomy, physiology, experimental surgery, cadaver surgery, pathology, bacteriology, pharmacology, etc.



## DESCRIPTION OF COURSES\*

### ANATOMY

Departmental Office, Institute of Anatomy

#### REQUIRED COURSES

- 1w. Anatomy for Embalmers. 55 hours. Dr. Erdmann and assistants.
- 2f,w,s,su. Elementary Anatomy. School of Nursing. 44 hours; 4 credits.†  
Mr. Watkins.
- 3f. Elementary Anatomy. For dental nurses. 33 hours; 3 credits. Dr. Miller.
- 4s. Human Anatomy. For students in physical education. 66 hours; 4 credits. Dr. Erdmann.
- 5f,su-6w,su. Gross Human Anatomy. Dissection, including osteology. Every student required to dissect lateral half of the body. Third year medical students. 330 hours; 18 credits. Dr. Jackson, Dr. Erdmann, Dr. Peyton.
- 9f-10w. Systematic Anatomy. Freshman dental students. 220 hours; 10 credits. Dr. Jackson, Dr. Scott, Dr. Miller.
- 11s. Anatomy of the Head and Neck. Freshman dental students. 99 hours; 5 credits. Dr. Scott, Dr. Miller.
- 14w,su. Histology and Embryology. Second year dental students. Prerequisites: Courses 9-10, 11. 143 hours; 8 credits. Dr. Rasmussen, Dr. Lee, Mr. Rowles, Mr. Watkins.
- 103s,su. Human Histology. Microscopic study of the various tissues and organs. Third year medical students. Prerequisite: Course 5-6. 165 hours; 9 credits. Dr. Lee, Dr. Rasmussen, Dr. Lippman.
- 107s,su. Human Embryology. Development of the human body. Third year medical students. Prerequisite: Course 5-6. 99 hours; 6 credits. Dr. Scammon, Dr. Peyton.
- 111f,su. Human Neurology. A study of the central nervous system and sense organs. Fourth year medical students. Prerequisites: Courses 103, 107. 110 hours; 6 credits. Dr. Rasmussen, Dr. Lippman, Mr. Rowles, Mr. Allen.

#### ELECTIVE COURSES

- 43s. Applied Anatomy. Relationships, with reference to clinical applications. Medical students. Prerequisite: Course 5-6. 33 hours; 1½ credits. Dr. Erdmann.

\* The letters f, w, s, and su indicate that the corresponding courses are offered in the fall, winter, spring, and summer quarters, respectively. Numbers joined by hyphens indicate that the course is continued through more than one quarter. Letters separated by commas indicate the repetition of the course in corresponding quarters.

† Credits, as stated in this bulletin, are on the quarter system; they are comparable with semester credits upon a ratio of three to two.

- 45f-46w.\* Special Dissections. Dissections of special regions, including preparation of museum specimens. Prerequisite: Course 5-6. 33 hours; 1½ credits. Dr. Erdmann.
- 121f,s. Anatomical Technique. Microtechnique, reconstruction, and museum methods, etc. 66 hours; 3 credits. Dr. Lee.
- 126f,w. Advanced Histology. A study of special preparations, including practice in the identification of unknown specimens. Prerequisite: Course 103. 33 hours; 1½ credits. Dr. Lee.
- 129f-130w-131s.\* Topographic Anatomy. Based upon a study of serial cross sections of the human body. Prerequisite: Course 5-6. 33 hours (or more); 2 credits (or more). Dr. Jackson.
- 133f,su. Anatomy of the Fetus and Child. A survey of prenatal and post-natal development. Prerequisites: Courses 5-6, 107. 33 hours; 3 credits. Dr. Scammon.
- 134w. Anatomy of the New-Born. A detailed laboratory study of the anatomy of the new-born. Prerequisite: Course 133, or equivalent. 66 hours; 3 credits. Dr. Scammon.
- 135f,su. Physical Development of Childhood. Lectures, with study of illustrative material. Primarily for students in the College of Education. 22 hours; 2 credits. Dr. Scammon.
- 137f-138w-139s-140su.\* Implantation and Placentation. Fourth, fifth, or sixth year medical, or graduate students. Prerequisite: Course 107, or equivalent. 66 hours; 3 credits. Dr. Lee.
- 149w. Experimental Neurology. A study of the morphology of the central nervous system as determined by experimental methods. Prerequisite: Course III. 66 hours; 3 credits. Dr. Rasmussen.
- 150f,w. Seminar in Neurology. Study of the literature on selected phases of human neurology. Prerequisite: Course III. Hours and credits to be arranged. Dr. Rasmussen.
- 151s. Morphology and Significance of the Endocrine System. Gross and microscopic structure with functional relations of the endocrine organs. Prerequisite: Courses 103, 107. 66 hours; 3 credits. Dr. Rasmussen.
- 153f-154w-155s-156su.\* Advanced Anatomy. Advanced work, largely individual in character, in gross anatomy, histology, embryology, or neurology. Hours and credits to be arranged. Dr. Jackson, Dr. Johnston, Dr. Lee, Dr. Scammon, Dr. Rasmussen.
- 157w. Advanced Histology and Embryology of the Eye, Ear, Nose, and Throat. Prerequisites: Courses 103, 107. 66 hours; 3 credits. Dr. Scammon.
- 160f-161w-163su.\* Seminar in Growth of Children. A study with graphic analysis of data on physical development of children of school age. Prerequisite: Course 135, or equivalent. Hours and credits to be arranged. Dr. Scammon.

\* These courses may be taken continuously through three or four quarters or in any one quarter.

- 201f-202w-203s-204su.\*** Research in Anatomy. Research work in gross or microscopic anatomy, neurology, histology, or embryology. Hours and credits to be arranged. Dr. Jackson, Dr. Johnston, Dr. Lee, Dr. Scammon, Dr. Rasmussen.
- 205f-206w-207s.\*** Anatomical Seminar. Presentation and discussion of research work in progress in the department, together with reviews of current anatomical literature. 11 hours; 1 credit. Dr. Jackson.

### BACTERIOLOGY AND IMMUNOLOGY

Departmental Office, Millard Hall

#### REQUIRED COURSES

- 1f,w,s.** Elementary Bacteriology. For home economics and nursing students and others. 66 hours; 4 credits. Mrs. Green.
- 51su,f,w,s.** 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. Prerequisites: ten credits in chemistry and ten credits in biology. 99 hours; 5 credits. Dr. Henrici, Dr. Green, Mrs. Green, Mr. Halvorson.
- 52s.** Special Bacteriology for Dental Students. Prerequisite: general bacteriology. 66 hours; 4 credits. Dr. Green and assistants.
- 101f,su.** Special Bacteriology. The pathogenic bacteria, especially in relation to definite diseases; principles of infection and immunity. Fourth year medical students and others. Prerequisite: general bacteriology. 77 hours; 4 credits. Dr. Larson and assistants.

#### ELECTIVE COURSES

- 103.** Soil Microbiology. Studies of the microscopic inhabitants of the soil, their interrelationships and rôle in the transformations of soil constituents with particular emphasis on the cycles of carbon, nitrogen, and sulphur in nature. 5 credits. Dr. Starkey.
- 105f.** Food Bacteriology. The decay, fermentation, and putrefaction of foods; molds; canning; bacterial food-poisoning. Prerequisite: general bacteriology. 66 hours; 3 credits. Mr. Halvorson.
- 114s.** The Higher Bacteria. Study of morphology, cultivation, and classification of actinomycetes, yeasts, and molds. Prerequisites: general and special bacteriology. 66 hours; 3 credits. Dr. Henrici.
- 116w.** Immunity. Laws of hemolysis. Quantitative relationship between antigen and antibody. Wasserman reaction. Oponins. Vaccines. Precipitin reaction. Blood-grouping. Abderhalden reaction. Anaphylaxis. 66 hours; 3 credits. Dr. Larson.
- 117s.** Pathogenic Protozoa. Study of parasitic Protozoa of man, including spirochaets; their morphology and life history; cultural methods. Prerequisites: general and special bacteriology; Animal Biology 144-145-146. 66 hours; 3 credits. Dr. Larson.

\* These courses may be taken continuously through three or four quarters or in any one quarter.

- 118f. Morphology and Taxonomy of Bacteria. Cytology of bacteria; consideration of morphological, biochemical, and immunological characters as data for classification. Prerequisites: general and special bacteriology. 66 hours; 3 credits. Dr. Henrici.
- 119f. Bacteriological Chemistry. Microphysics of bacteria. Inorganic and organic constituents. Permeability of cells. Metabolism of bacteria. Enzymes of micro-organisms. Pigments. Prerequisites: general and special bacteriology; physiologic or phytochemistry. 66 hours; 4 credits. Dr. Green and assistant.
- 120w. Continuation of 119f. Bacteriolysants. Protein poisons. Bacterial toxins. Phagocytosis, application of quantitative laws to disinfection, hemolysis, and immune reactions. Cataphoresis. Stability of bacterial suspensions. Protein chemistry of immune reactions. 4 credits.
- 121f. Industrial Bacteriology. A study of the bacteriology of water, milk, canned fruits, vegetables, and meat products. Lecture and lab. 3 credits; TTh I-II. Mr. Halvorson.
- 122w. Industrial Bacteriology. The bacteriology of fermentation industries, manufacture of alcohol, butyl alcohol, acetone, lactic and acetic acids. Bacteriology of tanning, flax-retting, sugar industries. Lecture and lab. 3 credits; TTh I-II. Mr. Halvorson.
- 150f-151w or 150w-151s. Advanced Bacteriology. Opportunity of working out special problems. Prerequisites: general and special bacteriology. Limited to ten students. Arrange credits. Dr. Larson, Dr. Henrici, Dr. Green, Mr. Halvorson, Dr. Starkey.
201. Research in Bacteriology. Graduate students of the necessary preliminary training may elect research, either as majors or minors, in bacteriology. Hours and credits arranged. Dr. Larson, Dr. Henrici, Dr. Green, Mr. Halvorson, Dr. Starkey.
- 203f,w,s. Seminar in Bacteriology. 1 credit. Staff.

## PATHOLOGY

Departmental Office, 110, Institute of Anatomy

### REQUIRED COURSES

- 4f. Pathology for Students in Dentistry. 165 hours; 9 credits. Dr. Clawson, Mr. Watson.
- 101w. Pathology. Part I. The general principles governing pathologic changes. Fourth year medical students. Prerequisites: histology, embryology, and special bacteriology. 165 hours; 9 credits. Dr. Bell, Dr. McCartney, Dr. Clawson, Mr. Watson.
- 102s. Pathology. Part II. The pathologic processes of infectious diseases; the special pathology of organs, systems of organs, and tissues of the body. Fourth year medical students. Prerequisites: Pathology, Part I. 165 hours; 9 credits. Dr. Bell, Dr. Clawson, Dr. McCartney, Mr. Watson.

109su,f,w,s. Clinical Pathological Conference. Presentation of clinical data on selected cases and of the pathological specimens from the same cases, with discussions of etiology and diagnosis. 11 hours in each quarter. Required in two quarters, senior year. Elective for others. Staff.

## ELECTIVE COURSES

- 104su,f,w,s. Autopsies. Technique; making records; examination of fresh organs; microscopic study. Three or four students called to each post-mortem; excused from conflicting classes. Fifth and sixth year medical students. Staff.
- 106f,w,s. Pathologic Technique. Methods of preparation of microscopic and gross specimens; practice with freezing microtome, embedding methods, stains, museum specimens, etc. Hours and credits arranged.
- 107f,w,s. Advanced Pathology. Laboratory studies in the examination of routine operative and autopsy specimens. Hours and credits arranged. Staff.
- 108f,su. Diagnosis of Tumors. Prerequisite: Pathology 102. 66 hours; 3 credits. Dr. Bell, Dr. McCartney, Dr. Warwick.
110. Histopathology of Skin. Dr. H. E. Michelson.
111. Neuropathology. Dr. J. C. McKinley.
112. Pathology of the Eye, Ear, Nose, and Throat. Dr. Camp.
113. Student Externship in Pathology. Full time work in autopsies and surgical pathology. One or more quarters as arranged.
- 116w,s. Tumor Clinic. 22 hours. Dr. Bell, Dr. Zierold.
201. Research. Graduate students, of the necessary preliminary training, may elect research, either as major or minor in pathology. Hours and credits to be arranged.

## PHARMACOLOGY

Departmental Office, Millard Hall

## REQUIRED COURSES

- 1f,w. Elementary Pharmacology. A brief study of drugs for nurses and others. 44 hours; 3 credits. Mr. Gregory.
- 2s. Therapeutics and Toxicology for Students in Pharmacy. 33 hours; 3 credits. Dr. Brown.
- 4w. Dental Pharmacology. 44 hours; 4 credits. Dr. Brown, Dr. Bieter.
- 6w. Experimental Pharmacology. For dental students. 22 hours; 1 credit. Dr. Brown, Dr. Bieter.
- 101w. Introduction to Pharmacology. Pharmaceutical preparations; dosage; principles of prescription-writing; relation of chemical structure to the action of drugs. Fourth year medical students. 22 hours; 2 credits. Dr. Hirschfelder, Dr. Brown.
- 102s. General Pharmacology, Part I. A detailed study of drugs important in medical practice. Fourth year medical students. 33 hours; 3 credits. Dr. Hirschfelder, Dr. Brown.

- 104s,su. Experimental Pharmacology. Exercises illustrating the preparation and action of medicine. Fourth year medical students. 66 hours; 3 credits. Dr. Hirschfelder, Dr. Brown, Dr. Bieter, Mr. Gregory.
- 105f. General Pharmacology, Part III. Same as Course 102, in continuation. Fifth year medical students. 22 hours; 2 credits. Dr. Hirschfelder, Dr. Brown.
- 106f. General Pharmacology, Part III. Same as Course 102, in continuation. Fifth year medical students. 22 hours; 2 credits. Dr. Hirschfelder, Dr. Brown.
- 108f,w. Prescription-Writing. The principles of prescription-writing. Fifth year. 11 hours. Dr. Brown.

#### ELECTIVE COURSES

- 109f,w,su. Pharmacological Problems. Experimental study of special topics in pharmacology, with a review of the literature. Hours and credits arranged. Dr. Hirschfelder, Dr. Brown.
- 110f,su. Detection of Poisons. Hours and credits arranged. Dr. Brown.
111. Physical Therapy. 22 hours, 1½ credits. Dr. J. A. Evert.
- 201f,w,s. Seminar in Physiology and Pharmacology. Reviews of recent literature. 11 hours; 1 credit. Staff.
- 203su,f,w,s. Research in Pharmacology. Open to graduate and advanced students. Hours and credits arranged. Dr. Hirschfelder, Dr. Brown.

#### PHYSIOLOGY

Departmental Office, Millard Hall

#### REQUIRED COURSES

- 1f,s. Physiologic Chemistry and Physiology for Nurses. 132 hours; 7 credits. Dr. Pettibone, Dr. Greisheimer, and others.
- 4f,w,s,su. Human Physiology. For academic and home economics students. 5 credits. Dr. Greisheimer and assistants.
- 5f,w,s,su. Human Physiology. Same as Course 4 without laboratory work. Pharmacy students. 4 credits.
- 57f,su.\* Physiologic Chemistry. For academic, dentistry, physical education students, and others. 66 hours; 4 credits. Dr. Pettibone and assistants.
- 58w,su-59s,su.\* Human Physiology. For academic, dental, and physical education students, and others. 66 hours; 4 credits each quarter. Dr. Lyon, Mr. Visscher, and assistants.
- 100su,w-101su,s. Physiologic Chemistry. Mineral, carbohydrate, fat, and protein metabolism in health and disease. Third year medical students and others. Prerequisite: organic chemistry and physics. 99 hours; 6 credits each quarter. Dr. McClendon, Dr. Pettibone, Dr. Medes, and assistants.

\* Courses 57, 58-59 constitute a sequence recommended for students who wish a knowledge of human physiology, but who do not desire the detailed consideration given in Courses 100-101, 103, and 104. A student cannot receive credit for both of these sequences, nor for both 4 and 58-59.

- 103su,f. Physiology of Muscle, Nerve, Blood, Circulation, Respiration, Digestion. Fourth year medical students and others. Prerequisites: organic chemistry and animal biology. 154 hours; 9 credits. Dr. Lyon, Dr. Scott, Dr. Greisheimer, Mr. Visscher, and assistants.
- 104w,su. Physiology of the Nervous System and Special Senses, Metabolism, Nutrition, and Excretion. Fourth year medical students and others. Prerequisites: Course 103, or organic chemistry and neurology. 88 hours; 7 credits. Dr. Lyon, Dr. Scott, Dr. Greisheimer, Mr. Visscher, and assistants.

## ELECTIVE COURSES

- 108f. Seminar in Physiologic Optics. For graduate and medical students. Prerequisite: Course 104 or equivalent. 22 hours; 2 credits. Dr. Lyon.
- 109w. Seminar in Physiology of the Senses. For graduate and medical students. Prerequisite: Course 104 or equivalent. 11 hours; 1 credit. Dr. Lyon.
- 113su,f,w,s. Problems in Physiology. Arranged by instructors with qualified students. Each student will be assigned a topic for special laboratory study, leading in some cases to original investigation. Conferences and reading. May be taken one or more quarters. Prerequisites: Courses 103, 104, or equivalent. 66 hours; 3 credits each quarter or arranged. Dr. Scott, Dr. Greisheimer, or Mr. Visscher.
- 114w-115s. Applied Physiology. The application of physiology to the interpretation of symptoms and signs of abnormal function. Prerequisite: Courses 103, 104, or equivalent. 3 credits each quarter. Dr. Greisheimer.
- 131w. Advanced Physiology of Muscle, Blood, Circulation, and Digestion. Alterations due to physiologic conditions. Conference and laboratory work. Prerequisite: Physiology 103. 66 hours; 3 credits. Dr. Scott.
- 135f,w,s. Conference on Physiology, with qualified students. 11 hours; 1 credit. Dr. Scott.
- 153f,w,s,su. Problems in Physiologic Chemistry. Special work arranged by instructors with qualified students. May be taken one or more quarters. Prerequisite: Course 100-101. Hours and credits arranged. Dr. McClendon, Dr. Pettibone, or Dr. Medes.
- 155f,156w,157s. Pathological Chemistry. Blood chemistry of diabetes and nephritis. Basal metabolism, deficiency diseases. Prerequisite: Courses 100-101. 66 hours, 3 credits each quarter. Dr. McClendon, Dr. Medes (with co-operation of Dr. Fahr).
- 163w. Metabolism. Lectures and laboratory work on special phases of metabolism. Prerequisite: Physiology 101. Lectures may be taken alone; number of students unlimited. 22 hours; 2 credits. Laboratory course limited to ten students. 33 hours; 1 credit. Dr. Pettibone.
- 201f,w,s. Seminar in Physiology and Pharmacology. For instructors and advanced students. 11 hours; 1 credit. Dr. Lyon, Dr. Hirschfelder, and staff.

- 203f,w,s,su. Research in Physiology. Hours and credits arranged. Dr. Lyon, Dr. Scott, Dr. Greisheimer, Mr. Visscher.
- 205f,w,s,su. Research in Physiologic Chemistry. Hours and credits arranged. Dr. McClendon, Dr. Pettibone, Dr. Medes.
- 206f,w,s. Seminar in History of Physiology and Related Sciences. 11 hours; 1 credit. Dr. Lyon.

## PREVENTIVE MEDICINE AND PUBLIC HEALTH

### REQUIRED COURSES

- 2w. First Aid. (See bulletin of Physical Education.)
- 3f,w,s. Personal Hygiene and Elementary Sanitation. (See Science, Literature, and the Arts bulletin.)
- 5f. Elementary Preventive Medicine for Nurses. (See Nursing bulletin.)
- 12s. Hygiene and First Aid to the Sick and Injured. (See Engineering bulletin.)
- 52f,w,s. Health Care of the Family. (See Home Economics bulletin.)
- 53f,su. Elements of Preventive Medicine. (See Public Health bulletin.)
- 58w,su. Maternal and Child Hygiene. (See Public Health bulletin.)
- 59w. Social Hygiene. (See Public Health bulletin.)
- 60w. The Tuberculosis Problem. (See Public Health bulletin.)
- 61w. Mental Hygiene. (See Public Health bulletin.)
- 62f,su. Principles of Public Health Nursing. (See Public Health bulletin.)
- 63w. Special Fields in Public Health Nursing. (See Public Health bulletin.)
- 64f,w,s,su. Field Practice in Infant Welfare Nursing. (See Public Health bulletin.)
- 65f,w,s,su. Field Practice in School Nursing. (See Public Health bulletin.)
- 66f,w,s,su. Field Practice in County Nursing. (See Public Health bulletin.)
- 67f,w,s,su. Field Practice in a Tuberculosis Sanatorium. (See Public Health bulletin.)
- 68f,w,s,su. Field Practice in Visiting Nursing. (See Public Health bulletin.)
- 100f. Preventive Medicine and General Hygiene. Personal and public factors which favor occurrence of disease among individuals and communities; modes of transmission and importance of environment in the spread of disease. Physicians' responsibilities in health work. Medical students. 33 hours; 3 credits. Dr. Diehl, Dr. Myers, Dr. Lees.
- 101f,w,s,su. Public Health Administrative and Field Work. Demonstrations of health agencies at work; boards of health, laboratories, filtration, pasteurization, and garbage disposal plants. Presentation of actual health problems. Groups of 10 to 15 medical students for 6 weeks. Prerequisite: 55. 24 hours; 2 credits. Staff.

### ELECTIVE COURSES

- 50f,w,su. Public and Personal Health. (See Science, Literature, and the Arts bulletin.)
- 73w. Occupational Hygiene and Disease. (See Science, Literature, and the Arts bulletin.)



- 80w,su. Educational Hygiene. (See Education bulletin.)  
 102f,w,s,su. Sanitation. (See Public Health bulletin.)  
 103s. Public Health Bacteriology. (See Public Health bulletin.)  
 104f,w,s,su. Epidemiology. (See Public Health bulletin.)  
 105f,w,s. Vital Statistics. (See Public Health bulletin.)  
 106f,w,s. Public Health Administration. (See Public Health bulletin.)  
 107s. Sanitary Surveys. For medical students. Conferences, practical field work, and report on a specified survey. Of particular value to practitioners who may be called upon to serve as local health officers. Prerequisite: 53 or 100. 48 hours; 2 credits. Dr. Myers.  
 108. Public Health Experience. (See Public Health bulletin.)  
 200. Research. (See Public Health bulletin.)

## MEDICINE

### REQUIRED COURSES

19. Clinical Medicine for Dentists. (See Dental College bulletin.)  
 20w. Normal Physical Diagnosis. Lectures and laboratory. The students in sections repeat upon each other the standard procedures of physical examinations. Sophomore year. 44 hours. Dr. Myers and others.  
 21s. Physical Diagnosis. Lectures and demonstrations on general symptomatology and on methods of physical examination, diagnosis, and record. Sophomore year. 22 hours. Dr. Schaaf.  
 22s. Practical Work in Physical Diagnosis. Sections are assigned to hospital wards and dispensary where they have opportunity to examine selected cases, and these are demonstrated by instructors. Sophomore year. 33 hours. Dr. Myers, Dr. Fahr, and others.  
 23su,w,24f. The Principles and Practice of Medicine. Systematic lectures, exclusive of neurology and neurologic diagnosis, q.v.; illustrated, so far as possible, by clinical material. Prerequisite: Medicine 20, 21, 22. Fifth year. 66 hours. Dr. White, Dr. Fahr, Dr. Schneider, Dr. Beard, Dr. Gardner, Dr. Rizer, Dr. Cook.  
 25su,f,w. Physical Diagnosis and Case-Taking. Students, working two in a room, write histories, make physical examination, and provisional diagnoses on assigned dispensary patients under supervision of instructors. University and Wilder dispensaries. Juniors. 66 hours. Dr. Myers and others.  
 26su,s. Clinical Chemistry and Microscopy. Methods of laboratory examination for diagnostic purposes. Prerequisites: pathology, physiologic chemistry. Fifth year. 66 hours. Dr. O'Brien.  
 27su,f,w,s. Physical Diagnosis and Therapy. Conducted with sections in the following dispensary clinics: (1) general medicine; (2) cardiac and vascular diseases; (3) respiratory diseases and tuberculosis; (4) thyroid and endocrine diseases; (5) gastro-intestinal diseases; (6) nervous and mental diseases; (7) dermatology and syphilis. Includes Courses 43 and 47. Sixth year. 108 hours. Dispensary staff.

- 28s. Practical Therapy and Therapeutic Technique. A study of special methods. Fifth year. 11 hours. Dr. Lewis.
- 29su,f,w,s. Clinic in Medicine. Conducted in the University Hospital. Junior year. 33 hours. Hospital staff.
- 30su,f,w,s. Clinic in Medicine. University Hospital. Senior year. 33 hours. Hospital staff.
- 31s. Mouth Infections. The typical infections of the oral cavity and their causal relations to disease. 8 hours. Dr. Hartzell.
- 32s. Medical Jurisprudence. Principles of law, rules of evidence, and duties of physicians in medico-legal cases. 16 hours. Dr. Sweeney.
- 33su,f,w,s. Clinical Clerkship. The personal observation of patients in the University Hospital and in Glen Lake Sanatorium; taking and recording of case histories; making of provisional diagnoses; and study of treatment. Clerkship period. 240 hours. Dr. White, Dr. Fahr, and staff.
- 33xsu,f,w,s. Same as 33 at Minneapolis General Hospital. Dr. Ulrich and staff.
- 34su,f,w,s. Clinics in Medicine. Conducted in the Ancker Hospital, St. Paul. A part of the course in required clinics. Fifth year. 17 hours. Dr. Hall, Dr. Lepak, Dr. Drake, Dr. Herrmann, Dr. Oerting.

## ELECTIVE COURSES\*

51. Clinics in Medicine. Bedside studies at the City and County Hospital, St. Paul. Limited to ten students. Dr. Hall.
52. Clinics in Medicine. Bedside studies at the Minneapolis General Hospital. No limit. Dr. Ulrich.
53. Advanced Physical Diagnosis. Minneapolis General Hospital. Limited to six students. Dr. Peppard.
54. Graphic Recording and Functional Diagnosis of Cardio-Vascular Diseases. A study of the use of the polygraph and electrocardiograph. Limited to six students. Dr. O. S. Hansen, Dr. Ziskin.
55. Studies of Diseases of the Circulation. Circulatory insufficiency, irregularity, organic diseases. Study of polygrams, electrocardiograms, vascular diseases, blood pressure, cardio-vascular medication. Limited to six senior and graduate students. Dr. Morris.
56. Clinical Studies in Metabolism. Limited to six students. Dr. McKinlay.
57. Advanced Physical Diagnosis of the Chest. Practical dispensary work on tuberculous patients. Limited to six students. Dr. Weisman.
58. Diagnosis and Treatment of Diseases of the Lungs. Two lectures, two periods practical work (Minneapolis General Hospital and Lymanhurst), per week. Lectures taken with or without practical work. Prerequisite: Med. 20. Hours and credits arranged. Dr. Myers.
59. Physical Signs in Pulmonary Tuberculosis. Tuberculosis Pavilion, City and County Hospital. 4 to 6 students. Dr. Geer.

\* Clinical electives in Medicine are usually repeated each quarter. Elective lecture courses are given once each year. See quarterly programs.

60. Externship in Medicine. Extension of clerkship. 1 to 4 students. Prerequisite: Med. 33. Arranged. Dr. White and staff.
61. Externship at Minneapolis General Hospital. History-taking, physical examination, and laboratory diagnosis. Daily 9-12, 198 hours credit or arrange. Dr. Ulrich and staff.
62. Tropical Medicine. Tropical diseases, their nature and transmissibility; e.g., insects and Protozoa in general; malaria; yellow fever; filariasis; relapsing fever; plague; the dysenteries; leprosy; sprue; cholera. 11 hours. Col. Rutherford.
63. Course of lectures including history of disease, distribution, effects at different ages, prevention, diagnosis, classification, modern methods of treatment, prognosis. Sophomores, juniors, seniors. 33 hours credit. Dr. Myers.
64. Differential Diagnosis. A study of cases in the dispensary. Juniors. Limited to six students. 17 hours credit. Dr. Schaaf.
101. Assistantship in the Dispensary. In any of the out-patient services in medicine. Open to two students in medicine in each service and in each quarter. Prerequisite: Course 33. Staff.
102. The Respiratory Organs in Health and Disease. Designed for students desiring training in preparation of scientific and clinical papers for publication. Each student selects a problem pertaining to some part of the respiratory tract, which he pursues independently or in collaboration with instructor. One or more quarters. Limited to 5 students. Dr. Myers.

### DIVISION OF NERVOUS AND MENTAL DISEASES

#### REQUIRED COURSES

- 40w. Neurology and Neurologic Diagnosis. Lectures on methods of examination and the diseases of the nervous system. Fifth year. 33 hours. Dr. Hamilton, Dr. Hammes, Dr. Morrison.
- 41f,s. Psychiatry. Methods of modern psychiatry; lectures on the various mental disorders. Fifth or sixth year. 22 hours. Dr. Hamilton.
- 42su,f,w,s. Clinical Neurology and Psychiatry. Section clinics in nervous and mental diseases at the Ancker Hospital, St. Paul. A part of course in required clinics. Fifth year. 17 hours. Dr. Hammes, Dr. Hengstler, Dr. Whitmore, Dr. Kamman, Dr. Ruhberg.
- 43su,f,w,s. Physical Diagnosis and Therapy. The personal observation and study of nervous and mental cases in the University Dispensary. Part of Course 27. Dr. Michael, Dr. McKinley.
- 44su,f,w,s. Physical Diagnosis and Case-Taking. Sections of the class in neurology in the University Hospital. Part of Course 33. Dr. Hamilton, Dr. McKinley, and staff.

#### ELECTIVE COURSES

80. Organic Nervous Diseases. The chief diagnostic procedures employed in the study of nervous diseases. Limited to four students. Prerequisite: Course 40. Dr. Hamilton and staff.

81. Syphilitic Nervous Affections. Referring particularly to dementia paralytica and tabes dorsalis. Limited to six students. Dr. Hammes.
82. Regional Diagnosis. A didactic and clinical conference on the regional diagnosis of lesions of the nervous system. Limited to four students. Prerequisite: Course 40. Dr. Morrison, Dr. McKinley.
83. Clinic in Neurology. Bedside studies. Minneapolis General Hospital. Juniors and seniors. Limited to six students. Dr. Morrison, Dr. Ahrens.
84. Clinical Study of Mental Diseases. Ancker Hospital, St. Paul. Juniors. Dr. Whitmore.
85. Externship in Nervous and Mental Diseases. University Hospital. Prerequisite: Medicine 33. Arranged. Dr. Hamilton and staff.
123. Pathology of the Nervous System. The anatomy and pathology of the nervous system and their correlation with clinical signs and symptoms. Not less than 5 students. Same as Pathology 111. Carry soph. honor point credit. Dr. McKinley.
124. Advanced Neuropathology. Individual gross and microscopic studies on existing preparations in neuropathology. Limited to two students. Prerequisite: Pathology 101 and 102. Dr. McKinley.
125. Problems in Neuropathology. The student will be assigned a topic for special study. Limited to 2 students. Prerequisite: Pathology 102. Dr. McKinley.
126. Clinical Assistantship, in nervous and mental diseases in the Out-Patient Department. Sixth year. Open to two students. Dr. Michael, Dr. McKinley.

### DIVISION OF DERMATOLOGY

#### REQUIRED COURSES

- 46w. Course in Dermatology. Clinical lectures upon the common skin diseases and syphilis, including diagnosis and treatment. Fifth year. 33 hours. Dr. Michelson, Dr. Butler, Dr. Irvine.
- 47su,f,w,s. Physical Diagnosis and Therapy. Section of the class in dermatology and syphilis, in the Dispensary; part of Course 27. Dr. Butler, Dr. Irvine, Dr. Michelson, Dr. G. M. Olson.

#### ELECTIVE COURSES

91. Night Clinics in Dermatology and Syphilis in the Out-Patient Department. Open to six students in clerkship division in each quarter. Dr. Michelson.
92. Ward Clinics in Dermatology. Conducted in City and County Hospital, St. Paul. Limited to six students. Dr. Freeman.
150. Histopathology of the Skin. Clinical and pathologic phases will be exemplified. Prerequisite: Pathology 102. Same as Pathology 110. Dr. Michelson.
151. Assistantship in Dermatology, in the Out-Patient Department. Open to two students in each quarter. Dr. Butler, Dr. Irvine, Dr. Michelson, Dr. G. M. Olson.

## OBSTETRICS AND GYNECOLOGY

Departmental Office, Institute of Anatomy

## REQUIRED COURSES

1. Obstetric Nursing. Dr. Litzenberg and others.
2. Gynecologic Nursing. Dr. Litzenberg and others.
- 20su,f. Obstetrics. The physiology of pregnancy, labor, and the puerperium. Fifth year medical students. 33 hours. Dr. Litzenberg, Dr. Adair, Dr. Condit.
- 21f,w. Obstetrics. The pathology of pregnancy, labor, and the puerperium. Prerequisite: Course 20. Fifth year medical students. 33 hours. Dr. Litzenberg, Dr. Adair, Dr. Condit.
- 22su,s. Operative Obstetrics. A study of operative obstetrics. Prerequisites: Courses 20 and 21. 11 hours. Dr. Adair, Dr. LaVake.
- 23su,f. Gynecology. A study of diagnostic methods in diseases of women. Fifth year medical students. 11 hours. Dr. Litzenberg, Dr. Barry.
- 24w. Gynecology. A study of diseases of women. Prerequisite: Course 23. 22 hours. Dr. Litzenberg, Dr. Barry, Dr. Condit.
- 25su,f,w,s. Obstetrics and Gynecology Clinic. The pathology of pregnancy, labor, and the puerperium, and of diseases of women. Prerequisites: Courses 20, 21, 22, 23, 24. Required of seniors during two quarters; elective for others. 44 hours. Dr. Litzenberg, Dr. Condit, Dr. Wynne.
- 26su,f,w,s. Clinical Clerkship in Obstetrics and Gynecology. Study of assigned patients in University Hospital and out-patient service in "The District" and Salvation Army Home; case histories; physical examinations, laboratory examinations; parturition clinics; operations; manikin demonstrations and bedside clinics. 65 hours. Dr. Litzenberg and associates.
- 26xsu,f,w,s. Same as 26 at Minneapolis General Hospital. Dr. Adair and associates.
- 27su,f,w,s. Clinics in Obstetrics and Gynecology. University Dispensary. Part of required section clinics, clerkship period. 25 hours. Dr. LaVake and associates.
- 28su,f,w,s. Clinics in Obstetrics and Gynecology. Conducted in the Minneapolis General Hospital. Fifth year, certain sections. 17 hours. Dr. Adair and associates.
- 28xsu,f,w,s. Same as Course 28. Fifth year, certain sections. Ancker Hospital, St. Paul. Dr. Barry, Dr. Hammond, Dr. Schulze.
- 29su,f,w,s. Clinic in Obstetrics and Gynecology. Minneapolis General Hospital Dispensary. Sixth year, 12 hours. Dr. LaVake, Dr. Maland, Dr. Simons, Dr. Dornblaser, Dr. Willcutt.

## ELECTIVE COURSES\*

50. Gynecologic Clinic. Diagnosis and treatment of diseases of women. Wilder Dispensary, St. Paul. Four students. Dr. Barry, Dr. Bicek.

\* Elective courses in this department are usually repeated each quarter. See quarterly programs for hours and credits.

51. Gynecologic Clinic. Diagnostic and operative clinic in diseases of women. Ancker Hospital, St. Paul. Dr. Barry, Dr. Hammond.
52. Obstetric Clinic. The diagnosis and treatment of obstetric conditions. Ancker Hospital, St. Paul. Dr. Barry, Dr. Schulze.
53. Clinics in Obstetrics and Gynecology. Minneapolis General Hospital. Dr. Adair, Dr. LaVake, Dr. Maland, Dr. Simons, Dr. Souba, Dr. Dornblaser, Dr. Willcutt.
54. Applied Anatomy of the Pelvis. The anatomy of the female generative organs using anatomical specimens, models, and the patient for demonstration. University Dispensary. Dr. LaVake.
55. Prenatal Clinics. Antepartum care of pregnant women at the various prenatal stations: limited to one student at each station. Dr. Simons, Dr. Maland.
56. Pathologic Obstetrics. Minneapolis General Hospital. Demonstration of abnormal obstetric cases and operative procedure. One clinic each week. Limited to six senior students. Dr. Adair.
57. Operative Gynecology. Demonstrations of gynecological operations and post-operative treatment. Limited to six senior students. Dr. Adair.
58. Gynecologic Clinics. Bedside clinics. Ancker Hospital, St. Paul. Dr. Barry, Dr. Hammond.
201. Advanced Obstetrics and Gynecology. Required of first year fellows. Dr. Litzenberg, Dr. Adair, and associates.
202. More advanced subjects. Required of second year fellows. Dr. Litzenberg, Dr. Adair, and associates.
203. Still more advanced. Third year fellows. Dr. Litzenberg, Dr. Adair, and associates.
204. Seminar. A weekly conference for fellows and graduate students. Dr. Litzenberg.
205. Research. Clinical and laboratory research upon problems in obstetrics and gynecology. Required of third year fellows, who must complete a satisfactory thesis during the year. Staff.

## OPHTHALMOLOGY AND OTO-LARYNGOLOGY

Departmental Office, Millard Hall

### REQUIRED COURSES

- 20w. Ophthalmology. Lectures and demonstrations. Fifth year. 18 hours. Dr. Murray.
- 21w,s. Laryngology and Rhinology. Lectures and demonstrations. Fifth year. 15 hours. Dr. Murray.
- 22s. Otology. Lectures and demonstrations. Fifth year. 11 hours. Dr. Newhart.

- 23su,f,w,s. Clinic in Diseases of the Eye. Diagnosis and treatment of cases, University Dispensary; part of required section clinics, clerkship period, 30 hours. Dr. Clark, Dr. Macnie, and assistants.
- 24su,f,w,s. Clinic in Diseases of the Ear. Diagnosis and treatment of cases, University Dispensary; part of required section clinics, clerkship period. 30 hours. Dr. Newhart and assistants.
- 25su,f,w,s. Clinic in Diseases of the Nose and Throat. Diagnosis and treatment, University Dispensary; part of required section clinics; clerkship period. 30 hours. Dr. Patterson, Dr. F. J. Pratt, Dr. J. A. Pratt, and assistants.

## ELECTIVE COURSES\*

50. Clinic in Diseases of the Eye. The examination of patients, diagnosis, and supervised treatment. Credit 50 hours. MWF or TThS. 1-2:30. University Dispensary. Dr. Clark, Dr. Macnie, and assistants.
51. Clinic in Diseases of the Ear. Studies in examination of cases, diagnosis, and supervised treatment. Credit 50 hours. MWF or TThS. 1-2:30. University Dispensary. Dr. Newhart and assistants.
52. Clinic in Diseases of the Nose and Throat. The examination of patients, diagnosis and supervised treatment. Credit 50 hours. MWF or TThS. 1-2:30. University Dispensary. Dr. Patterson, Dr. F. J. Pratt, and assistants.
53. Clinic in Diseases of the Eye. TThS. 1-2:30. Wilder Dispensary, St. Paul. Credit 50 hours. Dr. Burch and assistants.
54. Clinic in Diseases of the Ear. TThS. 1-2:30. Wilder Dispensary, St. Paul. Credits 50 hours. Dr. Connor and assistants.
55. Clinic in Diseases of Nose and Throat. TThS. 1-2:30. Wilder Dispensary, St. Paul. Credit 50 hours. Dr. Connor.
121. Operative Clinics in Eye, Ear, Nose, and Throat. University Hospital. Limited to ten students. Credit 22 hours. Dr. Murray, Dr. Clark.

## PEDIATRICS

Departmental Office, Millard Hall

## REQUIRED COURSES

- 20s. Physical Diagnosis in Children. A study of special diagnostic methods applied to pediatrics. Conducted in sections of fourth year class. 11 hours. Dr. \_\_\_\_\_
- 21w-22s. Diseases of Children. Diseases peculiar to, or distinctive of, children. Fifth year. 55 hours. Dr. Schlutz and others.
- 23f,w,s,su. Clinic in Pediatrics. Conducted at Ancker Hospital, St. Paul. Fifth year. One division each quarter, in sections. 17 hours. Dr. Christison, Dr. Ramsey, and others.
- 24f,w,s,su. Clinic in Contagious Diseases. Conducted in the Minneapolis General Hospital. Sections of one division each quarter. Fifth year. 17 hours. Dr. Seham and assistants.

\* Usually repeated each quarter.

- 24xf,w,s,su. Same as 24. Ancker Hospital, St. Paul. Dr. Christison and assistants.
- 26f,w,s,su. Out-Patient Pediatric Clinic. The practical study of the diseases of children. Sections of senior class. 50 hours. Dr. Seham, Dr. Stewart, Dr. Pearce, Dr. Taylor, Dr. Swanson, and assistants.
- 27f,w,s,su. Clinical Clerkship in Pediatrics. The observation and study of patients in the University Hospital; case histories; physical examinations and provisional diagnoses; treatment. One division of senior class each quarter. Each student, six weeks. 65 hours. Dr. Schlutz, Dr. Richdorf, and staff.
- 27xf,w,s,su. Same as 27 at Minneapolis General Hospital. Dr. Huenekens and others.
- 28f,w,s,su. Infant Welfare Clinic. Required of sections of one division of senior class each quarter. 5 hours. Northeast Neighborhood House, Dr. Platou. South Town Clinic, Dr. Lippman.
- 29f,w,s,su. Class Clinic in Pediatrics. Required of one division of senior class each quarter; elective for others as No. 51. 11 hours. Dr. Schlutz and others.

## ELECTIVE COURSES\*

51. Class Clinic. Same as 29; elective for juniors and seniors not in pediatric clerkship. 11 hours each quarter. Dr. Schlutz and others.
52. Diseases of the New-Born. The pathology and treatment of these disorders. Dr. Rodda, Dr. Stewart, and others.
53. Contagious Diseases. The advanced study of contagious diseases, including the practice of intubation and tracheotomy, with training upon the cadaver. Dr. Huenekens, Dr. Platou.
54. Pediatric Clinic. Out-Patient Department. Dr. Seham.
55. Course in Infant-Feeding. Conducted at various places. Dr. Ramsey, Dr. Stewart, Dr. Anderson, Dr. Moriarty, Dr. Shannon, Dr. Sansby.
56. Theory and Practice of Infant-Feeding. Including a study of diseases of the gastro-intestinal tract. Limited to six students. Dr. Huenekens.
57. Clinics in Pediatrics. Conducted at the University Hospital. Dr. Rodda.
58. Clinics in Pediatrics. Conducted at Minneapolis General Hospital. Dr. Huenekens.
59. General Pediatrics Including Skin Diseases. 2 to 8 students. 33 hours credit. Wilder Dispensary. Dr. Klein, Dr. Warner, Dr. Christison, Dr. Colby.
60. Diseases of the Heart. Seniors only. 2 students. 16 hours credit. Lymanhurst Hospital. Dr. Seham.
122. Pathology of the Diseases of Children. Given in conjunction with the Department of Pathology. Dr. Shannon.
- 200f,w,s,su. Advanced Study of Diseases of Infants and Children.

\* Electives in pediatrics usually repeated each quarter. See Medical School quarterly program.



- 202f,w,s,su. Research in Diseases of New-Born.  
 204f,w,s,su. Research in Physiology of New-Born.  
 206f,w,s,su. Research in Diseases of Infants and Growing Children.  
 208f,w,s,su. Research in Physiology of Infants and Growing Children.  
 210f,w,s,su. Research in Anatomy of Infants and Growing Children.

## DEPARTMENT OF SURGERY

## REQUIRED COURSES

- 20f. Bandaging. Instruction and practice. Fourth year. 11 hours. Pre-requisite: Gross Anatomy. Dr. Dunn, Dr. Zierold.  
 21su,f. Principles of Surgery. A study of the various surgical inflammations and processes; pathology and treatment. Principles underlying general surgical procedures. Lectures and demonstrations. Fifth year. 33 hours.  
 22f. General Surgery. The diseases and injuries of tendons, fasciae, bursae, blood vessels, nerves, brain, and meninges. Lectures and demonstrations. Fifth year. 33 hours. Dr. Law.  
 23w-24s. Regional Surgery. The practical surgery of the anatomical regions of the body; head, neck, thorax, abdomen, and extremities. Lectures and demonstrations. Fifth year. 44 hours. Dr. Strachauer, Dr. Lerche, Dr. Ritchie, Dr. Wilcox.  
 25s. Fractures and Dislocations. Lectures and demonstrations. Sixth year. 22 hours. Dr. Law, Dr. Daugherty.  
 26su,w. Diagnostic Clinic. A series of clinics on the diagnosis of surgical conditions as presented in the Out-Patient Department. 22 hours to each division. Dr. Johnson.  
 27su,f,w,s. Diagnostic Clinics. Sections of fifth year class; part of required clinics. 17 hours. Ancker Hospital. Dr. Colvin, Dr. Zimmerman, Dr. Abbott, Dr. Jones.  
 28su,f,w,s. Clinical Clerkships. 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 post-operative management. Practical instruction in anesthesia. 200 hours. University Hospital. Staff.  
 28xsu,f,w,s. Same as 28 at Minneapolis General Hospital. Dr. Zierold and staff.  
 29su,f,w,s. Minor Surgery Clinics. Sections daily in the Out-Patient Department; a part of required clinics. 30 hours. Dr. Johnson, Dr. McKinley, Dr. Hayes, Dr. Bratrud.

## ORTHOPEDIA

## REQUIRED COURSES

- 40f,w,s. Orthopedic Surgery. A course of clinical lectures, demonstrations, and operations conducted in each quarter, with divisions of the junior class, at the Hospital for Crippled and Deformed Children, Phalen Park. 22 hours. Dr. Chatterton, Dr. Cole.

- 41su,f,w,s. Orthopedic Clinic. A study of orthopedic conditions and treatment, conducted in the Out-Patient Department; a part of required section clinics. 11 hours. Dr. Giessler, Dr. Henry.
- 42f,s. Orthopedic Surgery. A course of lectures covering orthopedic conditions in the adult; lantern slides and demonstrations. 11 hours. Dr. Geist, Dr. Reed.

## UROLOGY

## REQUIRED COURSES

- 46w. Genito-Urinary Diseases. The etiology, diagnosis, and treatment of this group of diseases. A course of lectures. Sixth year. 18 hours. Dr. F. R. Wright.
- 47su,f,w,s. Genito-Urinary Clinic. The observation, examination, and treatment of patients in the Out-Patient Department; a part of required section clinics. 30 hours. Dr. Thomas, Dr. Kremer, Dr. Wethall.

## ELECTIVE COURSES\*

51. Minor Surgery. Clinical course conducted in the Out-Patient Department. Dr. Johnson, Dr. Bratrud, Dr. Hayes, Dr. McKinney.
52. Cadaver Surgery. The technic and performance of the various standard operations upon the cadaver.
53. Animal Surgery. A course which offers instruction in the technique of the operating room. Dr. Joannides.
54. Proctology. A clinical course conducted in the Out-Patient Department. Dr. Fansler.
55. Diagnostic and Operative Clinics. Conducted at the University Hospital. Dr. Strachauer, Dr. Law, Dr. Ritchie, Dr. Johnson, Dr. Dunn.
56. Diagnostic and Operative Clinics. Conducted at the Minneapolis General Hospital. Dr. Corbett, Dr. Wilcox, Dr. F. A. Olson, Dr. Robitshek, Dr. Zierold.
57. Diagnostic and Operative Clinics. Conducted at the Ancker Hospital. Dr. Colvin, Dr. Zimmerman, Dr. Abbott, Dr. Jones.
58. Extraction of Teeth. Course conducted at the College of Dentistry. Dr. Griffith.
59. Genito-Urinary Clinic. Held at the University Hospital and Out-Patient Department. Dr. Thomas, Dr. Kremer, Dr. Wethall.
60. Urologic Clinic. Conducted at the Minneapolis General Hospital. Dr. Owre, Dr. Kremer.
61. Orthopedic Clinic. Conducted in the Out-Patient Department. Dr. Giessler.
62. Advanced Clerkship in Surgery. Sixth year. Arranged. Staff.
114. Urologic Diagnosis and Cystoscopy. A course conducted at the University Hospital. Hours and credits arranged. Dr. Thomas.
- 201w,s. The Surgery of the Kidney. A review of the embryology, anatomy, and pathology. Diagnosis; cystoscopic study, including kidney function

\* Usually repeated each quarter.

estimation and pyelography. Operative technique. Studies of special problems. Dr. Strachauer.

204w,s. The Surgery of the Brain and Spinal Cord. Operative technique. Studies of special problems. Prerequisites: Anatomy 103, Medicine 125. Dr. Strachauer.

### HOSPITAL DEPARTMENT

#### DIVISION OF NURSING INSTRUCTION\*

##### PRINCIPLES OF NURSING

1f,w,s,su. History of Nursing. Eleven hours. Miss Baker.

2f,w,s,su. Nursing Ethics. 11 hours. Miss Vannier.

3f,w,s,su. Personal Hygiene. Eleven hours.

##### HOSPITAL ECONOMICS

5f,w,s,su. A Study of Hospitals and Hospital Departments. Eleven hours. Miss Coloton.

##### PRACTICAL DIETETICS

10f,w,s,su. Foodstuffs. Eleven hours. Miss Thomas.

11f,w,s,su. The Preparation of Food. Forty-eight hours.

##### PRINCIPLES AND PRACTICE OF NURSING

15-21f,w,s,su. Courses of lectures, demonstrations, and practical exercises. Eighty hours.

15. The Environment of the Patient.

16. Admission and General Care of the Patient.

17. Observation and Examination of the Patient.

18. Methods and Mechanisms of Treatment.

19. The Preparation of Patients for Operation.

20. Medicines.

21. Infectious Diseases.

#### DIVISION OF HOSPITAL DENTISTRY

50f,w,s. Hospital Dental Practice. Practical hospital dentistry in the University Hospital, University Dispensary, and Minneapolis General Hospital, in oral surgery, periodontia, and diagnosis, giving emphasis to the systemic relationship in oral disease and its treatment. For students of medicine or dentistry. Hours and credits arranged. Dr. Grey, Dr. Hillman, Dr. C. J. Olson, Dr. Swanson, Dr. D. R. Clark, Dr. Epstein, Dr. Levin, Dr. Lilja, Dr. Lindig, Dr. Roach, Dr. Ziskin.

#### DIVISION OF HOSPITAL SOCIAL SERVICE

60f,w,s,su. The Principles and Practice of Hospital Social Service. History and development of the movement; principles underlying the work; functions; relationships to medical, social, and public health field. Lectures and field work. 2-4 credits. Hours arranged. Miss Tebbets, Miss Smith, and assistants.

\* See Nursing School bulletin for description of courses.

- 61f,w,s,su. Field Work. Practical work available through Hospital Social Service Department for students in specialized fields. Includes lectures, social and medical; clinic observation and work with patients in their homes. Limited to groups of eight in a given field. 3 credits. Th VI, VII, VIII, and three hours to be arranged. Miss Tebbets, Miss Smith, and assistants.
- 62s. Relationships of the Medical Social Worker. To the patient, to the physician, to the hospital, to the nurse, to social agencies, to the community. 1 credit. Hours arranged. Miss Tebbets.
- 63s. Occupational Therapy. History, development, and relationships; institutional values; remedial aspects for patients; the influence of vocational rehabilitation. The therapeutic value of reading. 1 credit. Hours arranged. Miss Tebbets, Dr. Mariette, and others.
- 64s. Hospitals and Hospital Economics. Types of hospitals; hospital management; budgetary relations; hospital working group; organization and ethics. 1 credit. Hours arranged. Miss Tebbets.

#### DIVISION OF ROENTGENOLOGY

- 79su,w. Roentgenology. Lectures and plate-reading. Sixth year medical students. 11 hours. Dr. Allison.
80. Plate-Reading. Arrange hours and credit.
81. X-ray Technique. Arrange hours and credit.
82. X-ray Therapy. Arrange hours and credit.

#### MILITARY SCIENCE AND TACTICS, R.O.T.C.

This department contributes elective courses to the Medical School and leads to a certificate of proficiency in military science and tactics—medical, which qualifies for appointment and commission in the Officers' Reserve Corps, U.S. Army.

- B-1f,w,s. Elements of Military Science. An introductory course to familiarize the student with the more necessary fundamentals of military science and organization of the medical department. For freshmen only. 33 hours; 3 credits. Col. Rutherford.
- B-2s. Medical Tactics. A theoretic course in organization and tactics, preparatory for training in camp. For sophomores only. 33 hours; 3 credits. Col. Rutherford.
- A-1w. Military Hygiene and Sanitation. A theoretic course in the essentials of military hygiene and sanitation, to supplement the practical training in camp and in the Department of Public Health and Preventive Medicine. For juniors only. 33 hours; 3 credits. Col. Rutherford.
- A-2f. Medical Administration. A theoretic and practical course in medico-military administration, with special reference to hospitals and hospitalization methods. For seniors only. 33 hours; 3 credits. Col. Rutherford.

A-Csu. Field Service. A practical course at an army camp in hygiene and sanitation, medical tactics, administration, drill and command, of six weeks duration. Summer quarter following sophomore year. 180 hours. Col. Rutherford.

THE SCHOOL OF CHEMISTRY  
DEPARTMENT OF PHYSICAL CHEMISTRY

(Required course in the Medical School)

143f,w. Physical Chemistry. Designed chiefly for medical and biological students. Four credits. Prerequisite: 32.

For other courses in chemistry which may be elected for credit in the Medical School see bulletin of the School of Chemistry.

AGRICULTURAL BIOCHEMISTRY

(Contributing elective courses to the Medical School)

111-112. Phytochemistry. Advanced course dealing with the colloidal state, and the chemistry of proteins, carbohydrates, glucosides, tannins, fats, plant acids, enzymes, and pigments, and their physicochemical relations to the vital processes involved in growth and nutrition. Prerequisites: organic chemistry and animal biology (1 year). Three credits each quarter. Mr. Gortner.

113-114-115. Biochemical Laboratory Methods. A laboratory course paralleling the lectures in 111-112, using recent methods for the investigation of biologically important compounds, with especial reference to the detection and estimation of such compounds in cells or tissues. Prerequisite: Quantitative Analysis, parallel 111-112. Two credits each quarter. Mr. Morrow.

116w. Advanced Animal Nutrition. Lectures and assigned readings on recent developments in animal nutrition, covering the field of proteins, mineral metabolism, vitamins, and the relation of nutrition to disease. Dr. Palmer, Dr. Kennedy.

206f. Colloids. Lectures dealing with the colloidal state, the preparation and properties of colloidal solutions, and the relation of these to biochemical processes. Prerequisites: Course 111-112, or Physical Chemistry. Three credits. Dr. Gortner.

207f. Enzymes. Lectures dealing with the nature of enzyme action, including methods of preparation and investigation of enzymes, their physical and chemical properties and their methods of action. Prerequisites: Course 111-112, or physiologic chemistry. Three credits. Dr. Willaman.

208w. Proteins. Lectures on the composition, structure, biochemical reactions, and functions of the protein and amino acids, with special

emphasis upon those which are concerned in plant growth and metabolism, animal food, and industrial processes. Prerequisite: Course 111-112, or advanced organic chemistry. Three credits. Dr. Gortner.

#### DEPARTMENT OF ANIMAL BIOLOGY

(Contributing elective courses to the Medical School)

- 44f.s. Animal Parasites and Parasitism. An introductory course treating of the origin and biological significance of parasitism and of the structure, life history, and economic relations of parasites exclusive of the insects. Dr. Riley.
- 45w. Relation of Insects to Disease. The causation and transmission of disease by insects and other arthropods. Life history, habits, and methods of control of homonoxious species. Dr. Riley.
- 107s. Protozoology. Lectures, reference, and laboratory work on the structure and life history of Protozoa. Special reference is paid to the relations of the Protozoa to disease of animals. Dr. Sigerfoos.
- 144f-145w-146s. Animal Parasites and Parasitism. Lectures and laboratory work. Origin and biological significance of parasitism, and the structure, life history, and economic relations of representative parasites. Second term devoted primarily to relations of insects to diseases of man and animal. Dr. Riley.
- 153f-154w-155s. Hematology. Primarily for medical students, but open to others with proper qualifications. Lectures and laboratory work on the blood and blood-forming organs of man and mammals. Dr. Downey.
- 181f-182w. Embryology. A survey of the principles of animal development and a detailed study of the development of the circulatory or urino-genital system of a vertebrate. Lectures, reference, and laboratory work. Arranged.
183. Genetics and Eugenics. Facts and theories of heredity and application to man. Arranged.
- See also Course 11 (Cytology), 17, 18, 19, 109, 110, 111.

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

*The School of Nursing*  
*Announcement for the Years*  
**1925-1927**



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# UNIVERSITY CALENDAR

1925-26

## FALL QUARTER

September	17	Thursday	Payment of fees closes, except for new students
September	17-19		Entrance examinations
September	21-25		Examination, for removal of conditions Physical examinations for all new students
September	24-25		Registration period, <sup>2</sup> colleges of Science, Literature, and the Arts, and Education Registration days <sup>2</sup> for all colleges not included above
September	25	Friday	Payment of fees for new students closes
September	28	Monday	Fall quarter begins, 8:30 <sup>1</sup> a.m. First semester extension classes <sup>3</sup> begin
October	15	Thursday	Senate meeting, 4:30 p.m.
November	11	Wednesday	Armistice Day; a holiday
November	14	Saturday	Homecoming Day
November	26	Thursday	Thanksgiving Day; a holiday
December	3	Thursday	State Day Convocation
December	16-19		Final examination period
December	17	Thursday	Commencement Convocation Senate meeting, 4:30 p.m.
December	19	Saturday	Fall quarter ends. Christmas vacation begins, 5:20 p.m.
December	23	Wednesday	Payment of fees closes for all students in residence fall quarter <sup>4</sup>

## WINTER QUARTER

December	28-30		Entrance examinations
December	31	Thursday	} Registration days for new students in all colleges
January	2	Saturday	
January	4	Monday	Christmas vacation ends, winter quarter begins, 8:30 <sup>1</sup> a.m.
January	30	Saturday	First semester extension classes close
February	1	Monday	Second semester extension classes begin
February	12	Friday	Lincoln's Birthday; a holiday
February	18	Thursday	Charter Day Convocation Senate meeting, 4:30 p.m.
February	22	Monday	Washington's Birthday; a holiday
March	17-20		Final examination period
March	18	Thursday	Payment of fees closes for all students in residence winter quarter <sup>4</sup>
March	20	Saturday	Winter quarter ends, spring vacation begins, 5:20 p.m.



SPRING QUARTER

March	22-24		Entrance examinations
March	26-27		Registration days for new students in all colleges
March	29	Monday	Spring vacation ends, spring quarter begins, 8:30 <sup>1</sup> a.m.
April	2	Friday	Good Friday; a holiday
May	13	Thursday	Cap and Gown Day Convocation
May	20	Thursday	Senate meeting, 4:30 p.m.
May	29	Saturday	Second semester extension classes close
May	31	Monday	A holiday (May 30, Sunday, Memorial Day)
June	9-12		Final examination period
June	12	Saturday	Spring quarter closes, 5:20 p.m.
June	13	Sunday	Baccalaureate service
June	14	Monday	Fifty-fourth annual commencement

SUMMER SESSION

June	18-19		Summer Session first term begins, registration and payment of fees
June	21	Monday	Classes begin, 8:00 a.m.
July	31	Saturday	Registration and payment of fees for second term closes
			First term Summer Session closes
August	2	Monday	Second term classes begin
September	4	Saturday	Second term Summer Session closes

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

<sup>2</sup> Registration subsequent to the date specified will necessitate the approval of the college concerned. The penalty fee for late registration, late change of registration, or late payment of fees is two dollars (\$2) with one dollar (\$1) additional for each day of delay after classes begin, provided that no student shall pay more than twelve dollars (\$12) of penalty in any given quarter.

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 and peculiar circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

<sup>3</sup> This date does not refer to correspondence study courses which may be started at any time during the year.

<sup>4</sup> New students must pay fees on dates announced for registration.

## THE SCHOOL OF NURSING

MARION L. VANNIER, R.N., Director

From the date of its organization in 1909 to the year 1921, the School of Nursing of the University of Minnesota, the pioneer in the movement toward the university education of the nurse, had a slow, steady growth, the comparatively small capacity of its teaching hospital limiting its possibilities of practical instruction to a comparatively small body of students.

In the year 1921, overtures were made to the University by the Charles T. Miller Hospital, of St. Paul, with a capacity of 200 beds; by the Minneapolis General Hospital, with approximately 750 beds; and by the Northern Pacific Beneficial Association Hospital, with 200 beds, to entrust to the University the education of their students and to place their nursing services, together with that of the University Hospital, at the command of the school as the practical laboratories for the more complete and varied training of students in larger numbers. These overtures were accepted by the Board of Regents of the University of Minnesota and the greater School of Nursing was organized something over two years ago. Since that time its registration has materially increased and bids fair to grow greatly during the ensuing year.

A class is entered in fall and spring quarters. Students may be not less than eighteen years of age, but must evidence sufficient maturity. While the stated requirement for admission is a four-year high school course, or its equivalent in the required high school subjects, the school invites to its matriculation women of superior education and of large, earnest purpose.

The course of study in the School of Nursing covers a period of three years. The first two quarters are devoted to preliminary courses of instruction under special matriculation fees. These studies are conducted in the science departments of the Medical School, the Department of Physical Education, the Department of Drawing and Descriptive Geometry in the College of Engineering, and the associated hospitals. All courses are conducted by members of the university faculty. Examinations are held at the close of each quarter and must be satisfactorily passed to permit of advancement.

In the second quarter of the preliminary period, students are admitted to one or another of the associated hospitals for practical training in nursing service.

Upon the successful completion of the preliminary course, and with due consideration of their general fitness, students are admitted to the full hospital services. In the succeeding two and one-half years a graded system of hospital education is conducted, during which the students serve in the various departments of nursing service afforded by the associated hospitals and in the University and General Hospital dispensaries.

Undergraduate courses of lectures, recitations, and demonstrations are given by members of the university faculty in each department, including the superintendents of, and instructors in, nursing in each of the associated

hospitals, who also have faculty rank. At the close of each quarter, examinations are held in both practical and theoretical work.

In the encouragement of a still higher measure of education for students of nursing, the University offers a combined course in the College of Science, Literature, and the Arts and the School of Nursing, covering a period of five years and leading to the joint degrees of bachelor of science and graduate in nursing. It is confidently expected that, within a near time, this combined course will become the principal feeder of the School of Nursing, giving its students, as it does, larger preparation for the higher fields of nursing service.

In co-operation with the Department of Preventive Medicine and Public Health the School of Nursing assists in conducting courses in Public Health Nursing and, with the similar co-operation of the College of Education, courses in Nursing Education.

## THE MEDICAL SCHOOL

The School of Nursing is under the control of the Medical School through its Administrative Board. The director of the school is responsible to the dean of the Medical School.

### THE ADMINISTRATIVE BOARD

- Lotus Delta Coffman, Ph.D., LL.D., President  
Elias P. Lyon, Ph.D., M.D., LL.D., Dean of the Medical School and  
Director of the Department of Physiology  
Louis B. Baldwin, M.D., Superintendent of the University Hospital  
Clarence M. Jackson, M.S., M.D., LL.D., Director of the Department of  
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Arthur D. Hirschfelder, B.S., M.D., Director of the Department of  
Pharmacology  
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Winford P. Larson, M.D., Director of the Department of Bacteriology and  
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S. Marx White, B.S., M.D., F.A.C.S., Chief of the Department of Medicine  
Jennings C. Litzenberg, B.S., M.D., F.A.C.S., Chief of the Department of  
Obstetrics and Gynecology  
Frederic W. Schlutz, B.A., M.D., Chief of the Department of Pediatrics  
William R. Murray, Ph.B., M.D., F.A.C.S., Chief of the Department of  
Ophthalmology and Oto-Laryngology  
Arthur S. Hamilton, B.S., M.D., Chief of the Division of Nervous and  
Mental Diseases, Member-elect Representing the Faculty  
Arthur T. Henrici, M.D., Member-elect Representing the Faculty  
Harold S. Diehl, M.A., M.D., Director of University Health Service and  
of the Department of Preventive Medicine and Public Health

## THE SCHOOL OF NURSING

Marion L. Vannier, R.N., Director of the School, Associate Professor  
of Nursing

### CORPS OF OFFICERS AND INSTRUCTORS IN THE ASSOCIATED HOSPITALS\*

- Dorothy S. Kurtzman, R.N., Superintendent of Nurses (a) and Assistant  
Professor of Nursing  
Bessie Baker, R.N., B.S., Superintendent of Nurses (b) and Assistant  
Professor of Nursing  
Katherine E. Dougherty, R.N., Superintendent of Nurses (c) and Assistant  
Professor of Nursing

\* The following letters serve as index to the particular hospital in which the instructor serves: (a) The University Hospital; (b) The Charles T. Miller Hospital; (c) The Minneapolis General Hospital; (d) The Northern Pacific Beneficial Association Hospital.

Orlena Ordahl, R.N., Superintendent of Nurses (d) and Assistant Professor of Nursing  
 Mae E. Coloton, R.N., Assistant Superintendent of Nurses (a) and Instructor in Nursing  
 Lana Babcock, R.N., Assistant Superintendent of Nurses (b)  
 Helen Irene Erickson, R.N., Assistant Superintendent of Nurses (c) and Instructor in Nursing  
 Barbara A. Thompson, R.N., Assistant Superintendent of Nurses and Instructor in Nursing (a)  
 M. Frances Madigan, R.N., B.S., Instructor in Nursing (c)  
 Corah V. Lund, R.N., B.A., Instructor in Nursing (d)  
 Gertrude I. Thomas, Instructor in Theory and Practice of Dietetics (a)  
 Elsie W. Martin, B.A., Instructor in Dietetics (b)  
 Marion M. Stewart, Instructor in Dietetics (d)

## MEDICAL TEACHING STAFF

Fred L. Adair, B.S., M.A., M.D., F.A.C.S., Associate Professor of Obstetrics and Gynecology  
 Robert G. Allison, M.D., Assistant Professor of Roentgenology  
 Moses Barron, B.S., M.D., Assistant Professor of Medicine  
 Lee W. Barry, M.D., Ph.D., Assistant Professor of Obstetrics and Gynecology  
 Archibald H. Beard, B.A., M.D., F.A.C.P., Assistant Professor of Medicine  
 Richard O. Beard, M.D., Professor of Physiology, Emeritus  
 Frank E. Burch, M.D., F.A.C.S., Associate Professor of Ophthalmology and Oto-Laryngology  
 John Butler, M.D., Associate Professor of Dermatology  
 James T. Christison, M.D., Associate Professor of Pediatrics  
 Howard C. Clark, B.S., M.D., F.A.C.S., Assistant Professor of Ophthalmology and Oto-Laryngology  
 Harold S. Diehl, M.A., M.D., Director of University Health Service and Assistant Professor of Preventive Medicine and Public Health  
 Charles D. Freeman, M.D., Assistant Professor of Dermatology  
 James S. Gilfillan, M.D., Associate Professor of Medicine  
 Esther M. Greisheimer, Ph.D., M.D., Assistant Professor of Physiology  
 William A. Grey, D.D.S., Assistant Professor of Oral Surgery; Chairman of Group in Hospital Dentistry  
 Alexander R. Hall, M.D., C.M., M.R.C.S., L.R.C.P., Assistant Professor of Medicine  
 Arthur S. Hamilton, B.S., M.D., Professor of Nervous and Mental Diseases, in charge of Division of Nervous and Mental Diseases  
 Ernest M. Hammes, M.D., Associate Professor of Nervous and Mental Diseases  
 Thomas B. Hartzell, D.D.M., M.D., Research Professor of Mouth Infections  
 Arthur D. Hirschfelder, B.S., M.D., Professor of Pharmacology and Director of the Department of Pharmacology  
 Edgar J. Huenekens, B.A., M.D., Assistant Professor of Pediatrics

- Clarence M. Jackson, M.S., M.D., LL.D., Professor of Anatomy and  
Director of the Department of Anatomy
- James A. Johnson, M.D., F.A.C.S., Assistant Professor of Surgery
- William H. Kirchner, B.S., Professor of Drawing and Descriptive  
Geometry
- Winford P. Larson, M.D., Professor of Bacteriology and Immunology and  
Director of the Department of Bacteriology and Immunology
- Jennings C. Litzenberg, B.S., M.D., F.A.C.S., Professor of Obstetrics and  
Gynecology and Chief of the Department of Obstetrics and Gynecology
- Elias P. Lyon, Ph.D., M.D., LL.D., Dean of the Medical School, Professor  
of Physiology, and Director of the Department of Physiology
- Chauncey A. McKinlay, B.A., M.D., Assistant Professor of Medicine
- J. Charnley McKinley, M.D., Ph.D., Associate Professor of Neurology
- Arthur T. Mann, B.S., M.D., F.A.C.S., Associate Professor of Surgery
- Joseph C. Michael, B.S., M.D., Assistant Professor of Nervous and Mental  
Diseases
- Ernest S. Mariette, B.S., M.D., Assistant Professor of Medicine
- Henry E. Michelson, B.S., M.D., Associate Professor of Dermatology and  
Syphilis
- Angus W. Morrison, B.A., M.D., Associate Professor of Nervous and  
Mental Diseases
- William R. Murray, Ph.B., M.D., F.A.C.S., Professor of Ophthalmology  
and Oto-Laryngology and Chief of the Department of Ophthalmology  
and Oto-Laryngology
- Jay A. Myers, Ph.D., M.D., Assistant Professor of Preventive Medicine  
and Public Health
- J. Anna Norris, M.D., Professor of Physical Education for Women and  
Director of Health and Physical Education for Women
- George M. Olson, M.D., Assistant Professor of Dermatology and Syphilis
- Naboth O. Pearce, M.D., Assistant Professor of Pediatrics
- Fred J. Pratt, Jr., M.D., Assistant Professor of Ophthalmology and Oto-  
Laryngology
- Charles A. Reed, B.S., M.D., F.A.C.S., Associate Professor of Orthopedic  
Surgery
- Ernest T. F. Richards, M.D., C.M., Associate Professor of Medicine
- Harry P. Ritchie, Ph.B., M.D., F.A.C.S., Associate Professor of Surgery
- Frederick C. Rodda, M.D., Associate Professor of Pediatrics
- Frederic W. Schlutz, B.A., M.D., Professor of Pediatrics and Chief of  
the Department of Pediatrics
- Max Seham, M.D., Assistant Professor of Pediatrics
- Arthur C. Strachauer, M.D., F.A.C.S., Professor of Surgery and Chief  
of the Department of Surgery
- Rood Taylor, M.D., Ph.D., Assistant Professor of Pediatrics
- Marion A. Tebbets, B.A., Instructor in Social Service, Director of Division  
of Social Service
- Gilbert J. Thomas, M.D., Assistant Professor of Urology
- Margaret Warwick, B.S., M.D., Assistant Professor of Pathology

- S. Marx White, B.S., M.D., F.A.C.P., Professor of Medicine and Chief of the Department of Medicine  
 Frederick W. Wittich, M.A., M.D., Assistant Professor of Medicine  
 Harry B. Zimmerman, M.D., F.A.C.S., Assistant Professor of Surgery  
 Edward D. Anderson, B.A., M.D., Instructor in Pediatrics  
 Eula B. Butzerin, R.N., B.A., Director of Public Health Nursing Course and Instructor in Preventive Medicine and Public Health  
 Charles E. Connor, B.A., M.D., Instructor in Ophthalmology and Otolaryngology  
 George R. Dunn, Ph.B., M.D., Instructor in Surgery  
 Everett K. Geer, B.S., M.D., Instructor in Medicine  
 Paul W. Giessler, B.S., M.D., Instructor in Orthopedic Surgery  
 Beryl S. Green, B.A., Instructor in Bacteriology  
 Manley H. Haynes, B.S., Ph.D., M.D., Instructor in Obstetrics and Gynecology  
 Edgar T. Herrmann, B.S., M.D., Instructor in Medicine  
 Kano Ikeda, M.D., Instructor in Pathology  
 Frank L. Jennings, M.D., Instructor in Medicine  
 Ralph T. Knight, B.A., M.D., Instructor in Surgery  
 Harry DeWitt Lees, B.M., Instructor in Preventive Medicine and Public Health  
 Donald McCarthy, B.S., M.D., Instructor in Medicine  
 Cecile R. Moriarty, B.S., M.D., Instructor in Pediatrics  
 William A. O'Brien, M.D., Instructor in Pathology  
 Frederick A. Olson, M.S., M.D., Instructor in Surgery  
 Roscoe C. Webb, B.A., M.D., F.A.C.S., Instructor in Surgery  
 Charles H. Watkins, B.A., Teaching Fellow in Anatomy

## ASSISTANTS

- Eva H. Burggren, R.N., Assistant in Nursing  
 Laurence H. Cady, B.A., M.D., Assistant in Preventive Medicine and Public Health  
 Woodard L. Colby, B.S., M.D., Assistant in Pediatrics  
 Agnes Fleming, R.N., Assistant in Nursing  
 Hendrie W. Grant, M.D., M.S., Assistant in Ophthalmology and Otolaryngology  
 Jean C. Hawley, R.N., Assistant in Nursing  
 Ruth Hjermstad, R.N., Assistant in Nursing  
 Raymond L. Gregory, B.A., M.A., Teaching Fellow in Pharmacology  
 Ada M. Olsen, R.N., Assistant in Nursing  
 Blanche M. Pinkus, R.N., Assistant in Nursing  
 Joyce Stevens, R.N., Assistant in Nursing  
 Leo G. Rigler, B.S., M.D., Assistant in Medicine  
 Mary James, R.N., Assistant in Nursing  
 Eugene F. Warner, M.D., Assistant in Pediatrics

## LECTURERS GIVING VOLUNTARY SERVICE IN THE SCHOOL OF NURSING

- |                      |                          |
|----------------------|--------------------------|
| John A. Evert, M.D.  | Alexander Josewich, M.D. |
| F. E. B. Foley, M.D. | M. A. Shillington, M.D.  |

## GENERAL INFORMATION

*The associated hospitals.*—The ownership or control of teaching hospitals enables the University to offer the best opportunities of education alike in medicine and in nursing.

While the associated hospitals and the School of Nursing are interdependent, each serving the purposes of the others, the faculty looks upon the hospitals as the teaching laboratories of the nurse in which her interests, together with those of the medical student body, are primary considerations.

By the association of several hospitals with the University School, in the interests of nursing education, it is possible to give students the advantage of practical service with free patients, per diem patients, and private patients; and to add to the regular graded work experience in the care of contagious diseases, tuberculosis, and a large number of accident and emergency cases. It is possible in the central school of nursing to offer a practically unlimited registration.

*University relations.*—The School of Nursing has its teaching headquarters at the University, with offices in Millard Hall. This building is situated on the medical division of the new university campus, which includes within it both the hospital and laboratory buildings. These occupy the high bluffs overlooking the east bend of the Mississippi River.

The Elliot Memorial Building stands upon the bank of the river and commands a beautiful prospect. This building, provided principally by a gift from the estate of Dr. and Mrs. A. F. Elliot, is the first of the permanent hospital group. The service building connects with the west wing of the Elliot Memorial. The hospital has at present some two hundred beds, fifty of which are assigned to patients paying a per diem charge and the remainder to free patients.

Additional units of the university hospitals are in course of construction and equipment. The Frank C. Todd Memorial Clinic in Ophthalmology and Oto-Laryngology has been provided, in part, by gifts from Mrs. Frank C. Todd, Mrs. Edward C. Gale, and Mrs. Emery Mapes and, in part, by university appropriations. The Cancer Institute is the object of a gift of \$250,000, through the Citizens' Aid Society, at the instance of Mrs. George Chase Christian. These two units will add one hundred beds to the capacity of the university hospitals.

The Charles T. Miller Hospital, one of the associated group of hospitals, situated in St. Paul, is a beautiful and thoroly modern building, erected within the past three years, housing fifty free patients and one hundred and fifty private beds.

The Minneapolis General Hospital is supported by taxation and has some 750 beds, principally for the use of the indigent sick. It enters large numbers of accident and emergency cases and acute diseases.

The Northern Pacific Beneficial Association opened in the fall of 1921 its new model hospital building situated within St. Paul in the midway



district. It cares for the sick among employees and the families of employees of the railway system, the name of which it bears.

*The Out-Patient Department service.*—The dispensary is the Out-Patient Department of the University Hospital which is directed by the superintendent, Dr. L. B. Baldwin. It is conveniently located in Millard Hall in the block adjoining the hospital.

Students of the School of Nursing enjoy opportunities of clinical observation in the Out-Patient Department and are assigned, during their junior and senior years, to its nursing service.

The dispensary of the Minneapolis General Hospital is also available for study and training to the students of the school.

*The libraries.*—The medical libraries of the University contain 19,000 bound volumes, 45,200 unbound volumes, monographs, reprints, etc., and 276 current periodicals.

The general University Library also is open to students of all schools. The library catalogs a number of works selected with reference to the needs of students of the School of Nursing.

*Requirements for admission.*—Applications for admission to the School of Nursing should be made in writing to the director. Blanks are furnished on request. Educational credentials should accompany the application. When a registration card is received, it should be forwarded to the director. All applicants must meet personally the enrolment committee of the school. Notices of enrolment meetings will be sent to each applicant. A class is entered at the opening of fall and spring quarters.

Applicants must state age and residence, and present credentials of graduation from a four-year high school of the first grade or its equivalent. While a high school diploma is a prerequisite to admission, preference will be given to women of superior preliminary training. Applicants must be not less than eighteen nor more than thirty-five years of age. Those of minimal age will be admitted only when they give assurance of sufficient maturity. They must submit satisfactory evidence to the committee of physical and mental fitness and good character, and will undergo a general physical examination by the school physicians. References are required, two of these to be from former high school teachers.

Information and application blanks may be had upon request, of the Director of the School of Nursing, Millard Hall, University of Minnesota, Minneapolis.

*Registration and fees.*—Upon acceptance of the candidate by the enrolment committee, registration is made at the office of the registrar of the University. Fees approximating \$40 cover the preliminary course of instruction and are payable at the office of the university cashier. Students supply their own textbooks and stationery. Housing and board are provided on the campus or in the associated hospitals at no cost to the student.

No fees are charged during the remaining two and one-half years of the course. With admission to the hospitals, at the opening of the second quarter, students reside at the nurses' homes of the University or in the

associated hospitals. Clothing, other than the hospital uniform dress, students provide for themselves, and in character and sufficiency of supply it must conform to the school regulations.

A vacation of two weeks is allotted, in succession, to each nurse in each year at her own living expense.

Graduates of other schools for nurses, in good standing, or matriculants of these schools, having the required entrance qualifications, will be admitted to the preliminary course of instruction upon the conditions of entrance cited above and upon payment of the prescribed fee. Upon successfully passing the examinations in this course, they are granted a certificate of proficiency, which, if they are matriculants of any other school, is submitted to the superintendent in charge.

*Plan of instruction.*—The entire course of instruction in the School of Nursing covers a period of three years and, successfully pursued, leads to the degree of graduate in nursing conferred, upon recommendation of the faculty, by the Board of Regents of the University of Minnesota.

All matriculants are required to take the preliminary course of instruction and to pass examinations at its close. The faculty reserves the right to pass upon the general fitness of the student to enter the hospital services at the close of the preliminary period.

In the last half of the first year and the first half of the second year, the student is assigned to duty and receives instruction in the men's and women's medical and surgical wards of the associated hospitals. In the second half of the second year and throughout the third year, she is assigned to special duty in the obstetrical, gynecological, and children's wards, in the operating rooms, and in special departments of practice.

The practical work of each year is accompanied by courses of lectures and demonstrations conducted by members of the faculty. Examinations conclude each of these courses.

*Affiliated schools.*—Students from affiliated schools or from those of recognized standing and of general requirements equivalent to those of the University of Minnesota, who have completed two years of study and are graduates of such schools, will be admitted to the third year of the School of Nursing as affiliated students, so far as housing capacity will permit. Upon successful completion of the work of the third year they will receive a certificate.

This affiliated third year course is planned especially for those students whose training has been in schools allied to hospitals of exclusively surgical or other special character.

*Five-year course in Arts and Nursing leading to the degrees of bachelor of science and graduate in nursing.*—During the first two years of three quarters each in this course the student is registered in the College of Science, Literature, and the Arts. This period is followed by ten quarters during which the student is registered in the University School of Nursing. The last two quarters of the fifth year are devoted to elective work in the University, in preparation either for teaching and supervision in schools of nursing, or for public health nursing.

The student is required to earn one hundred thirty-five credits and one hundred thirty-five honor points in courses which regularly carry credit in the College of Science, Literature, and the Arts. The satisfactory completion of the required professional work is accepted as the equivalent of the senior year in this college.

The following courses are required, and should be taken during the first two years and the first quarter of the third year:

	Credits
Animal Biology 1-2 .....	10
Bacteriology 51 .....	5
Bacteriology 101 (elective) .....	4
Chemistry 6-7-8 .....	15
English Rhetoric A-B-C .....	15
Foreign language .....	15
History 1-2 or	
History 2-3 .....	10
History of Nursing 10 .....	1
Home Economics 21 .....	5
Human Anatomy 2 .....	4
Human Physiology 4 .....	5
Lettering 69 .....	1
Nursing Ethics 11 .....	1
Psychology 1-2-3 .....	9
Rhetoric 18-19 .....	6
Sociology 1 .....	5

The theoretical and practical work of the third year, winter quarter, includes metrology, pharmacology, hospital economics, personal hygiene, and nursing practice; with general work in the wards for a portion of each day under supervision.

In the spring and summer quarters of the third year and in the four quarters of the fourth year the student is assigned to graded services and to lecture and recitation courses in the associated hospitals.

During the final year the first two quarters are devoted to advanced nursing in hospital and dispensary service. The last two quarters are taken in class and field or practice work in a course which the student elects either in public health nursing or in nursing education. Schedules of these courses will be found in the bulletin of the School of Nursing and the bulletin of Public Health Nursing. Either election must include courses carrying twenty-five credits in the College of Science, Literature, and the Arts, and must be approved by the assistant dean for the Senior College or by the dean of the College of Education.

*Course in Public Health Nursing.*—The course in Public Health Nursing is given under the direction of the Department of Preventive Medicine and Public Health, in co-operation with the School of Nursing. It covers a period of nine months, or a full academic year, divided into three quarters. The satisfactory completion of the nine-month course, or the minimum of forty-five credits, in certain prescribed subjects, is necessary to secure the certificate in public health nursing.

For further information, the student is referred to the special bulletin of courses in Public Health Nursing.

*Course in Nursing Education.*—A course in Nursing Education is given by the School of Nursing with the co-operation of the College of Education and the College of Science, Literature, and the Arts, for those students in the combined Arts and Nursing course who elect it. Registered nurses who have the necessary entrance requirements may be admitted to this course.

Special courses in the School of Nursing will be arranged as required. The following courses are offered:

- Educ. 55f,w,s. Elementary Educational Psychology. A survey of fundamental facts of human behavior involved in educational activities. Three credits.
- Educ. 1f,w,s. Brief Course in History of Education. Current school problems and educational theories in the light of their history. Emphasis upon secondary education and those aspects of education of most immediate concern to high school teachers. Three credits.
- Educ. 11f,w,s. Technique of Teaching. Types of classroom exercises; preparation of teaching plans; hygiene of instruction; methods of treating individual differences; classroom management; the professional ethics of teaching; supervised study; marking systems, etc.; observation of high school work. Three credits.
- S.L.A. 1. Use of Books and Libraries. Introductory study of reference books and library methods as applied to individual study and research. Lectures, examination of reference material, and problems in its use.
- S.L.A. 41-42-43. A General Course in Public Speaking. Fundamentals of effective speaking; breathing, voice production, enunciation, and action; delivery of extracts from the works of well-known writers and speakers; principles underlying speech-making applied in both oral and written compositions. Each section is limited to twenty-five.
- Sch. of Nurs. Teaching Practice. Experience in teaching, under supervision, in the classes of the School of Nursing, upon subjects included in the education of nursing students.
- Ed. Soc. 3. A Study of Education As a Means of Solving Social Problems.

## PRELIMINARY COURSES OF INSTRUCTION

### SCIENTIFIC COURSES

#### ANATOMY

2f,w,s,su. Elementary Anatomy. The general properties and development of tissue cells; the development of the human embryo. The description and demonstration of the osseous, muscular, nervous, circulatory, respiratory, excretory, and reproductive systems. Forty-four hours. Mr. Watkins.

#### PHYSIOLOGY

1f,s. General and Physiologic Chemistry. (a) A brief study of physical and chemical laws; of the composition of matter, chemical compounds, chemical and energy changes; of the ionic theory; of gases and solutions. (b) The physiologic chemistry of gases, water, salts, carbohydrates, fats and proteins; of the nutritive media, of digestive fluids and digestion, of metabolism, of excretion and excretory products. Forty-four hours. Dr. Greisheimer.

1Af,s. Elementary Physiology. Functional properties of tissue cells; the material bases of the body; the nutritive media; the physiology of nerve and muscle; of the nervous system; the vascular mechanism; respiration, digestion, excretion, and metabolism. Ninety-nine hours. Dr. Greisheimer and others.

#### PHARMACOLOGY

1f,w,s,su. Elementary Pharmacology. A study of the history, uses, classification and preparation of drugs; definition of descriptive terms; systems of weights and measures; methods of administration, principles of dosage, etc. Forty-four hours. Mr. Gregory.

14f,s. Metrology. Systems of weights and measures; equivalents; solutions; dosage. Eleven hours. Miss Erickson.

#### BACTERIOLOGY

1f,w,s,su. Elementary Bacteriology. The principles and technique of general bacteriology. Studies in the morphologic and biologic characters of the common bacteria. Preparation of culture media. Disinfectants and disinfection. Bacteriology of water and food products. Sixty-six hours. Dr. Larson, Mrs. Green.

### PRACTICAL COURSES

#### LETTERING

6of,w,s,su. Exercises in Lettering. For training the nurse in the making of records and the charting of clinical observations; the accurate forming of letters in plain, single stroke types and special clinical characters. Eleven hours.

## PRINCIPLES OF NURSING

- 1f,w,s,su. History of Nursing. A study of nursing history to cultivate an understanding and appreciation of nursing traditions and ideals, and of the people and influences that have brought the profession to its present status. Eleven hours. Miss Baker.
- 2f,w,s,su. Nursing Ethics. This course deals with the present scope of nursing; the attitude of the nurse towards various problems, the patient, the physician, and other nurses. Hospital etiquette; the principles of self-government. Eleven hours. Miss Vannier.
- 3f,w,s,su. Personal Hygiene. A study of the conditions governing the health of the individual. Ideals and conceptions of health. Ethical and economic aspects of hygiene. Responsibility of the nurse in health preservation and disease prevention. Eleven hours. Dr. Norris, Mrs. Kurtzman.

## HOSPITAL ECONOMICS

- 5f,w,s,su. A Study of Hospitals and Hospital Departments. The general principles of hospital and household economics. Hospital buildings; construction, heating, lighting and plumbing. Equipment and operation of service rooms, kitchens, special departments. Hospital supplies; household chemicals. Eleven hours.

## PRACTICAL DIETETICS

- 10f,w,s,su. Foodstuffs. A course of practical exercises and lectures upon foods; their definition, classes, forms; food values; food composition; energy values; caloric index; selection of dietaries; balanced rations; market conditions. Eleven hours.
- 11f,w,s,su. The Preparation of Food. Methods of cooking; effect on food values; percentages of loss; treatment of various classes of foods; of typical foods; enhancement of food values; mechanical methods of preparation; raw foods. Forty-eight hours.

## PRINCIPLES AND PRACTICE OF NURSING

- 15-21f,w,s,su. Courses of lectures, demonstrations, and practical exercises. Eighty hours.
15. The Environment of the Patient. The care of room, ward, service room, bath, lavatory, serving room, linen room, bed and bedding, detail of bed-making.
16. Admission and General Care of the Patient. The bed, bath, and toilet; preparation of the patient for the night; prevention of bedsores, stiffness, and cramping of muscles; care of mouth, teeth, and hair; special devices for comfort.
17. Observation and Examination of the Patient. How and what to observe; temperature, pulse, respiration; feces, urine, sputum. Preparation of patient for routine examination; methods of assisting examiner; the doctor's order book; value of bedside records; detail and technique of record.

18. Methods and Mechanisms of Treatment. Preparation of solutions; application of heat and cold; counter irritants; enemata; vaginal douche; catheterization; lavage, gavage, gastric expression. Baths; reduction of temperature; sedative baths; baths and packs to produce sweating; local baths; medicated baths.
19. The Preparation of Patients for Operation. Details of preparation; the ether bed; post-operative care of patient.
20. Medicines. The medicine case; medicine trays; system of giving medicines; method of preparing and giving hypodermic injections; method of giving inhalations; methods of giving drugs by inunction.
21. Infectious Diseases. Precautions of care; details of disinfection; care of typhoid fever cases; venereal diseases.

#### UNDERGRADUATE COURSES

Students who have successfully completed the preliminary courses of the first six months are regularly entered in the hospital service. In addition to their hospital duties, which employ fifty-six hours each week, they will attend courses of lectures, demonstrations, and recitations upon subjects in general medicine and surgery and in special branches of practice related to their professional work.

#### ELEMENTS OF PATHOLOGY

28. The Principles of Pathology. Deviations from the normal in the more common diseases. A brief consideration of the normal and pathologic blood and excretions of the body. Eighteen hours.

#### SURGICAL NURSING

29. Surgical Technique. Principles of sterilization; inflammation; wounds; necessity for asepsis, and how obtained; dressings. Pre-operative and post-operative care of patients. Eight hours.
30. The Care of Surgical Cases. Anesthesia and anesthetics. Surgical emergencies; complications and infections. Special surgical conditions. Thirty hours.
31. Bandaging. Demonstrations and practical exercises in the uses and methods of application of bandages of all forms. Ten hours.

#### MEDICAL NURSING

32. Diseases of Circulatory System and Blood. Respiratory system; gastrointestinal tract and accessory digestive glands. Disorders of metabolism. Medical emergencies.
33. General Nursing Care. Diet, drugs, rest. Observation of symptoms. Recording intake and output of fluids. Isolation and prevention of infection.
34. Infectious and Contagious Diseases. Typhoid fever. Typhus. Dysentery. Hookworm. Malaria. Yellow fever. Tetanus and rabies.
35. General Nursing Care. Protection of nurse and public. Health regulations. Care of room and patient.

Courses Nos. 32 to 35 cover 32 hours.

## TUBERCULOSIS

36. Study of Tuberculosis. Cause, prevalence, prevention, curability. Classification; localization. Emergencies. Treatment in home and sanatorium. Care of tuberculosis; prevention of infection; treatment of emergencies; hemoptysis. Fresh air treatment; out-of-door sleeping. Dietary, rest, exercise. Ten hours.

## THE DIETETIC MANAGEMENT OF DISEASE

37. The Dietary of Disease. The conditions of digestion, absorption, assimilation, and metabolism in disease; the influence of age, sex, and previous nutrition; the relation of food and water supply to functional inactivity, tissue loss, and elimination.
38. The Dietetic Management in Special Diseases. The dietary of continued fevers; gastro-intestinal disorders; respiratory disorders; disorders of nutrition; renal diseases, cardiac disorders, and diabetes.
- Courses 37 and 38 cover a period of ten hours.

## GYNECOLOGY

39. Gynecological Nursing, including Obstetrics and Gynecology 2. A study of terms and definitions bearing upon the nursing of pelvic diseases; preparation of gynecological patients for examination and for operation; general care of gynecological cases; special modes of treatment. Eight hours.

## NURSING OF INFANTS AND CHILDREN

40. The Normal Child. Conditions of growth and development; breast feeding; artificial feeding; mixed feeding; preparation of foods in laboratory; general care and nursing. Psychology of childhood. Social aspects of children's diseases.
41. Diseases of Digestive Tract. Disorders of respiratory system. Diseases of circulatory system; of genito-urinary tract. Nervous disorders. Constitutional diseases. Syphilis; gonorrhoea.
42. Contagious Diseases. Diphtheria; scarlet fever; smallpox; chickenpox; whooping-cough; measles; mumps; meningitis; poliomyelitis.
- Courses Nos. 40 to 42 cover a period of thirty-eight hours.

## MASSAGE

23. Demonstrations and Class Practice in the general manipulation of the body tissues and in those general movements which have the value of passive exercise for the sick or convalescent. Fifteen hours.

## OBSTETRICS

44. Junior Obstetrical Nursing, including Obstetrics and Gynecology 1. Lectures and demonstrations of the anatomy and physiology of the female pelvis; the physiology of pregnancy; its accidents; the physiology of parturition; the nursing of labor.
- 44a. Senior Obstetrical Nursing. Complications; post-partem hemorrhage, puerperal fever; puerperal convulsions; puerperal insanity.
- Courses 44 and 44a cover 24 hours.



## PREVENTIVE MEDICINE

45. Elementary Preventive Medicine. Including Preventive Medicine 5. A descriptive course tracing the development and growth of public health with special reference to the past fifty years and a consideration of the various phases of preventive medicine in the present day. Twelve hours.

## DISEASES OF THE SKIN

46. The Nursing Care of the Skin. A course upon methods of treatment of disorders of the skin in general occurrence. Twelve hours.

## NERVOUS AND MENTAL DISEASES

47. The Nursing of Nervous and Mental Conditions. Insanity; its common forms and symptoms; principles of care of insane patients. Epilepsy; its manifestations and care. Neurasthenia, hysteria; their recognition and distinctive features; their nursing; their rest cure. Fifteen hours.

## DISEASES OF THE EYE, EAR, NOSE, AND THROAT

48. The Eye, Ear, Nose, and Throat. Anatomy and physiology. General and local care; use of applications, douches, etc. Recognition and care of foreign bodies. Prevention and treatment of ophthalmia neonatorum. Pre-operative and post-operative care. Twelve hours.

## SPECIAL THERAPEUTICS

49. Special Methods of Treatment. Special forms of therapy, requiring the services of the nurse. The X-ray in the diagnosis and treatment of disease. The use of vaccines and sera. Oral hygiene. Six hours.

## SOCIAL RELATIONS

50. Professional Problems. Social and civic status of nurses. Professional ethics and etiquette. Nursing education; legislation; organizations. Eight hours.

## SPECIAL TOPICS

Arrangements will be made, from time to time, for formal lectures upon special topics, to be delivered by available lecturers of large institutional and educational experience, to which the student of the training schools of the Twin Cities will be invited.

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

*The College of Dentistry*  
*Announcement for the Years*  
**1924-1926**



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1924							1925													
<b>JULY</b>							<b>JANUARY</b>							<b>JULY</b>						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
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6	7	8	9	10	11	12	4	5	6	7	8	9	10	5	6	7	8	9	10	11
13	14	15	16	17	18	19	11	12	13	14	15	16	17	12	13	14	15	16	17	18
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10	11	12	13	14	15	16	15	16	17	18	19	20	21	9	10	11	12	13	14	15
17	18	19	20	21	22	23	22	23	24	25	26	27	28	16	17	18	19	20	21	22
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<b>SEPTEMBER</b>							<b>MARCH</b>							<b>SEPTEMBER</b>						
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2	3	4	5	6	7	8	3	4	5	6	7	8	9	8	9	10	11	12	13	14
9	10	11	12	13	14	15	10	11	12	13	14	15	16	15	16	17	18	19	20	21
16	17	18	19	20	21	22	17	18	19	20	21	22	23	22	23	24	25	26	27	28
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<b>DECEMBER</b>							<b>JUNE</b>							<b>DECEMBER</b>						
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7	8	9	10	11	12	13	7	8	9	10	11	12	13	6	7	8	9	10	11	12
14	15	16	17	18	19	20	14	15	16	17	18	19	20	13	14	15	16	17	18	19
21	22	23	24	25	26	27	21	22	23	24	25	26	27	20	21	22	23	24	25	26
28	29	30	31	..	..	..	28	29	30	..	..	..	..	27	28	29	30	31	..	..
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# UNIVERSITY CALENDAR

1924-25

1924			
September	18	Thursday	Payment of fees closes, except for new students
September	18-20		Entrance examinations
September	22-26		Examinations for removal of conditions
			Physical examinations for all new students
			Registration period, <sup>2</sup> colleges of Science, Literature, and the Arts, Agriculture, Forestry, and Home Economics, and Education
September	22	Monday	First semester evening extension classes begin <sup>3</sup>
September	25-26		Registration days <sup>2</sup> for all colleges not included above
September	26	Friday	Payment of fees for new students closes
September	29	Monday	Fall quarter begins, 8:30 <sup>1</sup> a.m.
October	23	Thursday	Senate meeting, 4:30 p.m.
November	1	Saturday	Home Coming Day; classes dismissed the third and fourth hours
November	4	Tuesday	Election Day; a holiday
November	11	Tuesday	Armistice Day; a holiday
November	27	Thursday	Thanksgiving Day; a holiday
December	17-20		State Day Convocation
December	4	Thursday	Final examination period
December	18	Thursday	Commencement Convocation
			Senate meeting, 4:30 p.m.
December	20	Saturday	Fall quarter ends, Christmas vacation begins, 5:20 p.m.
1925			
January	5	Monday	Christmas vacation ends, winter quarter begins, 8:30 <sup>1</sup> a.m.
January	30	Friday	First semester evening extension classes close
February	2	Monday	Second semester evening extension classes begin <sup>3</sup>
February	12	Thursday	Lincoln's Birthday; a holiday
February	19	Thursday	Charter Day Convocation
			Senate meeting, 4:30 p.m.
March	16-19		Final examination period
March	21	Saturday	Winter quarter ends, spring vacation begins, 5:20 p.m.

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

<sup>2</sup> Registration subsequent to the date specified will necessitate the approval of the college concerned. See also penalty fees for late registration, page 11.

<sup>3</sup> This date does not refer to correspondence study courses which may be started at any time during the year.

## COLLEGE OF DENTISTRY

March	30	Monday	Spring vacation ends, spring quarter begins, 8:30 <sup>1</sup> a.m.
April	10	Friday	Good Friday; a holiday
May	14	Thursday	Cap and Gown Day Convocation
May	21	Thursday	Senate meeting, 4:30 p.m.
May	29	Friday	Second semester evening extension classes close
May	30	Saturday	Memorial Day; a holiday
June	10-13		Final examination period
June	13	Saturday	Spring quarter closes, 5:20 p.m.
June	14	Sunday	Baccalaureate service
June	15	Monday	Fifty-third annual commencement
June	19-20		Summer Session first term begins, registration and payment of fees
June	22	Monday	Classes begin, 8:00 a.m.
July	4	Saturday	Independence Day; a holiday
August	1	Saturday	First term Summer Session closes Registration and payment of fees for second term closes
August	3	Monday	Second term classes begin
September	5	Saturday	Second term Summer Session closes

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 and peculiar circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

# THE COLLEGE OF DENTISTRY

## FACULTY

### ADMINISTRATION

Lotus Delta Coffman, Ph.D., LL.D., President  
William Watts Folwell, LL.D., President Emeritus  
Alfred Owre, D.M.D., M.D., C.M., B.A., Dean of the College of Dentistry,  
Professor of the Practice of Dentistry, and Chairman of the Department of Dentistry

### ANATOMY

Clarence M. Jackson, M.S., M.D., LL.D., Professor of Anatomy  
Thomas G. Lee, B.S., M.D., Professor of Comparative Anatomy  
Andrew T. Rasmussen, Ph.D., Associate Professor of Neurology  
Shirley P. Miller, Ph.D., Instructor in Anatomy  
Walter P. Covell, B.S., Teaching Fellow in Anatomy  
Everett Rowles, B.A., Teaching Fellow in Anatomy  
Gordon H. Scott, B.A., Teaching Fellow in Anatomy

### BACTERIOLOGY AND IMMUNOLOGY

Winford P. Larson, M.D., Professor of Bacteriology and Immunology  
Robert G. Green, M.A., M.D., Assistant Professor of Bacteriology and Immunology  
Arthur T. Henrici, M.D., Associate Professor of Bacteriology and Immunology  
Beryl S. Green, M.A., Instructor in Bacteriology and Immunology  
Madeleine Guillemain, M.A., Instructor in Bacteriology and Immunology

### CHEMISTRY

<sup>1</sup>Paul H. M.-P. Brinton, Ph.D., Professor of Analytical Chemistry  
William H. Hunter, Ph.D., Professor of Chemistry  
Lee I. Smith, Ph.D., Assistant Professor of Organic Chemistry  
Landon A. Sarver, M.A., Instructor in Chemistry  
Arthur E. Stoppel, Ch.E., Ph.D., Instructor in Chemistry

### DENTISTRY

Alfred Owre, D.M.D., M.D., C.M., B.A., Dean of the College of Dentistry,  
Professor of the Practice of Dentistry, and Chairman of the Department of Dentistry  
Peter J. Brekhus, B.A., D.D.S., Professor of Crown and Bridge Work and Oral Diagnosis and Chairman of the Division of Oral Diagnosis  
Archibald B. Butter, D.D.S., Assistant Professor of Operative Dentistry  
Oscar Cooperman, D.D.S., Assistant Professor of Prosthetic Dentistry and Oral Anatomy  
Norman J. Cox, B.S., D.M.D., Associate Professor of Operative Dentistry

<sup>1</sup> Absent on leave, 1924-25.

- George M. Damon, D.D.S., Professor of Prosthetic Dentistry and Oral Anatomy and Chairman of the Division of Oral Anatomy  
Rudolph W. Delton, D.D.S., Assistant Professor of Prosthetic Dentistry and Orthodontia  
George D. Estes, D.D.S., Assistant Professor of Operative Dentistry  
Carl O. Flagstad, D.D.S., Associate Professor of Prosthetic Dentistry and Orthodontia  
Jay M. Freeburg, D.D.S., Assistant Professor of Operative Dentistry  
Henry S. Godfrey, D.M.D., Professor of Operative Dentistry  
Robert O. Green, D.D.S., Professor of Operative Dentistry  
Charles A. Griffith, D.D.S., Professor of Oral Surgery and Chairman of the Division of Oral Surgery  
Lee A. Harker, D.D.S., Assistant Professor of Oral Anatomy and Prosthetic Dentistry  
Raymond R. Henry, D.D.S., Assistant Professor of Operative Dentistry  
Clarence E. Hermann, D.D.S., Assistant Professor of Oral Surgery  
Houghton Holliday, B.A., D.D.S., Assistant Professor of Oral Surgery and Oral Diagnosis  
Ray R. Knight, B.A., M.D., Professor of Oral Roentgenology and Physical Diagnosis  
William F. Lasby, B.A., D.D.S., Professor of Prosthetic Dentistry and Orthodontia, Chairman of the Division of Prosthetic Dentistry, and Superintendent of the Clinic  
Harry C. Lawton, D.D.S., Associate Professor of Prosthetic Dentistry and Orthodontia  
Harold J. Leonard, B.A., D.D.S., Associate Professor of Oral Hygiene and Pathology, Chairman of the Division of Oral Hygiene and Pathology, and Superintendent of the School for Dental Nurses  
Joseph M. Little, D.D.S., Associate Professor of Operative Dentistry  
Everett E. MacGibbon, D.D.S., Associate Professor of Oral Surgery  
Herman A. Maves, D.D.S., Professor of Oral Surgery  
Richard S. Maybury, D.D.S., Associate Professor of Operative Dentistry  
George A. Montelius, D.D.S., Assistant Professor of Oral Diagnosis  
William C. Naegeli, D.D.S., Assistant Professor of Operative Dentistry  
Herbert C. Nelson, D.D.S., Associate Professor of Crown and Bridge Work  
Carl F. Otto, D.D.S., Associate Professor of Crown and Bridge Work  
Alfred A. Pagenkoph, D.D.S., Professor of Crown and Bridge Work  
Paul S. Parker, D.D.S., Assistant Professor of Operative Dentistry  
Mark O. Patridge, D.D.S., Associate Professor of Operative Dentistry  
Carl H. Petri, D.D.S., Assistant Professor of Prosthetic Dentistry and Oral Anatomy  
George W. Reynolds, D.D.S., Professor of Crown and Bridge Work  
William A. Roll, D.D.S., Associate Professor of Crown and Bridge Work  
Arthur T. Rowe, D.D.S., Assistant Professor of Prosthetic Dentistry  
Charles E. Rudolph, D.D.S., Associate Professor of Prosthetic Dentistry, Oral Anatomy, and Orthodontia  
Joseph F. Shellman, D.D.S., Associate Professor of Operative Dentistry

Louis W. Thom, D.D.S., Assistant Professor of Operative Dentistry  
 William D. Vehe, D.D.S., Associate Professor of Crown and Bridge Work and Operative Dentistry  
 Carl W. Waldron, M.D., D.D.S., L.D.S., F.A.C.S., Associate Professor of Oral Hygiene and Pathology and Oral Surgery  
 James M. Walls, D.M.D., Professor of Operative Dentistry and Chairman of the Division of Operative Dentistry  
 Oscar A. Weiss, D.M.D., Professor of Prosthetic Dentistry and Orthodontia and Chairman of the Division of Orthodontia  
 Amos S. Wells, B.A., D.D.S., Professor of Crown and Bridge Work and Chairman of the Division of Crown and Bridge Work  
 Lehman Wendell, B.S., D.D.S., Assistant Professor of Orthodontia and Prosthetic Dentistry  
 Charles A. Wiethoff, D.D.S., Professor of Oral Surgery  
 Daniel E. Ziskin, D.D.S., Assistant Professor of Oral Surgery  
 Joseph O. Baker, D.D.S., Instructor in Orthodontia  
 Harold G. Heckler, D.D.S., Instructor in Prosthetic Dentistry  
 Roy M. Jernall, D.D.S., Instructor in Prosthetic Dentistry  
 Arthur F. Johnson, D.D.S., Instructor in Prosthetic Dentistry  
 Raymond E. Johnson, D.D.S., Instructor in Oral Hygiene and Pathology  
 Raymond H. Lundquist, D.D.S., Instructor in Crown and Bridge Work  
 Lester C. McCarthy, D.D.S., Instructor in Crown and Bridge Work  
 Earl A. Nelson, D.D.S., Instructor in Crown and Bridge Work  
 Earl W. Nelson, D.D.S., Instructor in Oral Surgery  
 Carl R. Oman, D.D.S., Instructor in Operative Dentistry  
 John F. Sprafka, D.D.S., Instructor in Operative Dentistry  
 Fred C. Thiers, D.D.S., Instructor in Operative Dentistry  
 A. L. Thomas, D.D.S., Instructor in Orthodontia  
 Cora L. Ueland, M.A., Instructor in Oral Hygiene and Pathology and Supervisor of the School for Dental Nurses  
 Reuben A. Ulvestad, D.D.S., Instructor in Prosthetic Dentistry  
 Andrew J. Weiss, Instructor in Prosthetic Dentistry  
 F. Denton White, D.D.S., Instructor in Oral Hygiene and Pathology  
 Harry A. Young, D.D.S., Instructor in Prosthetic Dentistry

## LECTURERS

George E. Fahr, B.S., M.D., Associate Professor of Medicine  
 Boyd S. Gardner, D.D.S., Associate Professor of Dental Surgery, Mayo Foundation  
 Edwin L. Gardner, B.S., M.D., Assistant Professor of Medicine  
 Arthur S. Hamilton, B.S., M.D., Professor of Nervous and Mental Diseases, in charge of Division of Nervous and Mental Diseases  
 Jennings C. Litzenberg, B.S., M.D., F.A.C.S., Professor of Obstetrics and Gynecology and Chief of the Department of Obstetrics and Gynecology  
 William R. Murray, Ph.B., M.D., F.A.C.S., Professor of Ophthalmology and Oto-Laryngology and Chief of the Department of Ophthalmology and Oto-Laryngology  
 Robert I. Rizer, M.D., F.A.C.S., Assistant Professor of Medicine  
 David F. Swenson, B.S., Professor of Philosophy



S. Marx White, B.S., M.D., F.A.C.S., Professor of Medicine and Chief  
of the Department of Medicine  
Olga S. Hansen, B.S., M.D., Instructor in Medicine  
Walter V. McGilvra, Student Assistant in Anesthesia

## METALLOGRAPHY

Oscar E. Harder, Ph.D., Professor of Metallography  
Ralph L. Dowdell, Met.E., M.S., Instructor in Metallography  
Ludwig J. Weber, B.S., Ch.E., Instructor in Metallography

## MILITARY SCIENCE AND TACTICS

Frederick R. Wunderlich, Major, Dental Corps, U.S.A., Assistant Professor  
of Military Science and Tactics

## PATHOLOGY

Elexious T. Bell, B.S., M.D., Professor of Pathology  
Benjamin J. Clawson, B.S., M.D., Ph.D., Assistant Professor of Pathology  
James S. McCartney, Jr., B.A., M.D., Assistant Professor of Pathology  
William A. O'Brien, M.D., Instructor in Pathology  
Oscar B. Bergman, B.S., Teaching Fellow in Pathology  
Glenn W. Tuttle, B.S., Teaching Fellow in Pathology

## PHARMACOLOGY

Arthur D. Hirschfelder, B.S., M.D., Professor of Pharmacology  
Edgar D. Brown, Phm.D., M.D., Associate Professor of Pharmacology  
Herman Jensen, B.A., M.S., Instructor in Pharmacology  
Raymond L. Gregory, M.A., Teaching Fellow in Pharmacology

## PHYSIOLOGY

Elias P. Lyon, Ph.D., M.D., LL.D., Professor of Physiology  
Richard O. Beard, M.D., Associate Professor of Physiology  
Esther M. Greisheimer, Ph.D., M.D., Assistant Professor of Physiology  
Jesse F. McClendon, Ph.D., Professor of Physiology  
Chauncey J. V. Pettibone, Ph.D., Associate Professor of Physiologic  
Chemistry  
Frederick H. Scott, Ph.D., M.B., D.Sc., Professor of Physiology  
Grace Medes, Ph.D., Instructor in Physiology  
William W. Swanson, B.A., B.S., Instructor in Physiologic Chemistry  
Gertrude I. Thomas, Instructor in Dietetics  
Abigail Knowlton, B.S., Assistant in Physiology  
Milo M. Loucks, B.S., Teaching Fellow in Physiology  
Redding H. Rufe, B.S., Assistant in Physiology  
Alice Rupp, B.A., Teaching Fellow in Physiology  
Maurice Visscher, B.A., Assistant in Physiology

## SURGERY

Arthur C. Strachauer, M.D., F.A.C.S., Professor of Surgery  
Angus L. Cameron, B.A., M.S., M.D., Ph.D., Assistant Professor of  
Surgery

Rodney M. West, B.A., Registrar, University of Minnesota, Secretary of  
the Faculty, College of Dentistry, University of Minnesota

## GENERAL INFORMATION

### COURSES OFFERED

*Five-year course.*—The College of Dentistry unites with the College of Science, Literature, and the Arts in offering a five-year course consisting of one year in Arts and four years in Dentistry, leading to the degree of doctor of dental surgery.

*Seven-year course.*—The College of Dentistry unites with the College of Science, Literature, and the Arts in offering a seven-year course consisting of three years in Arts and four years in Dentistry, leading to the degrees of bachelor of arts and doctor of dental surgery, which are conferred at the close of the final year in the College of Dentistry.

*Combined course in Medicine and Dentistry.*—A combined course leading to the degree of bachelor of medicine and doctor of dental surgery is being considered by the dental and medical faculties. At the present time no statement can be made as to the time required to secure both degrees. Students contemplating such a course are advised to complete the admission requirements for the Medical School and the first two years of medical science in that school. Further information may be obtained from the Administrative Board of the Medical School and the dental faculty.

### REQUIREMENTS FOR ADMISSION

On account of the limited capacity of the college not more than ninety freshmen can be admitted. Application for admission should be in the examiner's office not later than July 15. Residents of Minnesota will be given prior consideration for vacancies existing at the date of their application. All applications must be accompanied by a ten-dollar preliminary fee, which will be credited toward the first quarter's tuition, or returned if the applicant is not accepted.

Applicants for admission must present one year of collegiate work (45 quarter or 30 semester credits) in science, literature, and the arts, completed at this or some other recognized college or university. High school physics or its equivalent must be completed by candidates before admission to the dental course proper.

The minimum requirements for admission include nine quarter (six semester) credits each in English (rhetoric), biology, and chemistry, (including general and qualitative); six quarter (four semester credits in either shop practice or technical drawing); and enough additional credits to make a total of at least forty-five quarter (thirty semester) credits. Electives may be selected from any of the above subjects or in the following: modern language, mathematics, history, or physics.

At Minnesota the pre-dental requirements are met by the following one-year course of study provided high school physics is presented for admission:

	Credits
English A-B-C .....	15
Animal Biology 5-6-7.....	12
Chemistry 4-5, 11 .....	12
Mechanical Engineering 11-12-13	
or	
Drawing and Descriptive Geometry 41-42-43	6
	—
Total.....	45

In case students enter the pre-dental year without high school physics, this additional requirement may be met by pursuing a course in physics in college, during the Summer Session or through work offered by the Extension Division.

Students who can spend two years in the pre-dental work are advised to take the two-year pre-medical course.

Those whose pre-dental work has been taken elsewhere than at the University of Minnesota must present to the examiner certified credentials of both preparatory and college work, showing the subjects completed, credits, and grades.

Students preparing for admission to the College of Dentistry are advised to follow this arrangement as closely as possible.

#### ADMISSION TO ADVANCED STANDING

Students from other dental colleges whose standards are fully equivalent to those of this institution, may be received into advanced classes provided vacancies occur. Such students must make formal application on the blank provided, and must submit credentials covering pre-dental and dental studies. Such credentials must show that the student had the required pre-dental subjects and has maintained the standard of scholarship required of students of this college.

As a rule notebooks and other evidences of laboratory work must be presented. The amount of credit to be granted a student from another school is decided by the heads of the respective departments in conference with the Student Work Committee. Subject credit, but not legal time credit, may be given for studies pursued other than in dental schools.

Students desiring advanced standing at the University of Minnesota should have a transcript of their record sent to the University examiner by the registrar of the college previously attended.

Students from foreign dental schools (not including Canadian schools) who are not graduates, will not be given credit in any course, except after examination.

## REQUIREMENTS FOR GRADUATION

A candidate for the degree of doctor of dental surgery must be twenty-one years of age, of good moral character, and, after satisfying all the requirements for admission to the college, must have complied with all the rules and regulations of the college and obtained regular credit for all subjects of the entire course.

## BRITISH RECOGNITION

On the recommendation of the Board of Examiners in Dental Surgery, the Council of the Royal College of Surgeons, in London, has added the College of Dentistry of the University of Minnesota to the list of dental schools recognized by the college. This recognition implies that the Royal College of Surgeons will exempt graduates in dental surgery of the University of Minnesota from the preliminary science examination for the license in dental surgery, and they will be admitted to the first and second professional examinations on producing the required certificates of study.

## SUMMER SESSION

A summer session of six or eleven weeks is offered in the departments of Anatomy, Bacteriology, Chemistry, Dentistry, Pathology, and Physiology. For detailed statements, see Summer Session bulletin.

## FEES

Tuition fee (per quarter):	
Residents of Minnesota.....	\$60.00
Nonresidents .....	70.00
Clock hour tuition fee (unclassified students, auditors, and others carrying less than full work):	
Residents of Minnesota.....	2.50
Nonresidents .....	3.00
Deposit* (first quarter only).....	10.00
Military deposit (required of all students taking military drill).....	10.00
Health fee (per quarter).....	2.00
Minnesota Union or Shevlin Hall (per quarter).....	1.00
Special fees:	
Examination for removal of conditions.....	1.00
Examinations for credit (after the first quarter in residence).....	5.00
Special examinations .....	5.00
Laboratory deposit (required of students registered for courses in chemistry) .....	5.00
<i>Registration penalties.</i> —A penalty fee for late registration, late change of registration, or late payment of fees shall be two dollars (\$2) and one dollar (\$1) additional for each day of delay after classes begin, provided that no student shall pay more than twelve dollars (\$12) of penalty in any given quarter.	
* The following charges are made against the general deposit for each student in addition to such charges as may be incurred for lockers, library penalties, laboratory breakage, etc.:	
<i>Minnesota Daily</i> (per quarter).....	\$0.50
Post-office box (per quarter).....	.20
<i>University Address Book</i> .....	.35

# COURSES OF STUDY 1924-26

## UNDERGRADUATE WORK

	Fall Quarter		Winter Quarter		Spring Quarter		Total	
	Crs.	Hrs.	Crs.	Hrs.	Crs.	Hrs.	Crs.	Hrs.
<b>FRESHMAN YEAR</b>								
Anatomy, Gross .....	5	99	5	99	5	99	15	297
Anatomy, Oral .....	3	77	3	77	3	77	9	231
Chemistry, Organic .....	4	99	4	99	..	..	8	198
Chemistry, Quantitative .....	..	..	..	..	3	88	3	88
Prosthesis .....	3	77	3	77	3	77	9	231
	<hr/> 15 = 352		<hr/> 15 = 352		<hr/> 14 = 341		<hr/> 44 = 1045	
<b>SOPHOMORE YEAR</b>								
Anatomy, Hist. & Emb. ....	..	..	6	132	..	..	6	132
Bacteriology .....	5	99	..	..	3	44	8	143
Chemistry, Physiologic .....	4	66	..	..	..	..	4	66
Crown and Bridge Work ....	..	..	..	..	3	99	3	99
Operative Dentistry .....	2½	82½	2½	82½	1	33	6	198
Orthodontia .....	..	..	..	..	3	99	3	99
Physiology .....	..	..	4	66	4	66	8	132
Prosthesis .....	3	99	3	99	..	..	6	198
	<hr/> 14½ = 346½		<hr/> 15½ = 379½		<hr/> 14 = 341		<hr/> 44 = 1067	
<b>JUNIOR YEAR</b>								
Crown and Bridge Work .....	2	66	2	66	2	66	6	198
Diagnosis, Oral .....	..	..	1	11	..	..	1	11
Hygiene, Gen. and Oral .....	2	22	..	..	..	..	2	22
Metallography .....	..	..	..	..	2	33	2	33
Operative Dentistry .....	4	110	4	110	4	110	12	330
Pathology, Gen. & Sp. ....	9	165	..	..	..	..	9	165
Pathology, Oral .....	..	..	..	..	3	33	3	33
Periodontia .....	..	..	1	33	..	..	1	33
Pharmacology .....	..	..	5	66	..	..	5	66
Prosthesis .....	1	11	3	77	3	77	7	165
Surgery, Oral .....	..	..	2	22	1	33	3	55
Surgery, Principles of .....	..	..	..	..	2	22	2	22
	<hr/> 18 = 374		<hr/> 18 = 385		<hr/> 17 = 374		<hr/> 53 = 1133	
<b>SENIOR YEAR</b>								
Crown and Bridge Work .....	3	77	4	110	5	143	12	330
Diagnosis, Gen. & Oral .....	1	11	1	33	..	..	2	44
Operative Dentistry .....	5	143	5	143	5	143	15	429
Orthodontia .....	2	44	2	44	2	44	6	132
Periodontia .....	1	33	..	..	..	..	1	33
Prosthesis .....	2	66	2	66	2	66	6	198
Surgery, Oral .....	3	55	2	22	1	11	6	88
Thesis and Seminar .....	..	..	1	11	2	22	3	33
	<hr/> 17 = 429		<hr/> 17 = 429		<hr/> 17 = 429		<hr/> 51 = 1287	

## DESCRIPTION OF COURSES

### EXPLANATIONS

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

### ANATOMY

- 9f-10w. Systemic Anatomy. Lectures and recitations on the gross morphology of the various systems of the body. Laboratory work upon human and mammalian material. Special emphasis laid upon human osteology. 9 hours a week. 10 credits. Offered to freshmen. Prerequisite: Animal Biology 1-2. Dr. Jackson, Mr. Miller, and assistants.
- 11s. Anatomy of the Head and Neck. Dissection of the human head and neck, with lectures and recitations. 9 hours a week. 5 credits. Offered to freshmen. Prerequisites: Animal Biology 1-2, Anatomy 9-10. Mr. Miller and assistants.
- 14w. Histology and Embryology. Minute structure and development of the tissues and organs of the body, with special emphasis upon the teeth and digestive tract. Lectures, recitations, and laboratory work. 12 hours a week. 6 credits. Offered to sophomores. Prerequisites: Animal Biology 1-2, Anatomy 9-10, 11. Dr. Jackson, Dr. Lee, and assistants.

### BACTERIOLOGY AND IMMUNOLOGY

- 51f,w,s,su. General Bacteriology. Preparation of culture media; morphology of bacteria; methods of staining and identification; anaerobic bacteria; principles of sterilization and disinfection; examination of air, water, milk; relations of bacteria to industries. 99 hours. 51f, special division for dental students. 5 credits. Offered to sophomores. Prerequisites: 10 credits in chemistry, 10 credits in biology. Dr. Henrici and assistants.
- 102s. Special Bacteriology. General consideration of the mouth flora; bacteriology of the stomatitides, dental caries, alveolar abscess and pyorrhoea; systemic infections secondary to bacterial diseases of the mouth and teeth. 44 hours. 3 credits. Offered to sophomores. Prerequisite: Bacteriology 51. Dr. Henrici and assistants.

### CHEMISTRY

- 28s. Quantitative Analysis. A short introductory course covering the general principles and methods of quantitative analysis both gravimetric and volumetric. Typical problems will be assigned and attention given to proper laboratory practice. 88 hours. 3 credits. Offered to freshmen. Prerequisite: Chemistry 11. Mr. Brinton, Mr. Sarver, Mr. Stoppel.

- 31f-32w. Elementary Organic Chemistry. This course will include a discussion of important compounds of the aliphatic and of the aromatic series, and the preparation of typical substances. 198 hours. 8 credits. Offered to freshmen. Prerequisite: Chemistry 11. Mr. Hunter, Mr. Smith.

### DENTISTRY

NOTE.—Courses numbered from 11 to 20 are freshman courses.

Those from 21 to 30 are sophomore courses.

Those from 31 to 40 are junior courses.

Those from 41 to 50 are senior courses.

#### DIVISION OF CROWN AND BRIDGE WORK

- 23s. Crown and Bridge Work. A technic course. Lectures, demonstrations, and laboratory work including all the more important forms of crowns and bridges. 99 hours. 3 credits. Prerequisite: Oral Anatomy 11-12-13. Dr. Wells, Dr. Reynolds, Dr. Lundquist, Dr. McCarthy, Dr. E. A. Nelson.
- 31f-32w.† Crown and Bridge Work. A technic course. Lectures, demonstrations, and laboratory work including all the more important forms of crowns and bridges. 132 hours. 4 credits. Prerequisite: Crown and Bridge 23. Dr. Wells, Dr. Reynolds, Dr. Lundquist, Dr. McCarthy, Dr. E. A. Nelson.
- 33s. Crown and Bridge Work. A clinical course covering the simpler forms of crowns and bridges. 66 hours. 2 credits. Prerequisite: Crown and Bridge 23. Dr. Wells, Dr. Brekhush, Dr. Pagenkoph, Dr. H. C. Nelson, Dr. Otto, Dr. Roll.
- 41f-42w-43s.† Crown and Bridge Work. A course of 33 lectures and 297 clinical hours, covering the entire field of crown and bridge work. 12 credits. Prerequisite: Crown and Bridge 31-32, 33. Dr. Wells, Dr. Brekhush, Dr. Pagenkoph, Dr. H. C. Nelson, Dr. Otto, Dr. Roll.

#### DIVISION OF ORAL ANATOMY

- 11f-12w-13s. Oral Anatomy. Lectures and recitations on anatomy and nomenclature of teeth, and such laboratory work as drawing, dissecting, modeling, and carving of the teeth. Special attention given the physiological function of tooth form and its practical application. 33 lecture and recitation hours, 198 laboratory hours. 9 credits. Dr. Damon, Dr. Rudolph, Dr. Cooperman, Dr. Harker, Dr. Petri, Dr. R. E. Johnson.

#### DIVISION OF ORAL DIAGNOSIS

- 32w. Oral Diagnosis. A consideration of the methods in oral diagnosis with special emphasis on the application of the X-ray. 11 hours. 1 credit. Dr. Brekhush, Dr. Knight, Dr. Waldron, Dr. Holliday, Dr. Montelius.
- 41f-42w.† Oral Diagnosis. A study of patients entering the clinic to determine the conditions of the teeth and surrounding tissues and advise

medical measures; and a study of selected cases from a medical point of view, aiming to correlate the condition of the teeth with the patient's state of health. 11 lectures hours, 33 clinical hours. 2 credits. Prerequisite: Oral Diagnosis 32. Dr. Brekhus, Dr. Knight, Dr. Waldron, Dr. Holliday, Dr. Montelius.

## DIVISION OF OPERATIVE DENTISTRY

- 21f-22w-23s.† Operative Dentistry. A course of lectures, recitations, demonstrations, and laboratory work. 198 hours. 6 credits. Prerequisite: Oral Anatomy 11-12-13. Dr. R. O. Green, Dr. Butter, Dr. Thom, Dr. Sprafka.
- 31f-32w-33s.† Operative Dentistry. A course of 33 lecture and recitation hours and 297 clinical hours. 12 credits. Prerequisites: Operative Dentistry 21-22-23, Histology and Embryology 14. Dr. Walls, Dr. Shellman, Dr. Cox, Dr. Butter, Dr. Estes, Dr. Naegeli, Dr. Parker, Dr. Thom, Dr. Sprafka, Dr. Thiers.
- 41f-42w-43s.† Operative Dentistry. A course of 33 lecture and recitation hours and 396 clinical hours. 15 credits. Prerequisite: Operative Dentistry 31-32-33. Dr. Walls, Dr. Godfrey, Dr. Green, Dr. Little, Dr. Maybury, Dr. Pattridge, Dr. Shellman, Dr. Vehe, Dr. Freeburg, Dr. Henry, Dr. Parker.

## DIVISION OF ORTHODONTIA

- 23s. Orthodontia. A course of lectures, recitations, and laboratory work in the making of regulating appliances. 99 hours. 3 credits. Dr. Lawton, Dr. Delton, Dr. Wendell.
- 41f-42w-43s.† Orthodontia. A course of lectures, recitations, and clinical work. Every student is required to treat at least one case of irregularity of the teeth. 33 lecture and recitation hours and 99 clinical hours. 6 credits. Prerequisites: Orthodontia 23, Operative Dentistry 31-32-33. Dr. O. A. Weiss, Dr. Lasby, Dr. Flagstad, Dr. Rudolph, Dr. Baker, Dr. Thomas.

## DIVISION OF ORAL HYGIENE AND PATHOLOGY

- 31f. Oral Hygiene. Lectures and recitations on general and oral hygiene. 22 hours. 2 credits. Prerequisite: bacteriology. Dr. Leonard.
- 33s. Oral Pathology. Lectures and recitations on the special pathology of the teeth and other oral tissues. 33 hours. 3 credits. Prerequisites: bacteriology and pathology. Dr. Leonard.
- 32w,s. Periodontia. An intensive demonstration and practice course in the causes, treatment, and prevention of gingivitis and dental periclasia and in the prevention of dental caries. Special attention is paid to diagnosis and to systemic complications. 33 hours. 1 credit. Prerequisite: Operative Dentistry 31. Dr. Leonard, Dr. Waldron, Dr. R. E. Johnson.
- 41f,s. Periodontia. A continuation of Course 32. 33 hours. 1 credit. Prerequisite: Periodontia 32. Dr. Leonard, Dr. Waldron, Dr. R. E. Johnson.



## COLLEGE OF DENTISTRY

## DIVISION OF ORAL SURGERY

- 32w-33s.† Oral Surgery. Principles underlying general surgical procedure; development and application of anesthesia chiefly as applied to face, mouth, and jaws. General considerations in the extraction of teeth, and the removal of foci of infection. 22 lecture and recitation hours and 33 clinical hours. 5 credits. Prerequisite: Pathology 33. Dr. Griffith, Dr. Maves, Dr. Wiethoff, Dr. MacGibbon, Dr. Waldron, Dr. Hermann, Dr. Holliday, Dr. Ziskin, Dr. E. W. Nelson.
- 41f-42w-43s.† Oral Surgery. A course of lectures, recitations, and demonstrations covering the diagnosis, treatment, and dental relationship of diseases and conditions of the mouth, jaws, throat, eyes, ears, nose, and face. 33 lecture and recitation hours. 3 credits. Prerequisite: Oral Surgery 32-33. Dr. Waldron.
- 44f-45w.† Oral Surgery. Diagnosis and treatment of surgical diseases of the face, mouth, and jaws. Practice in local and general anesthesia. Consideration of types of patients and complications. 22 lecture and recitation hours and 33 clinical hours. 3 credits. Dr. Griffith, Dr. Maves, Dr. Waldron, and assistants.

## DIVISION OF PROSTHETIC DENTISTRY

- 11f-12w-13s. Prosthetic Dentistry. A course of lectures, recitations, and laboratory work covering the use of impression materials and the different processes of plate work. 33 lectures and recitation hours, 198 laboratory hours. 9 credits. Dr. Damon, Dr. Rudolph, Dr. Cooperman, Dr. Harker, Dr. Petri, Dr. Heckler, Dr. A. F. Johnson.
- 21f-22w. Prosthetic Dentistry. A course of lectures, recitations, and laboratory work covering the principles of metallic dentures. 198 hours. 6 credits. Prerequisite: Prosthetic Dentistry 11-12-13. Dr. Lawton, Dr. Delton, Dr. Wendell.
- 31f-32w-33s.† Prosthetic Dentistry. A course of lectures and recitations covering the subject of prosthetic dentistry in preparation for clinical work. 33 hours. 1 credit. Prerequisite: Prosthetic Dentistry 21-22. Dr. O. A. Weiss.
- 35w-36s.† Prosthetic Dentistry. Clinical practice in denture work. 132 hours. 6 credits. Prerequisite: Prosthetic Dentistry 21-22. Dr. Lasby, Dr. Flagstad, Dr. Rowe, Dr. Jernall, Dr. Ulvestad, Dr. Young.
- 41f-42w-43s.† Prosthetic Dentistry. A course of clinical work in prosthesis, cleft palate, and facial restorations. 198 hours. 6 credits. Prerequisites: Prosthetic Dentistry 31-32-33 and 35-36. Dr. Lasby, Dr. O. A. Weiss, Dr. Flagstad, Dr. Rowe, Dr. Jernall, Dr. Ulvestad, Mr. A. J. Weiss, Dr. Young.

## THESIS AND SEMINAR

- 42w-43s.† A thesis, seminar, and lecture course in the theory and practice of medicine and dentistry, applied economics, jurisprudence, psychology, ethics, etc. 33 hours. 3 credits. Dr. Owre, Dr. Hamilton, Dr. Litzenberg, Dr. Murray, Mr. Swenson, Dr. S. Marx White, Dr. Fahr, Dr. Boyd S. Gardner, Dr. E. L. Gardner, Dr. Rizer, Dr. Hansen.

## METALLOGRAPHY

159s. Dental Metallography. Lectures, recitations, and demonstrations, taking up the most important metals with special reference to those used in dentistry and the study of dental alloys from the standpoint of metallography. 33 hours. 2 credits. Prerequisite: Quantitative Chemistry. Offered to juniors. Mr. Harder, Mr. Dowdell, Mr. Weber.

## MILITARY SCIENCE AND TACTICS

## BASIC COURSE

A Basic Course in Military Science and Tactics is offered in each of the first two years of the Dental College. Thirty-three hours of didactic work supplemented by such practical exercises and drill as may be required to meet the standard required of all physically fit male students enrolled in the University.

## ADVANCED COURSE

The Advanced Course is offered in the junior and senior years to such students as have satisfactorily completed the Basic Course and have been selected by the professor of military science and tactics and the dean of the Dental College. A satisfactory completion of the Advanced Course is a requisite for graduation for all students who elect this course unless relieved by proper authority. All Advanced Course students are required to attend one summer camp. They will receive the pay of an enlisted man of the seventh grade for the period of the camp and commutation of rations throughout the two academic years of their Advanced Course and one vacation intervening. All students who satisfactorily complete the Advanced Course will be recommended for a commission as first lieutenant, Dental Section, Reserve Officers Corps.

Elements of Military Science. This course covers such instruction in citizenship, government, history, and organization of the military establishment as will awaken the student to an appreciation of his responsibilities and fit him to continue in the Advanced Course if he so elects. Lectures and conferences. 33 hours.

Tactics. This course will cover so much of medical department tactics in the field, and related subjects as may be properly considered in the allotted time. Lectures, conferences, and exercises. 33 hours.

Hygiene and Sanitation. This entire course will be devoted to a consideration of application of the rules of hygiene and sanitation in the army under varying conditions. Lectures. 33 hours.

Hospitalization and Medical Department Administration. The entire time allotted will be devoted to the organization and administration of hospitals, clinics, offices, etc., and to a consideration of public health measures. Lectures and exercises. 33 hours.

## PATHOLOGY

- 4f. General and Special Pathology. Circulatory disturbances, metabolic changes in cells and tissues, pigment deposits, inflammations and tumors. Pathology of selected diseases, tumors, and lesions with reference to those affecting mouth and dental structures. Exercises in gross and microscopic diagnosis. 165 hours. 9 credits. Offered to juniors. Prerequisites: Gross Anatomy, Histology. Dr. Clawson and assistants.

## PHARMACOLOGY

- 4w. Pharmacology. The history, origin, nature, pharmacal preparations, and use of drugs, including the discussion of their physiologic, pharmacologic, and therapeutic actions. 44 hours. 4 credits. Offered to juniors. Dr. Brown.
- 6w. Experimental Pharmacology. Laboratory exercises upon the chemical composition and mode of action of typical drugs upon man and animals, primarily for students in dentistry. One exercise per week. 22 hours. 1 credit. Offered to juniors. Dr. Hirschfelder, Dr. Brown, Mr. Jensen.

## PHYSIOLOGY

- 57f,su. Physiologic Chemistry. An intermediate course. The components of the animal body; foods, digestion, the excreta, and metabolism. 66 hours. 4 credits. Offered to sophomores. Prerequisites: Biology 1, 2 or 5, 6, 7; Chemistry 1, 2, 3 or 4, 5. Dr. Pettibone and assistants.
- 58w,su-59s,su. Physiology. An intermediate course in the physiology of muscle, nerve, blood, circulation, digestion, the nervous system and special senses; respiration, metabolism, nutrition, and excretion. 132 hours. 8 credits. Offered to sophomores. Prerequisites: Biology 1, 2 or 5, 6, 7; Chemistry 1, 2, 3 or 4, 5. Dr. Lyon, Dr. Scott, Dr. Greisheimer, and assistants.

## SURGERY

- 52s. Principles of Surgery. A study of the various surgical inflammations and processes; pathology and treatment. Principles underlying general surgical procedure as applied in dental practice. 22 hours. 2 credits. Offered to juniors. Dr. Cameron.

## GRADUATE WORK

Graduate work and opportunities for research are open in certain fields of dentistry to properly qualified students.

The qualifications for admission to graduate work in this field are a baccalaureate degree from an acceptable college or university, and the dental degree from this or any other approved university. Such qualified students desiring graduate work will pursue courses of study in accordance with the regulations of the Graduate School. They may elect majors and minors for the graduate degree from the graduate courses in anatomy,

embryology, histology, neurology, pathology, bacteriology, chemistry physiology, and physiologic chemistry. The material for investigation along dental lines in these various subjects is available from the dental clinic, the medical dispensary, the University Hospital, and the Mayo Clinic, at Rochester, Minnesota, through the Mayo Foundation for Medical Education and Research. The Mayo Foundation offers several fellowships in dentistry similar to fellowships in other specialties on the foundation.

No special bulletin is issued for this work. The interested student will find the general conditions and the courses in the above fields set forth in the bulletin on graduate work in medicine.

#### DENTAL NURSES COURSE

A course for dental nurses consisting of two years' work requiring for admission, graduation from an accredited high school, and leading to the degree of graduate dental nurse.

#### PRACTITIONERS' COURSE

In order to enlarge its educational field and to fill a want that has found expression among practitioners, the College of Dentistry through the General Extension Division offers from time to time a series of courses in crown and bridge work, oral diagnosis, operative dentistry, orthodontia, prosthetic dentistry, periodontia, oral hygiene, oral surgery, and similar subjects. These courses are confined to graduate dentists.

There is also an opportunity for a dentist to come into the College of Dentistry for selected courses at any time of the year by registering through the General Extension Division. The courses which may be taken in the manner suggested, and the limitations as to time and enrolment, are as follows:

1. Crown and Bridge Work. Registration is open at all times. Extension students limited to three at a time.
2. Oral Diagnosis. A two weeks' course beginning the second and fourth Mondays of each month. Extension students limited to three at a time.
3. Operative Dentistry. The course covers a period of two weeks, and is conducted by the senior operative staff.
4. Orthodontia. The course may be started at any time.
5. Prosthetic Dentistry. A two weeks' course beginning the first Monday of each month. Extension students limited to three at a time.
6. Periodontia. The course starts at the beginning of each month of the winter and spring quarters. Classes are held on Monday, Wednesday, and Friday, from 9:30 a.m. to 12 m. for one month. Extension students limited to four at a time.
7. Oral Surgery. Courses begin the second and fourth Mondays of each month for two weeks. Extension students limited to two at a time.

All work in dentistry to be done through the General Extension Division should be arranged for in advance by correspondence, or by personal interview.

ALUMNI ASSOCIATION OF THE COLLEGE OF DENTISTRY

President, O. DeForest Davis

Secretary-Treasurer, Louis W. Thom

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

*The School for Dental Nurses*  
*Announcement for the Years*  
**1924-1926**



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Act of October 3, 1917, authorized July 12, 1918*

1924							1925													
<b>JULY</b>							<b>JANUARY</b>							<b>JULY</b>						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	6	7	8	9	10	11	4	5	6	7	8	9	10	5	6	7	8	9	10	11
13	14	15	16	17	18	19	11	12	13	14	15	16	17	12	13	14	15	16	17	18
20	21	22	23	24	25	26	18	19	20	21	22	23	24	19	20	21	22	23	24	25
27	28	29	30	31	..	..	25	26	27	28	29	30	31	26	27	28	29	30	31	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>AUGUST</b>							<b>FEBRUARY</b>							<b>AUGUST</b>						
..	3	4	5	6	7	8	1	2	3	4	5	6	7	..	2	3	4	5	6	7
10	11	12	13	14	15	16	8	9	10	11	12	13	14	9	10	11	12	13	14	15
17	18	19	20	21	22	23	15	16	17	18	19	20	21	16	17	18	19	20	21	22
24	25	26	27	28	29	30	22	23	24	25	26	27	28	23	24	25	26	27	28	29
31	..	..	..	..	..	..	..	..	..	..	..	..	..	30	31	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>SEPTEMBER</b>							<b>MARCH</b>							<b>SEPTEMBER</b>						
..	7	8	9	10	11	12	1	2	3	4	5	6	7	..	6	7	8	9	10	11
14	15	16	17	18	19	20	8	9	10	11	12	13	14	13	14	15	16	17	18	19
21	22	23	24	25	26	27	15	16	17	18	19	20	21	20	21	22	23	24	25	26
28	29	30	..	..	..	..	22	23	24	25	26	27	28	27	28	29	30	..	..	..
..	..	..	..	..	..	..	29	30	31	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>OCTOBER</b>							<b>APRIL</b>							<b>OCTOBER</b>						
..	5	6	7	8	9	10	..	..	..	1	2	3	4	..	4	5	6	7	8	9
12	13	14	15	16	17	18	5	6	7	8	9	10	11	11	12	13	14	15	16	17
19	20	21	22	23	24	25	12	13	14	15	16	17	18	18	19	20	21	22	23	24
26	27	28	29	30	31	..	19	20	21	22	23	24	25	25	26	27	28	29	30	31
..	..	..	..	..	..	..	26	27	28	29	30	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>NOVEMBER</b>							<b>MAY</b>							<b>NOVEMBER</b>						
..	2	3	4	5	6	7	..	..	..	..	1	2	1	2	3	4	5	6	7	
9	10	11	12	13	14	15	3	4	5	6	7	8	9	8	9	10	11	12	13	14
16	17	18	19	20	21	22	10	11	12	13	14	15	16	15	16	17	18	19	20	21
23	24	25	26	27	28	29	17	18	19	20	21	22	23	22	23	24	25	26	27	28
30	..	..	..	..	..	..	24	25	26	27	28	29	30	29	30	..	..	..	..	..
..	..	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>DECEMBER</b>							<b>JUNE</b>							<b>DECEMBER</b>						
..	7	8	9	10	11	12	..	1	2	3	4	5	6	..	6	7	8	9	10	11
14	15	16	17	18	19	20	7	8	9	10	11	12	13	13	14	15	16	17	18	19
21	22	23	24	25	26	27	14	15	16	17	18	19	20	20	21	22	23	24	25	26
28	29	30	31	..	..	..	21	22	23	24	25	26	27	27	28	29	30	31	..	..
..	..	..	..	..	..	..	28	29	30	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

# UNIVERSITY CALENDAR

1924-25

1924			
September	18	Thursday	Payment of fees closes, except for new students
September	18-20		Entrance examinations
September	22	Monday	First semester evening extension classes begin <sup>2</sup>
September	22-26		Examinations for removal of conditions Physical examinations for all new students Registration period, <sup>2</sup> colleges of Science, Literature, and the Arts, Agriculture, Forestry, and Home Economics, and Education
September	25-26		Registration days <sup>2</sup> for all colleges not included above
September	26	Friday	Payment of fees for new students closes
September	29	Monday	Fall quarter begins, 8:30 <sup>1</sup> a.m.
October	23	Thursday	Senate meeting, 4:30 p.m.
November	1	Saturday	Home Coming Day; classes dismissed the third and fourth hours
November	4	Tuesday	Election Day; a holiday
November	11	Tuesday	Armistice Day; a holiday
November	27	Thursday	Thanksgiving Day; a holiday
December	17-20		State Day Convocation
December	4	Thursday	Final examination period
December	18	Thursday	Commencement Convocation Senate meeting, 4:30 p.m.
December	20	Saturday	Fall quarter ends, Christmas vacation begins, 5:20 p.m.
1925			
January	5	Monday	Christmas vacation ends, winter quarter begins, 8:30 <sup>1</sup> a.m.
January	30	Friday	First semester evening extension classes close
February	2	Monday	Second semester evening extension classes begin <sup>2</sup>
February	12	Thursday	Lincoln's Birthday; a holiday
February	19	Thursday	Charter Day Convocation Senate meeting, 4:30 p.m.

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

<sup>2</sup> Registration subsequent to the date specified will necessitate the approval of the college concerned. See also penalty fees for late registration, page 10.

<sup>3</sup> This date does not refer to correspondence study courses which may be started at any time during the year.



## SCHOOL FOR DENTAL NURSES

March	16-19		Final examination period
March	21	Saturday	Winter quarter ends, spring vacation begins, 5:20 p.m.
March	30	Monday	Spring vacation ends, spring quarter begins, 8:30 <sup>1</sup> a.m.
April	10	Friday	Good Friday; a holiday
May	14	Thursday	Cap and Gown Day Convocation
May	21	Thursday	Senate meeting, 4:30 p.m.
May	29	Friday	Second semester evening extension classes close
May	30	Saturday	Memorial Day; a holiday
June	10-13		Final examination period
June	13	Saturday	Spring quarter closes, 5:20 p.m.
June	14	Sunday	Baccalaureate service
June	15	Monday	Fifty-third annual commencement
June	19-20		Summer Session first term begins, registration and payment of fees
June	22	Monday	Classes begin, 8:00 a.m.
July	4	Saturday	Independence Day; a holiday
August	1	Saturday	First term Summer Session closes Registration and payment of fees for second term closes
August	3	Monday	Second term classes begin
September	5	Saturday	Second term Summer Session closes

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 and peculiar circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

## AN ACT TO PROVIDE FOR THE LICENSING OF DENTAL NURSES AND PROVIDING THE DUTIES AND RIGHTS OF DENTAL NURSES.

Be it enacted by the Legislature of the State of Minnesota:

Section 1. *Who may become dental nurse.*—Any woman of good moral character, having a high school education and being 20 years of age or over, who is a graduate of a training school for dental nurses requiring a course of not less than two academic years, and approved by the board of dental examiners, or who is a graduate of a training school for nurses and has received at least three (3) months' clinical training in dental hygiene in any approved training school for dental nurses, may upon payment of ten (\$10) dollars be examined by said board on the subjects considered essential by it for a dental nurse. Such examinations may, in the discretion of the board, be conducted by a part of the members of the board. If the applicant in the opinion of the board, successfully passes said examination, she shall be registered and licensed as a dental nurse. Any woman of good moral character and 20 years of age or more, who before June 1, 1919, shall register her name with the state board of dental examiners, may upon showing three (3) years' actual experience in the office of a licensed dentist, and upon complying with such requirements and passing such examinations as the board of dental examiners shall require, be licensed as a dental nurse.

Sec. 2. *Employment of and practice by dental nurses.*—Any licensed dentist, public institution or school authorities may employ such licensed dental nurse. Such dental nurse may remove lime deposits, accretions and stains from the exposed surface of the teeth, and administer gas and ether anesthesia, as applied to dentistry, but shall not perform any other operation on the teeth or tissues of the mouth. She may operate in the office of any licensed dentist or in any public institution, or in the schools, under the general direction or supervision of a licensed dentist. The board of dental examiners may suspend or revoke, with power to reinstate, the license of any licensed dentist who shall permit any dental nurse operating under his supervision, to perform any operation other than that permitted under the provisions of this section, and it may also suspend or revoke, with power of reinstatement, the license of any dental nurse violating the provisions of this act, the procedure to be followed in the case of such suspension, revocation, or reinstatement, shall be the same as that prescribed by law in the case of suspension, revocation or reinstatement of a licensed dentist.

Sec. 3. *Payments to be made to Board of Dental Examiners.*—Before the first of May in each year, every licensed dental nurse shall pay to the board of dental examiners a license fee of one (\$1) dollar and in default of such payment, the board may upon hearing and upon twenty (20) days' notice revoke the license of the nurse in default; but the payment of such

fee on or before the time of hearing, with such additional sum not exceeding five (\$5) dollars, as may be fixed by the board, shall excuse any default. The board may collect such fee by suit.

Sec. 4. *Licensing of dental nurses authorized by another state.*—Any female dental nurse or dental hygienist duly licensed to practice as such in another state having and maintaining an equal standard of laws regulating the practice of dental nurses with this state, and who is of good moral character and is desirous of moving to this state, and deposits in person with the board of dental examiners a certificate from the examining board of the state in which she is licensed, certifying to the fact of her being licensed and that she is of good moral character and professional attainments, may upon the payment of a fee of twenty (\$20) dollars, at the discretion of the board, be granted a license to practice in this state without further examination. As to any person so applying and who has been licensed in a state not maintaining an equal standard of laws within this state, the board may license such person upon the payment of the fee above provided for, furnishing the same evidence as to licensing, good moral character, and professional attainments, and passing such further examinations as the board of dental examiners shall deem necessary.

Sec. 5. This act shall take effect from and after its passage.

Approved April 15, 1919.

## SCHOOL FOR DENTAL NURSES

### FACULTY\*

- Lotus Delta Coffman, Ph.D., LL.D., President  
William Watts Folwell, LL.D., President Emeritus  
Alfred Owre, D.M.D., M.D., C.M., B.A., Dean of the College of Dentistry,  
Professor of the Practice of Dentistry, Chairman of the Department  
of Dentistry  
Harold J. Leonard, B.A., D.D.S., Associate Professor of Oral Hygiene and  
Pathology, Chairman of the Division of Oral Hygiene and Pathology  
and Superintendent for Dental Nurses  
Anne Dudley Blitz, M.A., Dean of Women  
Edward E. Nicholson, M.A., Dean of Student Affairs  
Richard O. Beard, M.D., Associate Professor of Physiology  
Peter J. Brekhus, B.A., D.D.S., Professor of Crown and Bridge Work and  
Oral Diagnosis and Chairman of the Division of Oral Diagnosis  
F. Stuart Chapin, Ph.D., Professor of Sociology and Chairman of the  
Department of Sociology  
Alice M. Child, M.A., Assistant Professor of Home Economics  
George M. Damon, D.D.S., Professor of Prosthetic Dentistry and Oral  
Anatomy and Chairman of the Division of Oral Anatomy  
Harold S. Diehl, M.A., M.D., Assistant Professor of Preventive Medicine  
and Public Health, Director of the University Health Service and of  
the Department of Preventive Medicine and Public Health  
George W. Dowrie, Ph.D., Professor of Economics and Dean of the School  
of Business  
Richard M. Elliott, Ph.D., Associate Professor of Psychology and Chairman  
of the Department of Psychology  
Esther Greisheimer, Ph.D., M.D., Assistant Professor of Physiology  
Charles A. Griffith, D.D.S., Professor of Oral Surgery and Chairman of  
the Division of Oral Surgery  
Lee A. Harker, D.D.S., Assistant Professor of Oral Anatomy  
Houghton Holliday, B.A., D.D.S., Assistant Professor of Oral Diagnosis  
and Oral Surgery  
Clarence M. Jackson, M.S., M.D., Professor of Anatomy and Director of  
the Department of Anatomy  
Winford P. Larson, M.D., Professor of Bacteriology and Immunology and  
Director of the Department of Bacteriology and Immunology  
William F. Lasby, B.A., D.D.S., Professor of Prosthetic Dentistry and  
Orthodontia and Superintendent of the Infirmary  
Elias P. Lyon, Ph.D., M.D., Professor of Physiology and Director of the  
Department of Physiology  
Wylle B. McNeal, B.S., M.A., Professor of Home Economics and Chief  
of the Division of Home Economics

\*In this roster the head of the department in which instruction is given is listed as well as the actual teacher of the course, since in each case the content and arrangement of the course is worked out in co-operation with the head.

- J. Anna Norris, M.D., Professor of Physical Education for Women and  
Director of Health and Physical Education for Women
- Frank M. Rarig, M.A., Associate Professor of Public Speaking
- M. Cannon Sneed, Ph.D., Associate Professor of Chemistry and Head of  
the Division of General and Inorganic Chemistry
- Joseph M. Thomas, Ph.D., Professor of English and Chairman of the  
Department of English
- Carl W. Waldron, M.D., D.D.S., L.D.S., Associate Professor of Oral  
Hygiene and Pathology and of Oral Surgery
- Amos S. Wells, B.A., D.D.S., Professor of Crown and Bridge Work, and  
Chairman of the Division of Crown and Bridge Work
- Daniel E. Ziskin, D.D.S., Assistant Professor of Oral Surgery
- Ruth E. Boynton, B.A., M.D., Instructor in Preventive Medicine and Public  
Health
- Hally J. Fisher, R.N., Instructor in Preventive Medicine and Public Health
- Beryl S. Green, M.A., Instructor in Bacteriology and Immunology
- Raymond E. Johnson, D.D.S., Instructor in Oral Hygiene and Pathology
- Raymond H. Lundquist, D.D.S., Instructor in Crown and Bridge Work
- Lillian Mayer, B.A., M.D., Instructor in Preventive Medicine and Public  
Health
- Shirley P. Miller, Ph.D., Instructor in Anatomy
- Cora L. Ueland, M.A., Instructor in Oral Hygiene and Pathology and  
Supervisor of School for Dental Nurses
- F. Denton White, D.D.S., Instructor in Oral Hygiene and Pathology
- Mildred Coddon, Teaching Fellow in Business
- Walter V. McGilvra, Teaching Fellow in Oral Surgery

## GENERAL INFORMATION

*Purpose.*—The School for Dental Nurses has been established primarily to fill the need for workers in the public schools, hospitals, mercantile and industrial institutions and dental offices to do dental prophylaxis work and to teach the hygiene of the mouth—in other words to do preventive dental work which has not been possible in the organization of dentistry up to the present and which is recognized to be one of the great physical needs of the times. As thoro a background of scientific and cultural subjects as is possible in the time of the course is included to give students that professional education and point of view without which they would be mere technicians and quite unsafe to turn loose on the public in the semi-independent capacity which the nature of their work will demand. The course includes training in all branches of dental office assisting and should make graduates easily adaptable to the general and special needs of the private dental offices should that be the field of work selected.

The course requires two years of thirty-three weeks each and leads to the degree of graduate dental nurse (G.D.N.). The incorporation of this work in the University makes it possible to give all the subjects of the curriculum in the appropriate departments of the University, thus assuring a university contact to the student and instruction under the best auspices.

The first year's work deals mostly with preliminary science courses and dental technic and corresponds to some extent with the year course given at other schools. The second year is designed to prepare the student particularly for work in the public schools and clinics where the worker must be largely on her own responsibility and must be able to take an active part in oral hygiene work with the public.

*Time and place.*—The course of study in the School for Dental Nurses for the school year 1924-25 will begin September 29, 1924. Registration days are the two days preceding. The work is done in the various University buildings housing the respective departments excepting that done in the hospitals and schools of the Twin Cities in the second year. The fall quarter is the only time at which beginning students will be admitted. Rules for the guidance of students are printed in a separate booklet.

*Registration.*—Applicants for admission may obtain credential blanks from the office of the registrar or from the superintendent of the school, Dr. Harold J. Leonard, College of Dentistry, University of Minnesota. These should be filled out and sent by the principal or superintendent of the high school or preparatory school to the registrar's office.

All applications should be filed before August 15 at which time a committee will pass upon the candidates whose credentials are satisfactory, choosing the twenty-five best prepared to enter upon the career of dental nursing as shown by their credentials. Those not included in the best twenty-five will be placed upon the waiting list to be notified in order of merit of any vacancy existing in the class. In case twenty-five have not applied by August

15 all properly accredited applicants will be included and the class filled as applications come in. Notification of acceptance or rejection will not be sent before August 15 but applicants will be informed whether their credentials are satisfactory as they come in. On receipt of notice of acceptance a preliminary fee of ten (\$10) dollars must be sent as a guaranty of the candidate's intention to enter and in order that a place may be held. This will be applied on the first quarter's tuition fee and is not refundable.

For further information in regard to registration and to the general requirements for admission to the University, application may be made for the bulletin of general information.

*Requirements for admission.*—The School for Dental Nurses requires for admission graduation from an approved high school or other preparatory school on the accredited list.

Typewriting credit or ability to demonstrate a fair proficiency on the typewriter is also an entrance requirement. Students without this requirement will need to get it outside of the University before beginning of the spring quarter of the freshman year. High school chemistry is also an entrance requirement beginning with the fall of 1924. Students without this requirement can arrange to take a heavier course (see departmental statement in chemistry, page 13) and make up the deficiency by the end of the winter quarter. Preference will be given to women of superior preliminary training. Applicants must be not less than eighteen nor more than thirty-five years of age. They must be able to pass a satisfactory general physical examination by the school physician. The beginning class is limited to twenty-five students.

The following fees are required.

Preliminary fee (to be applied on tuition fee of first quarter).....	\$10.00
Tuition fee (per quarter).....	25.00
*Deposit (first quarter only).....	5.00
Health fee (per quarter).....	2.00
Shevlin Hall (per quarter).....	1.00
Special fees:	
Examination for removal of conditions.....	1.00
Examination for credit (after first six weeks in residence)....	5.00
Special examinations.....	5.00
Chemistry deposit.....	5.00

*Registration penalties.*—A penalty fee for late registration, late change of registration, or late payment of fees shall be two dollars (\$2) and one dollar (\$1) additional for each day of delay after classes begin, provided that no student shall pay more than twelve dollars (\$12) of penalty in any given quarter.

\* The following charges are made against the general deposit for each student in addition to such charges as may be incurred for lockers, library penalties, laboratory breakage, etc.

<i>Minnesota Daily</i> , per quarter.....	\$0.50
Post-office box, per quarter.....	0.20
<i>University Address Book</i> .....	0.35

*Part-time fees.*—Students not registered for the full course will be charged tuition at the rate of \$2 per credit.

*Advanced standing.*—Graduates of approved training schools for nurses who are also graduates of accredited high schools will be admitted for advanced standing in the School for Dental Nurses, and should be able to complete the remainder of the work required for the degree of graduate dental nurse in one college year. Graduate nurses will be given permission to enter the school for one quarter's work to qualify them according to the law to take the state board examination for a license to practice dental nursing. Such students will not be candidates for the degree of graduate dental nurse and will be given university credit only in so far as it would apply if sufficient work to qualify for the degree were taken later.

*Instruments.*—The University will furnish the larger pieces of equipment needed for the work in the clinic and laboratories but the students must furnish their own aprons, operating instruments, and tools. These instruments and tools will be needed at the beginning of the freshman year. They will cost approximately forty dollars. Some few textbooks also will be required.

#### PRIZES

*Alpha Gamma Gamma prize in dental nursing.*—The active chapter of Alpha Gamma Gamma Sorority offers an annual prize of ten dollars (\$10) in gold to that student graduating from the School for Dental Nurses who has maintained the highest scholastic average and who has completed her entire course at the University of Minnesota.

*The Louise C. Ball prize.*—Annually Louise C. Ball, B.A., D.D.S., who founded the courses in oral hygiene in New York City, July 10, 1916, at Columbia University, will give a prize of forty dollars in gold to the student in the graduating class writing the best essay on "Preventive Dentistry."



# COURSE OF STUDY, YEAR 1924-25

## FRESHMAN YEAR

Number	Subject	Department	Fall Quarter		Winter Quarter		Spring Quarter		Total		Prerequisites	Teacher
			Hours*	Credits†	Hours	Credits	Hours	Credits	Hours	Credits		
3f	Elementary Anatomy	Anatomy	33	3					33	3	None	Mr. Miller
4f-5w	General Inorganic Chemistry	Chemistry	77	4	77	4			154	8	H.S. Chemistry	Ar. by Mr. Sneed
1f-2w-3s	Prophylaxis	Dentistry	99	3	99	3	99	3	297	9	None	Miss Ueland
1f-2w-3s	Oral Anatomy	Dentistry	44	2	44	2	44	2	132	6	None	Dr. Harker
1f-3s	Dental Assisting	Dentistry	22	1			33	1	55	2	None	Miss Ueland
95Nf-96Ns	Office Practice	Business	33	2			33	2	66	4	Typewriting	Miss Coddon
1f-2w-3s	Elem. Physical Training	Physical Education	33	0	33	0	33	0	99	0	None	Ar. by Dr. Norris
4f	Preliminary Hygiene	Physical Education	11	0					11	0	None	Dr. Norris
6s	Principles of Dentistry	Dentistry	22	1					22	1	None	Ar. by Dr. Leonard
4f,w,s,su	Elementary Physiology	Physiology			88	5			88	5	Chem. 4 Anat. 3	Dr. Greishoimer
2w-3s	Surgical Assisting	Dentistry			33	1	44	1½	77	2½	None	Ar. by Dr. Holliday
2w	Dental Laboratory	Dentistry			33	1	33	1	66	2	None	Dr. Lundquist
2w	Dental Roentgenology	Dentistry					33	1½	33	1½	None	Dr. Holliday
1f,w,s,su	Elementary Bacteriology	Bacteriology					66	4	66	4	None	Mrs. Green
			—	—	—	—	—	—	—	—		
		Total	374	16	407	16	418	16	1199	48		

## SENIOR YEAR

4f,w,s } 5f,w,s } 6f,w,s }	Composition for Technical Students	English	33	3	33	3	33	3	99	9	None	Ar. by Mr. Thomas
4f-5w-6s		Prophylaxis	66	2	66	2	66	2	198	6	Proph. 1-2-3	Miss Ueland
1f-2w		General Psychology	Psychology	33	3	33	3			66	6	None
1f	Oral Pathology	Dentistry	33	3					33	3	Phys. 4 & Bact. 1	Dr. Leonard
23s	Food and Nutrition	Home Economics	55	3					55	3	Chem. 5	Miss Child
32f	Oral Hygiene	Dentistry	22	2					22	2	Phys. 4 & Bact. 1	Dr. Leonard
1f,w,s	Introduction to Sociology	Sociology			55	5			55	5	None	Ar. by Mr. Chapin
7w	Oral Hygiene Education	Dentistry			11	1			11	1	None	Miss Ueland
32w,s-41f,s	Periodontia Technic	Dentistry			33	1	33	1	66	2	Proph. 1-2-3	Dr. Leonard
41s	Public Speaking	English					33	3	33	3	Rhet. 4-5	Ar. by Mr. Rarig
9s	Thesis and Seminar	Dentistry					22	2	22	2	None	Dr. Owre
52f,w,s	Health Care of the Family	Hygiene					55	3	55	3	Phys. 4 & Bact. 1	Miss Fisher
4s	Anesthetics	Dentistry					33	1	33	1	Phys. 4	Mr. McGilvra
			—	—	—	—	—	—	—	—		
		Total	242	16	231	15	275	15	748	46		

\* Hours mean actual hour periods spent in class.

† A credit means approximately three hours a week for a quarter. This may be three hours of laboratory or clinic work without time spent in outside preparation or one hour in recitation requiring approximately two hours of outside preparation.

## DESCRIPTION OF COURSES

### ANATOMY

3. Elementary Anatomy. A brief survey of human gross anatomy including a brief introduction to histology, followed by a more detailed study of the anatomy of the oral region. Recitations and demonstrations. Three hours a week for one quarter. Mr. Miller.

### BACTERIOLOGY AND IMMUNOLOGY

- 1f,w,s,su. Elementary Bacteriology. The principles and technic of general bacteriology. Studies of the morphologic and biologic characters of the common bacteria. Preparation of culture media. Disinfectants and disinfection. Bacteriology of water and food products. Six hours a week for one quarter. Mrs. Green.

### BUSINESS

- 95Nf. Office Practice. A study of the most approved practices relative to the conduct of an office; appliances, accounts, records, correspondence, filing systems. Three hours a week for one quarter. Miss Coddon.
- 96Ns. Office Practice. A continuation of Course 95Nf.

### CHEMISTRY

- 4f-5w. General Inorganic Chemistry. A study of general laws of chemistry and of non-metals and their compounds with a brief introduction to organic and biological chemistry. Seven hours a week for two quarters. Arranged by Mr. Sneed and staff.
- 14f-15w. General Inorganic Chemistry. A course similar to the foregoing for those who have not had high school chemistry. Nine hours a week for two quarters. Arranged by Mr. Sneed and staff.

### DENTISTRY

#### ORAL ANATOMY

- 1f-2w-3s. Oral Anatomy. A course of lectures and recitations on the anatomy and nomenclature of the teeth and such laboratory work as drawing, dissection, modeling, and carving of the teeth. Special attention is given to the physiological function of tooth form and its practical application. Four hours a week for three quarters. Dr. Harker.

#### CROWN AND BRIDGE

- 2w. Dental Laboratory. A technic course in the manipulation of investments, waxes, metals, and porcelain including simple bridge construction as used in the dental office laboratory. Three hours a week for two quarters. Dr. Lundquist.

## SCHOOL FOR DENTAL NURSES

## ORAL DIAGNOSIS

- 2w. Dental Roentgenology. Lectures, demonstrations, readings, and quizzes in the elements of dental roentgenology. Training in the operation of X-ray equipment and in producing and reading X-ray films. One lecture hour; two practice hours a week for one quarter. Dr. Holliday and assistants.

## ORAL HYGIENE AND PATHOLOGY

- 31f. Oral Hygiene. Lectures and recitations on general and oral hygiene. Such subjects as communicable diseases, skin diseases, and orthopedics are included. Two hours a week for one quarter. Dr. Leonard.
- 1f. Oral Pathology. A somewhat abbreviated course on the special pathology of the teeth and other oral tissues, including the systemic manifestations of oral disease. The course is introduced by a brief study of general pathology. Three hours a week for one quarter. Dr. Leonard.
- 1f-2w-3s. Prophylaxis. Theory and practice in the technic and application of dental prophylaxis and oral hygiene. The work is introduced by practice on manikins after which it is done in the dental infirmary. Nine hours a week throughout the year. Miss Ueland.
- 4f-5w-6s. Prophylaxis. A continuation of Prophylaxis 1-2-3 in the public schools and hospitals of the Twin Cities. In this course particular attention is paid to physical defects both outside and in the oral cavity which may be prevented or corrected. Six hours a week throughout the year. Dr. Ziskin, Miss Ueland, Dr. White.
- 7w. Oral Hygiene Education. A recitation course in the preparation and delivery of talks on oral hygiene for various groups and occasions. One hour a week for a quarter. Miss Ueland.
- 32w,s. Periodontia Technic. An intensive demonstration and practice course in the causes, treatment, and prevention of gingivitis and dental periclasia, and in the prevention of dental caries. Special attention is paid to diagnosis and to systemic complications. Three hours a week for one quarter. Dr. Leonard, Dr. Waldron, Dr. Johnson.
- 41f,s. Periodontia. A continuation of Periodontia 32.

## ORAL SURGERY

- 2w-3s. Surgical Assisting. Lectures and practice in assisting in oral surgical operations. Three hours a week for two quarters. Dr. Holliday, and members of the Oral Surgery staff.
- 4s. Anesthetics. Lectures and practice in administering general anesthetics. Three hours a week for a quarter. Mr. McGilvra.

## THESIS AND SEMINAR, MISCELLANEOUS LECTURES, ETC.

- 9s. Thesis and Seminar. A conference course in the theory and practice of dentistry, including such subjects as ethics, jurisprudence, economics, etc. Two hours a week for one quarter. Dr. Owre.
- 6s. Principles of Dentistry. A course of lectures on the principles of operative dentistry, crown and bridge, prosthetics, and orthodontia by which an understanding and appreciation may be gained of the problems

involved in each subject. Two hours a week for one quarter. Arranged by Dr. Leonard.

- 1f-3s. Dental Assisting. A course of lectures, demonstrations, and practice in assisting the dentist at the chair. A study of dental equipment, instruments, and drugs is included. Three hours a week for the fall quarter, six hours a week for the spring quarter. Arranged by Miss Ueland.

#### ENGLISH

- 4f,w,s,-5f,w,s,-6f,w,s. Composition for Technical Students. A beginning course in the study of the fundamental principles of composition; training in the art of writing; the principles of structure, and analysis of specimens of good prose. Three hours a week throughout the year. Arranged by Mr. Thomas and staff.
- 41s. Public Speaking. Fundamentals of effective speaking; breathing, voice production, enunciation, and action; delivery of extracts from the works of well-known writers and speakers; principles underlying speech-making applied in both oral and written compositions. Three hours a week for one quarter. Arranged by Mr. Rarig and staff.

#### HOME ECONOMICS

- 25s. Food and Nutrition. Chemical composition and physiological significance of foodstuffs. Principles of cookery underlying the preparation of foods: planning and preparation of normal and special diets. Five hours a week for one quarter. Miss Child.

#### PHYSICAL EDUCATION FOR WOMEN

- 1f-2w-3s. Elementary Physical Training. Lighter forms of gymnastics, apparatus work, orthopedic exercise, folk dancing, indoor and out door games. Individual health consultations. Arranged by Dr. Norris and staff.
- 4s. Preliminary Hygiene. One lecture a week. The most essential aspects of the care of personal health. Dr. Norris.

#### PHYSIOLOGY

- 4f,w,s,su. Elementary Physiology. The functional properties of tissue-cells; the material bases of the body; the nutritive media; the physiology of nerve and muscle; of the nervous system; the vascular mechanism; respiration, digestion, excretion, and metabolism. Eight hours a week for one quarter. Dr. Beard, Dr. Greisheimer.

#### PREVENTIVE MEDICINE AND PUBLIC HEALTH

- 52f,w,s. Health Care of the Family. First aid; communicable diseases; their transmission and prevention; hygiene of infancy, maidenhood,

maturity. The care of the sick room; observation and care of the patient. Elementary symptomatology. Five hours a week for one quarter. Dr. Boynton, Dr. Mayer, Miss Fisher.

### PSYCHOLOGY

1f-2w. General Psychology. An introductory survey of psychology; its material, fundamental laws, applications, and relations to other sciences. Two lectures, one recitation per week for two quarters. Arranged by Mr. Elliott and staff.

### SOCIOLOGY AND SOCIAL WORK

1f,w,s. Introduction to Sociology. A study of the origin and development of human societies; various agencies which have determined the type of social life; social organization, institutions, and progress; bearing of sociology upon other social sciences and arts. Five hours a week for one quarter. Arranged by Mr. Chapin and staff.

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

*The School of Mines*  
*Announcement for the Year*  
**1924-1925**



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1924							1925													
<b>JULY</b>							<b>JANUARY</b>							<b>JULY</b>						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	..	1	2	3	4	5	..	..	..	..	1	2	3	..	..	..	1	2	3	4
6	7	8	9	10	11	12	4	5	6	7	8	9	10	5	6	7	8	9	10	11
13	14	15	16	17	18	19	11	12	13	14	15	16	17	12	13	14	15	16	17	18
20	21	22	23	24	25	26	18	19	20	21	22	23	24	19	20	21	22	23	24	25
27	28	29	30	31	..	..	25	26	27	28	29	30	31	26	27	28	29	30	31	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>AUGUST</b>							<b>FEBRUARY</b>							<b>AUGUST</b>						
..	..	..	..	..	1	2	1	2	3	4	5	6	7	..	..	..	..	..	..	1
3	4	5	6	7	8	9	8	9	10	11	12	13	14	2	3	4	5	6	7	8
10	11	12	13	14	15	16	15	16	17	18	19	20	21	9	10	11	12	13	14	15
17	18	19	20	21	22	23	22	23	24	25	26	27	28	16	17	18	19	20	21	22
24	25	26	27	28	29	30	..	..	..	..	..	..	..	23	24	25	26	27	28	29
31	..	..	..	..	..	..	..	..	..	..	..	..	..	30	31	..	..	..	..	..
<b>SEPTEMBER</b>							<b>MARCH</b>							<b>SEPTEMBER</b>						
..	1	2	3	4	5	6	1	2	3	4	5	6	7	..	..	1	2	3	4	5
7	8	9	10	11	12	13	8	9	10	11	12	13	14	6	7	8	9	10	11	12
14	15	16	17	18	19	20	15	16	17	18	19	20	21	13	14	15	16	17	18	19
21	22	23	24	25	26	27	22	23	24	25	26	27	28	20	21	22	23	24	25	26
28	29	30	..	..	..	..	29	30	31	..	..	..	..	27	28	29	30	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>OCTOBER</b>							<b>APRIL</b>							<b>OCTOBER</b>						
..	..	..	1	2	3	4	..	..	..	1	2	3	4	..	..	..	..	1	2	3
5	6	7	8	9	10	11	5	6	7	8	9	10	11	4	5	6	7	8	9	10
12	13	14	15	16	17	18	12	13	14	15	16	17	18	11	12	13	14	15	16	17
19	20	21	22	23	24	25	19	20	21	22	23	24	25	18	19	20	21	22	23	24
26	27	28	29	30	31	..	26	27	28	29	30	..	..	25	26	27	28	29	30	31
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>NOVEMBER</b>							<b>MAY</b>							<b>NOVEMBER</b>						
..	..	..	..	..	..	1	..	..	..	..	..	1	2	1	2	3	4	5	6	7
2	3	4	5	6	7	8	3	4	5	6	7	8	9	8	9	10	11	12	13	14
9	10	11	12	13	14	15	10	11	12	13	14	15	16	15	16	17	18	19	20	21
16	17	18	19	20	21	22	17	18	19	20	21	22	23	22	23	24	25	26	27	28
23	24	25	26	27	28	29	24	25	26	27	28	29	30	29	30	..	..	..	..	..
30	..	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>DECEMBER</b>							<b>JUNE</b>							<b>DECEMBER</b>						
..	1	2	3	4	5	6	..	1	2	3	4	5	6	6	7	8	9	10	11	12
7	8	9	10	11	12	13	7	8	9	10	11	12	13	13	14	15	16	17	18	19
14	15	16	17	18	19	20	14	15	16	17	18	19	20	20	21	22	23	24	25	26
21	22	23	24	25	26	27	21	22	23	24	25	26	27	27	28	29	30	31	..	..
28	29	30	31	..	..	..	28	29	30	..	..	..	..	..	..	..	..	..	..	..
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# UNIVERSITY CALENDAR

1924-25

1924			
September	18	Thursday	Payment of fees closes, except for new students
September	18-20		Entrance examinations
September	22	Monday	Seniors, School of Mines, report for completion of field work
September	22-26		Examinations for removal of conditions and entrance examinations
			Physical examinations for all new students
September	24	Wednesday	Juniors, School of Mines, report for completion of field work
September	25-26		Registration days
September	26	Friday	Payment of fees for new students closes
September	29	Monday	Fall quarter begins, 8:30 <sup>1</sup> a.m.
October	23	Thursday	Senate meeting, 4:30 p.m.
November	1	Saturday	Home Coming Day; classes dismissed the third and fourth hours
November	4	Tuesday	Election Day; a holiday
November	11	Tuesday	Armistice Day; a holiday
November	27	Thursday	Thanksgiving Day; a holiday
December	4	Thursday	State Day Convocation
December	17-20		Final examination period
December	18	Thursday	Commencement Convocation
December	18	Thursday	Senate meeting, 4:30 p.m.
December	20	Saturday	Fall quarter ends, Christmas vacation begins, 5:20 p.m.
1925			
January	5	Monday	Christmas vacation ends, winter quarter begins, 8:30 <sup>1</sup> a.m.
February	12	Thursday	Lincoln's Birthday; a holiday
February	19	Thursday	Charter Day Convocation
February	19	Thursday	Senate meeting, 4:30 p.m.
March	16-19		Final examination period
March	21	Saturday	Winter quarter ends, spring vacation begins, 5:20 p.m.
March	30	Monday	Spring vacation ends, spring quarter begins, 8:30 <sup>1</sup> a.m.
April	10	Friday	Good Friday; a holiday
May	14	Thursday	Cap and Gown Day Convocation

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



## SCHOOL OF MINES

May	21	Thursday	Senate meeting, 4:30 p.m.
May	30	Saturday	Memorial Day; a holiday
June	10-13		Final examination period
June	13	Saturday	Spring quarter closes, 5:20 p.m.
June	14	Sunday	Baccalaureate service
June	15	Monday	Fifty-third annual commencement
June	19-20		Summer Session first term begins, registration and payment of fees
June	22	Monday	Classes begin, 8:00 a.m.
July	4	Saturday	Independence Day; a holiday
August	1	Saturday	First term Summer Session closes
			Registration and payment of fees for second term closes
August	3	Monday	Second term classes begin
September	5	Saturday	Second term Summer Session closes

*Program of Supplementary Examinations*

Tuesday	Sept. 23	9-12 a.m.	Physics
		2-5 p.m.	Chemistry, experimental engineering
Wednesday	Sept. 24	9-12 a.m.	Mathematics and mechanics
		2-5 p.m.	Drawing and descriptive geometry
Thursday	Sept. 25	9-12 a.m.	Metallurgical subjects
		2-5 p.m.	Electric power
Friday	Sept. 26	9-12 a.m.	Geology and mineralogy
		2-5 p.m.	Mining and mining engineering subjects

## GENERAL INFORMATION

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

The School of Mines occupies the new 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 offices, 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, darkrooms, 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 there are three regular courses of study, viz., Mining Engineering, Mining Engineering specializing in Geology, and Metallurgy, leading to the degree of engineer of mines (E.M.), engineer of mines in geology (E.M. [Geology]), and metallurgical engineer (Met. E.) respectively.

The degree of metallurgical engineer may be conferred upon a candidate who received the degree of engineer of mines in four years, and vice versa, provided such candidate completes an additional year's work at the school and presents a suitable thesis.

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 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 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, charges prepaid. Shipping tags will be furnished upon request.

Address all communications to William R. Appleby, Director, Minnesota School of Mines Experiment Station, the University of Minnesota, Minneapolis, Minnesota.

#### ADMISSION

The courses leading to the degrees of engineer of mines, engineer of mines (in geology), 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, the University of Minnesota, Minneapolis.

#### UNCLASSIFIED STUDENTS

No unclassified students will be admitted to the School of Mines.

#### 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 Enrolment Committee of the School of Mines.

#### FEEES

Tuition fees (per quarter)	
Residents of Minnesota .....	\$30.00
Nonresidents .....	40.00
Deposit (first quarter only) .....	5.00*
Military deposit (required of all students taking drill) .....	10.00
Minnesota Union (per quarter) .....	1.00
Health fee .....	2.00
Special fees	
Examination for removal of condition .....	1.00
Examinations for credit (after the first six weeks in residence) .....	5.00
Special examinations .....	5.00
Chemistry deposit .....	5.00

#### Penalty Fees

*Registration penalties.*—A penalty fee for late registration, late change of registration, or late payment of fees shall be two dollars (\$2) and one dollar (\$1) additional for each day of delay after classes begin, provided that no student shall pay more than twelve dollars (\$12) of penalty in any quarter.

#### 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 following charges are made against the general deposit for each student in addition to such charges as may be incurred for lockers, library penalties, laboratory breakage, etc.:

<i>Minnesota Daily</i> (per quarter) .....	\$0.50
Post-office (per quarter) .....	.20
<i>University Address Book</i> .....	.35

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.

#### 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); and the investigation of a metallurgical problem, for candidates for the degree of metallurgical engineer.

As much latitude as possible will be allowed the student in the choice of type of deposit and location. He must select a suitable project 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 ample opportunity therefor.

Prior to the reopening of field work at the School of Mines, Monday, September 22, 1924, each student is required to submit to the department concerned an outline embodying the principal features of the project, together with the topographic map and a sufficient number of photographs to represent clearly the locality. Unless this outline is submitted when due and is accepted by the department, final registration for the first semester, senior year, will not be permitted.

Students may, if they so desire, take a reasonable number of samples on which to make assays and hand laboratory tests during the ore-testing laboratory work given in the first semester, senior year.

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.

#### 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 on page 4.

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 failing to pass supplementary examinations will become members of the succeeding class and must register for those subjects in which they have failed. They may take in addition other subjects not more than one year in advance of their class, with the exception of mining, mining engineering, and metallurgical courses, based upon requirements of the various courses and daily program. They may also take certain electives in other colleges provided suitable arrangements can be made.

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.

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 10 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.

All subjects elected in other colleges become part of the School of Mines curriculum. All students are required to receive credits in these subjects before graduation.

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 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*

Chemistry 4f or 14f,\* General Inorganic, 6 or 9†

Drawing 11f, Engineering Drawing, 10

a. Mathematics 2f, Algebra, 6

b. Mathematics 1f, Algebra and Solid Geometry, 6

Geology 1f, General, 4

Military Science 1, Basic Course, R.O.T.C., 3

##### *Second Quarter*

Chemistry 5w or 15w, General Inorganic, 6 or 9, Chem. 4f or 14f

Drawing 12w, Engineering Drawing, 8, Draw. 11f

Mathematics 4w, Trigonometry, 6

Metallurgy 1w, Assaying, 4, Chem. 4f or 14f, Geol. 23f

Metallurgy 2w, Assaying Laboratory, 8, Chem. 4f or 14f, Geol. 23f

Geology 23w, Elements of Mineralogy, 4, Geol. 1f

Military Science 1, Basic Course, R.O.T.C., 3

##### *Third Quarter*

Chemistry 16s, Qualitative Analysis, 9, Chem. 5w or 15w

Drawing 13s, Engineering Drawing, 8, Draw. 12w

Mathematics 5s, Analytical Geometry, 6, Math. 4w

b. Mathematics 3s, Algebra, 4, Math. 1f

Geology 24s, Elements of Mineralogy, 8, Geol. 23w

Military Science 1, Basic Course, R.O.T.C., 3

#### SOPHOMORE YEAR

##### *First Quarter*

Drawing 14f, Descriptive Geometry, 3, Draw. 13s, Math. 5s

Geology 25f, Elements of Mineralogy, 8, Geol. 24s

Geology, 105f, Rock Study, 4, Geol. 24s

\* 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.

† Figure following the descriptive name of a course indicates number of hours per week. Course names following indicate prerequisite courses.

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  
 Military Science 2a, 2b, 2c, Basic Course, R.O.T.C., 3

#### *Second Quarter*

Chemistry 28w, Quantitative Analysis, 8, Chem. 16s  
 Drawing 15w, Drafting, 4, Draw. 14f  
 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  
 Military Science, 2a, 2b, or 2c, Basic Course, R.O.T.C., 3

#### *Third Quarter*

Geology 2s, Historical, 7, Geol. 1f  
 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, 7, Min. Eng. 2w  
 Physics 43s, Magnetism and Electricity, 3, Phys. 3f  
 Physics 44s, Magnetism and Elec. Lab., 2, Phys. 4f  
 Military Science, 2a, 2b, or 2c, Basic Course, R.O.T.C., 3  
 Mining Engineering 4s, Field Work beginning about May 1, 7 weeks, Min. Eng. 4s.  
 Geology 8s, Field Work beginning about June 20, 2 weeks, Geol. 2s

## JUNIOR AND SENIOR YEARS

### COURSES LEADING TO THE DEGREE OF ENGINEER OF MINES

#### JUNIOR YEAR

##### *First Quarter*

Experimental Engineering, M.E. 84f, Elementary Lab., 4, with Mech. 112f  
 Geology 73f, Economic, 3, Geol. 2s, 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, Phys. 43s, Geol. 25f  
 Mining 130f, First Aid, 1 week  
 Mining 131, Exploration, 5, Mining 21s

##### *Second Quarter*

Experimental Engineering, M & W. 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, Tunneling, 5, Mining 131f  
 Mining Engineering 105w, Mine-Mapping, 6, Min. Eng. 4s



*Third Quarter*

Mechanics 111s, Mechanics of Materials, 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 133s, Mining Methods, 5, Mining 132w  
 Mining Engineering 106s, Mine-Mapping, 6, Min. Eng. 105w  
 Metallurgy 116s, Field Work in Metallurgy beginning about May 1, 10 days,  
 satisfactory completion of junior year  
 Mining 134s, Field Work in Mine Plant and Mining beginning about May 1,  
 2 weeks, satisfactory completion of junior year

## SENIOR YEAR

*First Quarter*

Electrical Engineering 41f, Electric Power, 5, Phys. 43s  
 Geology 111f, Ore Deposits, 3, Geol. 73f, 106w  
 Mechanics 117f, Water Power, 7, Mech. 111s  
 Mechanics 118f, Engineering Construction, 8, Mech. 111s  
 Metallurgy 119f, Ore-Testing, 2, Met. 108s  
 Metallurgy 120f, Ore-Testing Lab., 8, Met. 108s  
 Mining 141f, Mining Methods, 5, Mining 133s  
 Mining 140f, Mine Rescue, 1 week  
 Mining 144f, Thesis, 2, Mining 133s

*Second Quarter*

Experimental Engineering, M.E., 181w, Advanced Lab., 4, Exp. Eng. M.E. 84f  
 Geology 112w, Petroleum, 3, Geol. 111f  
 Geology 115w, Applied Geology, 3, Geol. 73f, 111f  
 Mech. 119w, Mine Plant Design, 9, Mech. 118f  
 Metallurgy 121w, Special Problems, 4, Met. 119f  
 Mining 142w, Mine Management, 5, Mining 141f  
 Mining 145w, Thesis, 12, Mining 144f

*Third Quarter*

Geology 113s, Problems in Ore Deposits, 4, Geol. 112w  
 Mechanics 120s, Mine Plant Design, 12, Mech. 119w  
 Metallurgy 122s, Special Problems, 8, Met. 121w  
 Mining 143s, Mine Administration, 5, Mining 142w  
 Mining 146s, Thesis, 12, Mining 145w

## 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.

## FIELD WORK IN MINING

## JUNIOR YEAR

At the end of the junior year students are required to study mine plant and mining methods in one or more mining districts under the direction of members of the faculty. This work begins about May 1, and not over

three weeks will be devoted to it. The work is carried on in the leading western metal-mining districts, the exact location to be announced in April of each year. The expenses for the trip are estimated at \$225. 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 department reserves 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 underground mining work in the West 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, Monday, September 22, 1924. No senior will be registered after that date. Registration will cover field work, electric power, and geology.

The final reports covering field work in mining and metallurgy must be prepared at the School of Mines under the direct supervision of the departments concerned. The program covering this work is as follows: metallurgy, September 22 to 29, inclusive; mining and mine plant, September 30 to October 13, inclusive.

On October 13 all seniors who expect to graduate must register for the remaining\* subjects. Prior to this date the student must submit a typewritten report on field work fully illustrated with drawings, to scale, made from the field sketches, covering metallurgical and milling operations, and details of plant and equipment. Final registration will not be allowed until after reports on field work are accepted. All final reports, therefore, must be presented on or before October 13. These reports shall become the property of the school.

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.

## DEPARTMENT OF MINING ENGINEERING

### 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 \$150.

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; 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.

A full equipment of surveying instruments of the latest and best types is furnished each squad for this work.

#### COURSES LEADING TO THE DEGREE OF ENGINEER OF MINES IN GEOLOGY

##### JUNIOR YEAR

###### *First Quarter*

Geology 61f or 65f, Blowpipe Analysis or Crystallography, 6, Geol. 25f  
 Geology 73f, Economic, 3, Geol. 2s, 105f  
 Geology 131f, Advanced Petrology, 6, Geol. 2s, 106w  
 Geology 151f, Advanced General, 3, Geol. 73f  
 German 24f or 27f, or French 1f or 21f, or Spanish 1f or 65f, 5, 4, or 3  
 Mechanics 109f, Mechanics, 5, Math. 8s  
 Mining 130f, First Aid, 1 week  
 Mining 131f, Exploration, 5, Min. 21s

###### *Second Quarter*

Geology 124w, Struct. and Metamorphic, 3, Geol. 73f, 105f  
 Geology 132w, Advanced Petrology, 6, Geol. 2s, 106w  
 Geology 144w, Geologic Maps, 6, Geol. 73f  
 Geology 152w, Advanced General, 3, Geol. 73f  
 German 25w or 28w, or French 2w or 22w, or Spanish 2w or 66w, 5, 4, or 3  
 Mechanics 110w, Mechanics of Materials, 5, Mech. 109f  
 Mining 132w, Tunneling, 5, Min. 131f  
 Mining Engineering 105w, Mine-Mapping, 6, Min. Eng. 4s

###### *Third Quarter*

Geology 125s, Struct. and Metamorphic, 6, Geol. 73f, 105f  
 Geology 133s, Advanced Petrology, 6, Geol. 2s, 106w  
 Geology 145s, Geologic Maps, 12, Geol. 73f  
 Geology 153s, Advanced General, 3, Geol. 73f  
 Mechanics 111s, Mechanics of Materials, 5, Mech. 110w  
 Mining 133s, Mining Methods, 5, Min. 132w

Geology 150s, Field Work in Geology beginning about May 1, six weeks, Geol.

125s

Geologic Field Work beginning about June 15 with geologic surveys or private companies

## COURSES OF STUDY

15

### SENIOR YEAR

#### *First Quarter*

Geology 91f, Paleontology, 3, Geol. 2s  
Geology 111f, Ore Deposits, 3, Geol. 73f, 106w  
Metallurgy 110f, Ore-Dressing, 3, Phys. 5s, Geol. 25f  
Mining 140f, Mine Rescue, 1 week  
Mining 141f, Mining Methods, 5, Min. 133s  
Thesis, 8  
Electives, 6

#### *Second Quarter*

Geology 92w, Paleontology, 3, Geol. 2s  
Geology 112w, Petroleum, 3, Geol. 111f  
Geology 137w, Testing Economic Materials, 5, Geol. 73f  
Geology 140w, Applied Petrography, 5, Geol. 111f, 133s  
Geology 166w, Mineralography, 6, Geol. 111f  
Metallurgy 111w, Ore-Dressing, 3, Met. 110f  
Mining 142w, Mine Management, 5, Min. 141f

#### *Third Quarter*

Geology 93s, Paleontology, 3, Geol. 2s  
Geology 113s, Problems in Ore Deposits, 4, Geol. 112w  
Geology 141s, Applied Petrography, 5, Geol. 111f, 133s  
Geology 167s, Mineralography, 6, Geol. 111f  
Metallurgy 115s, Ore-Dressing Lab., 6, Met. 111w

## FIELD WORK IN 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.

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 \$225. A deposit of \$50 must be made before starting on the trip to cover lodging and necessary side trips. Any balance will be returned at the close of the work in the field. 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 or the season's work.

Field work in geology for students having taken either of the above trips will reopen at the School of Mines, Wednesday, September 24, 1924. The final reports covering the field work must be prepared at the School of Mines under the direct supervision of the Department of Geology. These reports are to be turned in to the department on September 29.

#### COURSES LEADING TO THE DEGREE OF METALLURGICAL ENGINEER

##### JUNIOR YEAR

###### *First Quarter*

Geology 73f, Economic, 3, Geol. 2s, 105f  
 Mechanics 109f, Mechanics, 5, Math. 8s  
 Mechanics 112f, Mine Plant, 6, Math. 8s  
 Metallurgy 110f, Ore-Dressing, 3, Phys. 43s, Geol. 25f  
 Metallurgy 112f, Ore-Dressing Lab., 4, Phys. 43s, Geol. 25f  
 Metallurgy 106f, Base Metals, 4, Met. 3f  
 Metallurgy 153f, Metallography, 7, Chem. 28w, Phys. 43s  
 Mining 130f, First Aid, 1 week

###### *Second Quarter*

Mechanics 110w, Mechanics of Materials, 5, Mech. 109f  
 Mechanics 115w, Metallurgical Plant, 3, Mech. 112f  
 Metallurgy 111w, Ore-Dressing, 3, Met. 110f, 112f  
 Metallurgy 113w, Ore-Dressing Lab., 4, Met. 110f, 112f  
 Metallurgy 107w, Base Metals, 4, Met. 106f  
 Metallurgy 154w, Metallography, 7, Met. 153f  
 Mining Engineering 105w, Mine-Mapping, 6, Min. Eng. 4s

###### *Third Quarter*

Mechanics 111s, Mechanics of Materials, 5, Mech. 110w  
 Mechanics 116s, Metallurgical Plant, 3, Mech. 115w  
 Metallurgy 114s, Ore-Dressing Lab., 6, Met. 111w, 113w  
 Metallurgy 108s, Precious Metals, 4, Met. 107w  
 Metallurgy 155s, Metallography, 7, Met. 154w  
 Mining Engineering 106s, Mine-Mapping, 6, Min. Eng. 105w.  
 Metallurgy 116s, Field Work in Metallurgy beginning about May 1, 10 days,  
 satisfactory completion of junior year  
 Mining 134s, Field Work in Mine Plant and Mining beginning about May 1,  
 2 weeks, satisfactory completion of junior year

##### SENIOR YEAR

###### *First Quarter*

Electrical Engineering 41f, Electric Power, 5, Phys. 43s  
 Geology 111f, Ore Deposits, 3, Geol. 73f, 106w, or  
 Mechanics 118f, Engineering Construction, 8, Mech. 111s  
 Mechanics 117f, Water Power, 7, Mech. 111s  
 Metallurgy 119f, Ore-Testing, 2, Met. 108s  
 Metallurgy 120f, Ore-Testing Lab., 8, Met. 108s  
 Metallurgy 123f, Electrometallurgy, 3, Met. 108s  
 Metallurgy 124f, Thesis, 8  
 Mining 140f, Mine Rescue, 1 week

###### *Second Quarter*

Geology 112w, Petroleum, 3, Geol. 111f, or  
 Mechanics 119w, Mine Plant Design, 9, Mech. 118f  
 Metallurgy 121w, Special Problems in Ore-Testing, 4, Met. 119f

Metallurgy 117w, Advanced Metallurgy, 10, Met. 108s  
 Metallurgy 125w, Thesis, 18, Met. 124f  
 Metallurgy 164w, Advanced Metallography, 3, Met. 155s, or  
 Geology 115w, Applied Geology, 3, Geol. 73f, or  
 Mining 142w, Mine Management, 5, Min. 141f

#### *Third Quarter*

Metallurgy 122s, Special Problems in Ore-Testing, 8, Met. 121w  
 Metallurgy 118s, Advanced Metallurgy, 10, Met. 117w  
 Metallurgy 126s, Thesis, 18, Met. 125w  
 Metallurgy 165s, Advanced Metallography, 3, Met. 155s, or  
 Geology 113s, Problems in Ore Deposits, 4, Geol. 112w, or  
 Mining 143s, Mine Administration, 5, Min. 142w

### DEPARTMENT OF METALLURGY

This department is well supplied with representative ores of all the most important metals, drawings of furnaces, and models 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 in 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 courses 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 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 Experiment Station laboratory are available for working out practical problems. The Mines 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 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 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.

## FIELD WORK IN METALLURGY

At the end of the junior year students are required to study practical operations at one or more smelters and mills. This begins about May 1. The expenses for this trip are estimated at \$225. 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 end 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 given to the completed report and to the original field notes. The department reserves the right to reject notebooks considered below standard.

Upon termination of the junior field work in metallurgy and two weeks in mining and mine plant (not later than June 1), the members of the junior class who are candidates for the degree of metallurgical engineer are urged to spend at least six weeks in practical work in one or more of the smelters or mills, for which they 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, Monday, September 22, 1924. No senior will be registered after that date. Registration will cover field work, electric power, and geology.

The final reports covering field work in metallurgy and mining must be prepared at the School of Mines under the direct supervision of the departments concerned. The program covering this work is as follows:

metallurgy, September 22 to 29, inclusive; mining and mine plant, September 30 to October 13, inclusive.

On October 13 all seniors who expect to graduate must register for the remaining subjects. Prior to this date the student must submit a type-written report on field work fully illustrated with drawings to scale, made from the field sketches, covering metallurgical and milling operations, and details of plant and equipment. Final registration will not be allowed until after reports on field work are accepted. All final reports, therefore, must be presented on or before October 13. These reports will become the property of the school.

### METALLOGRAPHY

Courses in metallography are offered to candidates for the degree of metallurgical engineer in the School of Mines, 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. 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 furnace, and pyrometers of the latest and improved type. This department has a special dark room for the preparation of photomicrographs.



## DEPARTMENTAL STATEMENTS

### EXPLANATION OF COURSE NUMBERS

The suffixes f, w, or s, indicate the quarter in which a course is offered. e.g., fall, winter, or spring quarters, respectively. More than one suffix indicates that a course is offered in each of the corresponding quarters. No suffix indicates that the time of taking a course is to be arranged with the departments concerned.

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

Professor Paul H. M.-P. Brinton, Ph.D.; Associate Professor M. Cannon Sneed, Ph.D.; Assistant Professor Norville C. Pervier, M.S.; Instructors Gladstone B. Heisig, M.S., M.A., Arthur E. Stoppel, B.S., Ch.E.

#### COURSES

No.	Title	Lec. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
4f	General Inorganic Chemistry....	3	3	All fr.	H.s. chem.
5w	General Inorganic Chemistry....	3	3	All fr.	4f
14f	General Inorganic Chemistry....	3	6	All fr.	....
15w	General Inorganic Chemistry....	3	6	All fr.	14f
16s	Qualitative Chemical Analysis...	3	6	All fr.	5w or 15w
28w	Quantitative Chemical Analysis..	1	7	All soph.	16s
123f	Adv. Analytical Chemistry.....	1	7	Elective	28w
124w	Adv. Analytical Chemistry.....	1	7	Elective	28w

- 4f. General Inorganic Chemistry. A study of the general laws of chemistry and of the non-metals, the metals, and their compounds. Mr. Heisig.
- 5w. General Inorganic Chemistry. A continuation of Course 4f. Mr. Heisig.
- 14f. General Inorganic Chemistry. A study of the general laws of chemistry and of the non-metals, the metals, and their compounds. Mr. Pervier.
- 15w. General Inorganic Chemistry. A continuation of Course 14f. Mr. Pervier.
- 16s. Qualitative Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibrium, oxidation and reduction, etc. Mr. Heisig.
- 28w. 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. Mr. Stoppel.

123f. Advanced Analytical Chemistry. Analytical methods for the determination of the common constituents of iron ore, iron, and steel are discussed and compared, with emphasis upon the general principles involved. Typical problems are assigned for laboratory practice. Mr. Brinton.

124w. Advanced Analytical Chemistry. A survey of the methods of analytical chemistry applied to the analysis of minerals and ores. Typical procedures for laboratory practice serve as a basis for discussion of more general methods. Mr. Brinton.

## DRAWING AND DESCRIPTIVE GEOMETRY

Professor William H. Kirchner, B.S.; Assistant Professor Howard D. Myers, B.S. in C.E.; Instructor Orrin W. Potter, E.M.

## COURSES

No.	Title	Lec. or rec. hrs	Lab. hrs.	Required of	Prereq. courses
11f	Engineering Drawing .....	10	0	All fr.	....
12w	Engineering Drawing .....	8	0	All fr.	11f
13s	Engineering Drawing .....	8	0	All fr.	12w
14f	Descriptive Geometry .....	3	0	All soph.	13s, Math. 5s
15w	Drafting .....	4	0	All soph.	14f

11f. Engineering Drawing. Sketching, lettering, representation, elements of drafting, details of machines and structures, interpretation of working drawings. Mr. Kirchner, Mr. Potter.

12w. Engineering Drawing. Continuation of Course 11f. The elements of general drafting, mechanical drawing as a language. Lines, views, dimensions, standards, signs, abbreviations, and explanatory notes. Mr. Kirchner, Mr. Potter.

13s. Engineering Drawing. Continuation of Course 12w. The elements of general drafting. Maps and sketches. Brush and pen conventions. Mr. Kirchner, Mr. Potter.

14f. 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. Mr. Myers.

15w. Drafting. Graphics, machine drafting, and structural drafting. Instruction in drafting room methods. Mr. Myers.

## ELECTRICAL ENGINEERING

Professors George D. Shepardson, M.A., M.E., D.Sc., William T. Ryan, E.E.; Instructor George W. Swenson, M.S. (E.E.).

## COURSES

No.	Title	Lec. or rec. hrs	Lab. hrs.	Required of	Prereq. courses
41f	Electrical Power .....	2	3	Sr.E.M.	Physics 43s

- 41f. 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. Mr. Ryan.

### EXPERIMENTAL ENGINEERING

#### MATHEMATICS AND MECHANICS

Professor William E. Brooke, B.C.E., M.A.; Instructor Charles Boehlein, B.S., M.E.

#### COURSES

No.	Title	Lec. or Lab.		Required of	Prereq. courses
		rec. hrs	hrs.		
144w	Materials-Testing Laboratory.....		4	Jr.E.M.	With Mech. 10w

- 144w. 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. Mining and metallurgical engineers. Mr. Boehlein.

#### MECHANICAL ENGINEERING

Professors John J. Flather, Ph.B., M.M.E., Frank B. Rowley, M.E.; Associate Professor Charles F. Shoop, B.S.; Assistant Professor Burton J. Robertson, E.E.

#### COURSES

No.	Title	Lec. or Lab.		Required of	Prereq. courses
		rec. hrs	hrs.		
84f	Elementary Laboratory (General)...		4	Jr.E.M.	With Mech. 12f
181w	Advanced Laboratory (General)...		4	Sr.E.M.	84f

- 84f. Elementary General Laboratory. Calibration of thermometers, gages, weirs, nozzle orifices, and meters. Efficiency of machines, friction of belting, friction tests; burning point, chill point, viscosity and specific gravity of oils. Tests of water motor, rams, and pulsometers. Mr. Shoop.
- 181w. Advanced General Laboratory. Indicator practice, valve-setting, separating and throttling calorimeters, tests of steam engines, gas engines, pumps, air compressors, blowers, turbines, boilers, and power plant. Mr. Rowley, Mr. Shoop, Mr. Robertson.

### GEOLOGY AND MINERALOGY

Professors William H. Emmons, Ph.D., Frank F. Grout, Ph.D., Clinton R. Stauffer, Ph.D.; Assistant Professors John W. Gruner, Ph.D., George M. Schwartz, Ph.D.; Instructors Ira S. Allison, B.A., George A. Thiel, M.A.

## COURSES

No.	Title	Lec. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
1f	General Geology .....	3	1	All fr.	....
2s	Historical Geology .....	3	4	All soph.	1f
19s	Elem. of Paleontology .....	3	..	Elective	....
23w	Elem. of Mineralogy .....	2	2	All fr.	1f
24s	Elem. of Mineralogy .....	4	4	All fr.	23w
25f	Elem. of Mineralogy .....	4	4	All soph.	24s
61f	Blowpipe Analysis .....	2	4	Elective	25f
65f	Crystallography .....	2	4	Elective	25f
73f	Econ. Geology .....	3	..	All jr.	2s, 105f
85s	Summer Field Work .....	..	2 wks.	All soph.	2s
91f	Index Fossils of North America	3	..	Sr.E.M.(Geol.)	2s
92w	Index Fossils of North America	3	..	Sr.E.M.(Geol.)	2s
93s	Index Fossils of North America	3	..	Sr.E.M.(Geol.)	2s
101f	Sedimentation .....	3	..	Elective	24s
105f	Rock Study .....	..	4	All soph.	24s
106w	Petrography .....	..	4	All soph.	105f
111f	Ore Deposits .....	3	..	All sr.	73f, 106w
112w	Geology of Petroleum .....	3	..	All sr.	111f
113s	Problems in Ore Deposits.....	..	4	All sr.	112w
115w	Applied Geology .....	3	..	Sr.E.M.	73f, 111f
124w	Struct. & Metamorph. Geol. ....	3	..	Jr.E.M.(Geol.)	73f, 105f
125s	Struct. & Metamorph. Geol. ....	6	..	Jr.E.M.(Geol.)	73f, 105f
127	Geol. of Lake Superior Region..	3	..	Elective	125s
131f	Advanced Petrology .....	3	3	Jr.E.M.(Geol.)	2s, 106w
132w	Advanced Petrology .....	3	3	Jr.E.M.(Geol.)	2s, 106w
133s	Advanced Petrology .....	3	3	Jr.E.M.(Geol.)	2s, 106w
137w	Testing Econ. Minerals .....	1	4	Sr.E.M.(Geol.)	73f
140w	Applied Petrography .....	1	4	Sr.E.M.(Geol.)	111f, 113s
141s	Applied Petrography .....	1	4	Sr.E.M.(Geol.)	111f, 113s
144w	Interpretation of Geologic Maps ..	..	6	Jr.E.M.(Geol.)	73f
145s	Interpretation of Geologic Maps ..	..	12	Jr.E.M.(Geol.)	73f
150s	Field Geology .....	..	6 wks.	Jr.E.M.(Geol.)	125s
151f	Advanced General Geology .....	3	..	Jr.E.M.(Geol.)	73f
152w	Advanced General Geology .....	3	..	Jr.E.M.(Geol.)	73f
153s	Advanced General Geology .....	3	..	Jr.E.M.(Geol.)	73f
166w	Mineralography .....	..	6	Sr.E.M.(Geol.)	111f
167s	Mineralography .....	..	6	Sr.E.M.(Geol.)	111f
246	Pre-Cambrian Geology .....	3	3	Elective	125s

- 1f. General Geology. A synoptical treatment of materials of the earth and of geologic processes. Physiographic, dynamic, and structural geology. Mr. Thiel.
- 2s. Historical Geology. The sequence of events in geologic history, with special reference to North America. Mr. Thiel.
- 19s. Elements of Paleontology. An introduction to the study of fossil organisms. Lectures supplemented by field excursions. Mr. Stauffer.
- 23w-24s-25f. Elements of Mineralogy. The crystal systems; 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. Mr. Gruner.

- 61f. Blowpipe Analysis. The determination of minerals by systematic blowpipe analysis. Mr. Gruner.
- 65f. Crystallography. Study of crystal models and space groups. Crystal drawings and measurements. Projections and mathematical calculations. Mr. Gruner.
- 73f. Economic Geology. Study of non-metallic minerals of economic value, and discussions of geologic guides to prospecting for these deposits. Mr. Schwartz.
- 85s. 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. Mr. Gruner, Mr. Thiel.
- 91f-92w-93s. Index Fossils of North America. A study of fossil forms with special reference to those of geologic importance; faunas and their correlation. Mr. Stauffer.
- 101f. Sedimentation. Origin and structure of sedimentary deposits; the interpretation of these in relation to paleogeography. Lectures and assigned readings. Mr. Allison.
- 105f. 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. Mr. Grout, Mr. Lovering.
- 106w. 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. Mr. Grout, Mr. Thiel.
- 111f. Ore Deposits. The nature, distribution, and genesis of ore deposits of the United States; relations of ore deposits to geologic structure; the deformation and superficial alteration of ore deposits. Mr. Emmons.
- 112w. Geology of Petroleum. The nature, origin, and accumulation of petroleum; discussion of the various oil fields of the world. Mr. Emmons.
- 113s. Problems in Ore Deposits. Field excursions, map work, lectures on field and laboratory methods. Mr. Emmons.
- 115w. Applied Geology. The application of methods to laboratory, library, and field problems in geology. Mr. Thiel.
- 124w-125s. Structural and Metamorphic Geology. A study of the principles and application of structural geology. The conditions, processes, and results of metamorphism. Mr. Schwartz.
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. Mr. Thiel.
- 131f-132w-133s. 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. Mr. Grout

- 137w. 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. Mr. Grout.
- 140w-141s. Applied Petrography. Determination of ores and gangue minerals. Microscopic studies of paragenesis of ores and other mineral associations. Practical problem in mining and geology settled by microscopic and optical examinations. Mr. Grout, Mr. Gruner.
- 144w-145s. Interpretation of Geologic 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. Mr. Allison.
- 150s. 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 for 1924, Black Hills, South Dakota. Reports to be written week before college opens in fall. Mr. Emmons, Mr. Schwartz.
- 151f-152w-153s. Advanced General Geology. Geologic processes and their results; development of the North American continent. Mr. Stauffer.
- 166w-167s. Mineralography. Methods of studying opaque minerals and the application of the methods to problems in ore genesis and history. Mr. Schwartz.
246. Pre-Cambrian Geology. The problems of pre-Cambrian correlation and structure; the pre-Cambrian stratigraphy of North America. (Given in alternate years.)

## GERMAN

Professor Carl Schlenker, B.A.; Assistant Professors James Davies, Ph.D., George Lussky, Ph.D.

## COURSES

No.	Title	Rec. hrs.	Required of	Prereq. courses
24f-25w-26s*	Beginning .....	4	Jr.E.M.(Geol.)	.....
27f	Narrative Prose .....	3	Elective	26 or 2 yrs. prep.
28w-29s*	Advanced Chemical .....	3	Elective	27

- 24f-25w-26s. Beginning for Miners. Pronunciation, grammar, conversation; selected reading in easy prose. Mr. Davies.
- 27f. Narrative Prose for Chemists. Reading, grammar review. Mr. Lussky.
- 28w-29s. Chemical German. Selections from more difficult works on chemistry. Mr. Lussky.

## METALLURGY

Professors William R. Appleby, M.A., Peter Christianson, B.S., E.M., Oscar E. Harder, Ph.D., Levi B. Pease, M.S.; Instructors Ralph L. Dowdell, Met.E., M.S., Erwin H. Kersten, E.M., Elwyn L. Smith, B.S., Ludwig J. Weber, B.S., Ch.E.

\* All quarters must be completed before credit is given in any one quarter.

## SCHOOL OF MINES

## COURSES

No.	Title	Lec. Lab.		Required of	Prereq. courses
		hrs.	hrs.		
1w	Assaying .....	4	..	All fr.	Chem.14f,Geol.1f
2w	Assay Lab. ....	..	8	All fr.	Chem.14f,Geol.1f
3f	General Metallurgy .....	3	..	All soph.	1w,2w,Chem.16s
4w	Metallurgy of Pig Iron .....	3	..	All soph.	3f
5s	Met. Wrought Iron and Steel ..	3	..	All soph.	4w
106f	Met. of Base Metals.....	4	..	Jr. E.M.&Met.E.	3f
107w	Met. of Base Metals.....	4	..	Jr. E.M.&Met.E.	106f
108s	Met. of Precious Metals .....	4	..	Jr. E.M.&Met.E.	107w
109f	Met. of Base Metals.....	3	..	M.E.&Chem. elective	Chem.8s or equiv.
109w	Met. of Base Metals .....	3	..	E.E.&Chem. elective	Chem.8s or equiv.
110f	Ore-Dressing .....	3	..	All jr.	Phys.43s,Geol.25f
111w	Ore-Dressing .....	3	..	All jr.	110f
112f	Ore-Dressing Lab. ....	..	4	Jr. Met. E.	Phys.43s,Geol.25f
113w	Ore-Dressing Lab. ....	..	4	Jr. Met. E.	110f,112f
114s	Ore-Dressing Lab. ....	..	6	Jr. Met. E.	111w,113w
115s	Ore-Dressing Lab. ....	..	6	Jr. E.M.&E.M. (Geol.)	111w
116s	Field Work in Met. ....	..	†	Jr. Met. E.	Same as 124f
117w	Advanced Metallurgy .....	4	6	Sr. Met. E.	108s
118s	Advanced Metallurgy .....	4	6	Sr. Met. E.	117w
119f	Ore-Testing .....	2	..	Sr. E.M.&Met.E.	108s
120f	Ore-Testing Lab. ....	..	8	Sr. E.M.&Met.E.	108s
121w	Spec. Prob. in Ore-Test. ....	..	4	Sr. E.M.&Met.E.	119f
122s	Spec. Prob. in Ore-Test. ....	..	8	Sr. E.M.&Met.E.	121w
123f	Electrometallurgy .....	3	..	Sr. Met. E.	108s
124f	Thesis in Metallurgy .....	..	8	Sr. Met. E.	Satisfactory com- pletion of jr. year
125w	Thesis in Metallurgy .....	..	18	Sr. Met. E.	124f
126s	Thesis and Specifications .....	..	18	Sr. Met. E.	125w
150f	Mphy. for Elec. Eng. ....	2	3	Elective	....
151w	Adv. Mphy. for Elec. Eng. ....	2	3	Elective	150f
153f	Mphy., Long Course .....	3	4	Jr. Met. E.	Chem.28w,Phys.43s
154w	Mphy., Long Course .....	3	4	Jr. Met. E.	153f
155s	Mphy., Long Course .....	3	4	Jr. Met. E.	154w
156f	Mphy. for Mech. Eng. ....	2	3	Elective	....
157w	Adv. Mphy. for Mech. Eng. ....	2	3	Elective	156f
159s	Dental Metallography .....	1	2	Elective	Chem.21-22
160f	Mphy. for Chemists .....	2	3	Elective	Chem.20
161w	Adv. Mphy. for Chemists .....	2	3	Elective	160f
162s	Adv. Mphy. for Chemists .....	2	3	Elective	160f
163f	Adv. Metallography .....	To be ar.	..	Elective	151, 155, 157, or equiv.
164w	Adv. Metallography .....	To be ar.	..	Elective	....
165s	Adv. Metallography .....	To be ar.	..	Elective	....
201f	Adv. Mphy. for Gr. Students ...	To be ar.	..	Elective	....
202w	Adv. Mphy. for Gr. Students ...	To be ar.	..	Elective	....
203s	Adv. Mphy. for Gr. Students ...	To be ar.	..	Elective	....

1w. Assaying. The determination of values of ores, metallurgical products by the fire method. Lectures and recitations. Mr. Appleby, Mr. Kersten.

† Ten days.

- 2w. Assay Laboratory. Practical determination of gold, silver, lead, and tin by the fire method. Mr. Christianson, Mr. Pease, Mr. Kersten, Mr. Smith.
- 3f. General Metallurgy. Combustion, fuels, refractory materials, furnaces and fluxes. Lectures and recitations. Mr. Christianson.
- 4w. 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. Mr. Christianson.
- 5s. Metallurgy of Wrought Iron and Steel. General principles involved in the production of wrought iron and steel. Lectures and recitations. Mr. Christianson.
- 106f. Metallurgy of Base Metals. Lead, copper, zinc, and mercury. Consideration of smelting methods and principles involved in refining. Lectures and recitations. Mr. Pease.
- 107w. Metallurgy of Base Metals. Continuation of Course 106f. Mr. Pease.
- 108s. Metallurgy of the Precious Metals. Principles involved and methods used in the extraction of gold, silver, and other precious metals. Lectures and recitations. Mr. Pease.
- 109f. Metallurgy of Base Metals. Short course for mechanical engineers. Special consideration is given to the mechanical appliances. Mr. Christianson, Mr. Pease.
- 109w. Metallurgy of Base Metals. Short course for electrical engineers. Special consideration is given to electrical appliances. Lectures and recitations. Mr. Christianson, Mr. Pease.
- 110f. Ore-Dressing. Crushing, sizing, classification, and concentration of ores. Lectures and recitations. Mr. Smith.
- 111w. Ore-Dressing. Continuation of Course 110f. Mr. Smith.
- 112f. Ore-Dressing Laboratory. Practical examination of ores and the use of ore-dressing machinery. Mr. Smith.
- 113w. Ore-Dressing Laboratory. Practical problems in ore-dressing. Mr. Smith.
- 114s. Ore-Dressing Laboratory. Continuation of Course 113w. Mr. Smith.
- 115s. Ore-Dressing Laboratory. Short course in the laboratory use of ore-dressing machinery. Mr. Smith.
- 116s. Field Work in Metallurgy. Study of metallurgical operations at smelters and mills. Detail reports are required covering plants visited. Mr. Christianson, Mr. Pease.
- 117w. Advanced Metallurgy. Metallurgical calculations to determine heat balance and heat distribution. Lectures and laboratory work. Mr. Christianson.
- 118s. Advanced Metallurgy. Design of furnaces, conferences, and laboratory work. Mr. Christianson.
- 119f. Ore-Testing. General principles involved in determining the best method of extraction, including amalgamation, concentration, cyanidation, roasting, etc. Lectures and recitations. Mr. Christianson.



- 120f. Ore-Testing Laboratory. Practical determination of extraction and distribution of values in mill and metallurgical products. Methods of calculation. Mr. Christianson and assistants.
- 121w. Special Problems in Ore-Testing. Continuation of Course 120f. Practical determinations for regulating metallurgical operations. Mr. Pease.
- 122s. Special Problems in Ore-Testing. Continuation of Course 121w. Mr. Pease.
- 123f. 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. Mr. Christianson.
- 124f. Thesis in Metallurgy. Conferences to select suitable problem together with preliminary laboratory work on problem selected. Mr. Christianson, Mr. Harder, Mr. Pease.
- 125w. Thesis in Metallurgy. Continuation of Course 124f. Mr. Christianson, Mr. Harder, Mr. Pease.
- 126s. Thesis and Specifications. Completion of thesis including specifications covering installation of a plant. Mr. Christianson, Mr. Harder, Mr. Pease.
- 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. Mr. Harder, Mr. Dowdell, Mr. Weber.
- 151w. Advanced Metallography for Electrical Engineers. Continuation of 150f. 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. Mr. Harder, Mr. Dowdell, Mr. Weber.
- 153f-154w-155s. Metallography. (Long course for metallurgical engineers.) Theory of metallic alloys. Metallographic technique. Properties of metals and alloys. Metallography of iron and steel and commercial alloys. Technical metallurgy. Laboratory work. Mr. Harder, Mr. Dowdell, Mr. Weber.
- 156f. 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. Mr. Harder, Mr. Dowdell, Mr. Weber.
- 157w. Advanced Metallography for Mechanical Engineers. Continuation of 156f. 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. Mr. Harder, Mr. Dowdell, Mr. Weber.

- 159s. 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. Mr. Harder, Mr. Dowdell, Mr. Weber.
- 160f. 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. Mr. Harder, Mr. Dowdell.
- 161w. Advanced Metallography for Chemical Students. Metallography and heat treatment of iron and steel, including alloy steels, commercial uses of various steels, and engineering specifications. Laboratory work. Mr. Harder, Mr. Dowdell.
- 162s. Advanced Metallography for Chemical Students. Metallography of the non-ferrous metals with a study of the constitution diagrams, properties, and uses of important commercial alloys. Laboratory work. Mr. Harder, Mr. Dowdell.
- 163f-164w-165s. Advanced Metallography. Technical and scientific research. The study of steel rails, automobile and locomotive parts, tool steels, etc. Special problems in metallography with outside reading. Seminar work on the recent advances in metallography. Mr. Harder, Mr. Dowdell.
- 201f-202w 203s. Advanced Metallography for Graduate Students. Intended primarily for research work. Mr. Harder.

#### MILITARY SCIENCE AND TACTICS

Professor Bernard Lentz, Major, Infantry; Assistant Professors Henry H. Rutherford, Lieutenant Colonel, Medical Corps, Frederick R. Wunderlich, Major, Dental Corps, Roger Hilsman, Captain, Infantry, Leo J. Farrell, Captain, Infantry, Andrew C. Tychsen, Captain, Infantry, Newton W. Speece, Captain, Infantry, Myron J. Conway, First Lieutenant, Infantry; Instructors Joseph Havlicek, Master Sergeant, U.S.A., Retired, John McWilliams, First Sergeant, U.S.A., Retired, Alfred Brandt, Technical Sergeant, Harry E. Strider, Technical Sergeant, Aubrey R. Dunkum, Technical Sergeant, Ernest R. Mylk, Private, First Class.

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.

## COURSES

No.	Title	Rec. hrs.	Required of	Prereq. courses
1	First Year Basic Course R.O.T.C.	3	All fr.*	None
2a	Second Year Basic Course R.O.T.C. Infantry .....	3	Soph.†	1
2b	Second Year Basic Course R.O.T.C. Coast Artillery.....	3	Soph.	1
3a	First Year Advanced Course R.O.T.C. Infantry .....	5	Elective, jr.	1, 2a
3b	First Year Advanced Course R.O.T.C. Coast Artillery.....	5	Elective, jr.	1, 2b
4a	Second Year Advanced Course R.O.T.C. Infantry .....	5	Elective, sr.	3a
4b	Second Year Advanced Course R.O.T.C. Coast Artillery.....	5	Elective, sr.	3b

## MINE PLANT AND MECHANICS

Professor Elting H. Comstock, M.S.; Assistant Professors Anders J. Carlson, C.E., James C. Sanderson, Ph.D.

## COURSES

No.	Title	Lec. or rec. hrs	Lab. hrs.	Required of	Prereq. courses
1f	Algebra and Solid Geometry.....	6	..	B fr.	..
2f	Algebra .....	6	..	A fr.	..
3s	Algebra .....	4	..	B fr.	1f
4w	Trigonometry .....	6	..	All fr.	..
5s	Analytical Geometry .....	6	..	All fr.	4w
6f	Calculus .....	4	..	All soph.	5s
7w	Calculus .....	3	..	All soph.	6f
8s	Calculus .....	6	..	All soph.	7w
109f	Mechanics .....	5	..	Jr.E.M.&Met.E.	8s
110w	Mechanics of Materials .....	5	..	Jr.E.M.&Met.E.	109f
111s	Mechanics .....	5	..	Jr.E.M.&Met.E.	109f
112f	Mine Plant .....	6	..	Jr.E.M.&Met.E.	8s
113w	Mine Plant .....	6	..	Jr.E.M.	112f
114s	Mine Plant .....	6	..	Jr.E.M.	113w
115w	Metallurgical Plant .....	3	..	Jr.Met.E.	112f
116s	Metallurgical Plant .....	3	..	Jr.Met.E.	115w
117f	Hydraulics and Water Power.....	5	2	Sr.E.M.&Met.E.	111s
118f	Engineering Construction .....	..	8	Sr.E.M.	111s
119w	Mine Plant Design.....	..	9	Sr.E.M.	118f
120s	Mine Plant Design.....	..	12	Sr.E.M.	119w

\* Must be legally eligible for enrolment in R.O.T.C.

† Two hours' drill credit allowed on account of work required in the classroom and in the field.

- 1f. Algebra and Solid Geometry. Equations, involution and evolution, theory of exponents, surds, quadratic equation, theory of logarithms, determinants. Demonstrations of most important theorems of solid geometry. Volumes, approximate volumes, prismoidal formula, etc. Mr. Sanderson.
- 2f. 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. Mr. Comstock, Mr. Sanderson.
- 3s. 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. Mr. Sanderson.
- 4w. Trigonometry. Trigonometric ratios, right triangles, definitions of trigonometric functions, analytic relations, trigonometric equations, etc., solution of spherical triangles. Mr. Comstock, Mr. Sanderson.
- 5s. 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. Mr. Sanderson.
- 6f-7w-8s. 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. Mr. Sanderson.
- 109f-111s. 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. Mr. Carlson.
- 110w. 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. Mr. Carlson.
- 112f-113w-114s. 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. Mr. Comstock.
- 115w-116s. Metallurgical Plant. Power, air, and water supply for metallurgical plants. Mr. Comstock.
- 117f. 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. Mr. Carlson.

118f. Engineering Construction. Theory of structures, loading, analytic and graphic resolution of stresses in framed structures, stresses in mining structures, design of mining structures. Mr. Carlson, Mr. Allard.

119w-120s. Mine Plant Design. A study of power possibilities, costs, etc., and designs of a power plant, surface equipment, and structures for a mine. Mr. Comstock, Mr. Allard.

### MINING

Associate Professor Walter H. Parker, E.M.; Instructor Raymond W. Allard, E.M.

#### COURSES

No.	Title	Lec. rec.	Lab. hrs.	Required of	Prereq. courses
21s	Introductory Mining....	4	..	All soph.	Registration for soph. field trip
130f	First Aid ..	*	..	All jrs.	21s
131f	Exploration ..	5	..	Jr.E.M.&E.M.(Geol.)	21s
132w	Tunneling ..	5	..	Jr.E.M.&E.M.(Geol.)	131f
133s	Mining Methods ..	5	..	Jr.E.M.&E.M.(Geol.)	132w
134s	Practical Mining ..	2 wks.	..	Jr.E.M.	Satisfactory completion of junior yr. and 133s
140f	Mine Rescue ..	*	..	All sr.	....
141f	Mining Methods ..	5	..	Sr.E.M.&E.M.(Geol.)	133s
142w	Mine Management ..	5	..	Sr.E.M.&E.M.(Geol.)	141f
143s	Mine Administration ..	5	..	Sr.E.M.	142w
144f	Thesis ..	2	..	Sr.E.M.	133s, 134s
145w	Thesis ..	12	..	Sr.E.M.	144f
146s	Thesis ..	12	..	Sr.E.M.	145w

21s. Introductory Mining. Introductory mining course, preparatory to sophomore field trip. Mr. Allard.

130f. First Aid. Course in first aid to the injured, given by the staff of the United States Bureau of Mines car.

131f. Exploration. Occurrence of ore bodies, prospecting, exploration, boring, explosives, drilling, and blasting. Mr. Parker.

132w. Tunneling. Tunneling, drifting, shaft-sinking, raising, and mining methods. Mr. Parker.

133s. Mining Methods. Underground mining methods and support of underground excavations. Mr. Parker.

134s. Practical Mining. Study of mining operations. Mine plant and mining work in one or more mining camps. Mr. Parker, Mr. Comstock.

140f. Mine Rescue. Course in mine rescue, given by the staff of the United States Bureau of Mines car.

141f. Mining Methods. Coal mining, open-pit work, quarrying, placer mining, hydraulic mining, and dredging. Mr. Parker.

\* 15 hours a week.

- 142w. Mine Management. Mine drainage, mine ventilation, mine transportation, mine sanitation, mine hygiene, cost accounting, and mine examination. Mr. Parker.
- 143s. Mine Administration. Course in mining law, mine management, and economics of mining. Mr. Parker.
- 144f. Thesis. Preparatory work on the mining thesis. Mr. Parker.
- 145w. Thesis. Preparation of an original thesis on some mining project, covering the exploration and development of a mining property. Mr. Parker.
- 146s. Thesis. Completion of thesis project. Mr. Parker.

MINING ENGINEERING

Professor Edwin M. Lambert, M.E.

COURSES

No.	Title	Lec. or Lab.		Required of	Prereq. courses
		rec. hrs.	hrs.		
1f	Mine-Surveying .....	3	..	All soph.	Math. 4w
2w	Mine-Surveying .....	3	..	All soph.	1f
3s	Mine-Surveying .....	3	4	All soph.	2w
4s	Field Work .....	..	7 wks	All soph.	3s
105w	Mine-Mapping .....	..	6	All jr.	4s
106s	Mine-Mapping .....	..	6	Jr. E.M.&Met. E. 105w	

- 1f-2w-3s. 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, topographic map-reading, solar observations, shaft plumbing, underground traversing and leveling. Mr. Lambert.
- 4s. 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. Mr. Lambert, Mr. Carlson, Mr. Allard.
- 105w-106s. Mine-Mapping. Mine-mapping in accordance with prevalent practice in mining districts. Ore and stripping estimates and mine maps based on Mesabi Range practice. Mr. Allard.

PHYSICS

Professors Henry A. Erickson, Ph.D., Anthony Zeleny, Ph.D.; Associate Professor Louallen F. Miller, Ph.D.

COURSES

No.	Title	Lec. or Lab.		Required of	Prereq. courses
		rec. hrs.	hrs.		
3f	Elements of Mechanics and Sound	3	..	All soph.	Math. 5s
4f	Mechanics Laboratory .....	..	2	All soph.	With 3f
23w	Heat .....	3	..	All soph.	3f
24w	Heat Laboratory .....	..	2	All soph.	4f and with 23w
43s	Magnetism and Electricity .....	3	..	All soph.	3f
44s	Magnetism and Electricity Lab. ..	..	2	All soph.	4f and with 43s

- 3f. 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. Mr. Erikson, Mr. Miller.
- 4f. 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. Mr. Erikson, Mr. Miller.
- 23w. Heat. A study of the principles underlying heat phenomena. Course 24 should be taken in conjunction with this course. Mr. Miller.
- 24w. Heat Laboratory. The laboratory part supplementing Course 23. One two-hour session in the laboratory a week. Mr. Miller.
- 43s. Magnetism and Electricity. A study of the principles underlying magnetic and electric phenomena. Course 44 should be taken in conjunction with this course. Mr. Zeleny, Mr. Miller.
- 44s. Electrical Laboratory. The laboratory part supplementing Course 43. One two-hour session in the laboratory a week. Mr. Zeleny, Mr. Miller.

## ROMANCE LANGUAGES

Professors Everett W. Olmsted, Ph.D., Litt.D., Head; Irville C. LeCompte, Ph.D., Colbert Searles, Ph.D.; Associate Professors Francis B. Barton, Docteur de l'Université de Paris, Ruth S. Phelps, M.A.; Assistant Professors Herbert E. Clefton, M.A., Jules T. Frelin, B.A., Joseph E. Gillet, Ph.D., Eugene F. Parker, Ph.D., Gustav van Roosbroeck, Ph.D.

## COURSES

No.	Title	Rec. hrs.	Required of	Prereq. courses
1-2*	Beginning French .....	5	Jr. E.M. (Geol.)	....
3-4	Intermediate French .....	5	Elective	1-2
21-22-23*	Survey French Lit. ....	3	Elective	3-4
1-2*	Beginning Spanish .....	5	Jr. E.M. (Geol.)	....
3-4	Intermediate Spanish .....	5	Elective	1-2
65-66-67*	Spanish Literature .....	3	Elective	3-4

Note.—Beginning and intermediate courses are offered every quarter.

## 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. Mr. LeCompte, Mr. Searles, Mr. Barton.

## 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. Mr. Gillet.

\* All quarters must be complete before credit is given in any one quarter.

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

*The College of Pharmacy*  
*Announcement for the Years*  
**1925-1927**



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1925							1926													
<b>JULY</b>							<b>JANUARY</b>							<b>JULY</b>						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	1	2	3	4	..	..	..	..	..	1	2	..	..	..	..	1	2	3
5	6	7	8	9	10	11	3	4	5	6	7	8	9	4	5	6	7	8	9	10
12	13	14	15	16	17	18	10	11	12	13	14	15	16	11	12	13	14	15	16	17
19	20	21	22	23	24	25	17	18	19	20	21	22	23	18	19	20	21	22	23	24
26	27	28	29	30	31	..	24	25	26	27	28	29	30	25	26	27	28	29	30	31
..	..	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>AUGUST</b>							<b>FEBRUARY</b>							<b>AUGUST</b>						
..	..	..	..	..	..	1	..	1	2	3	4	5	6	1	2	3	4	5	6	7
2	3	4	5	6	7	8	7	8	9	10	11	12	13	8	9	10	11	12	13	14
9	10	11	12	13	14	15	14	15	16	17	18	19	20	15	16	17	18	19	20	21
16	17	18	19	20	21	22	21	22	23	24	25	26	27	22	23	24	25	26	27	28
23	24	25	26	27	28	29	28	..	..	..	..	..	..	29	30	31	..	..	..	..
30	31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>SEPTEMBER</b>							<b>MARCH</b>							<b>SEPTEMBER</b>						
..	..	1	2	3	4	5	..	1	2	3	4	5	6	..	..	..	1	2	3	4
6	7	8	9	10	11	12	7	8	9	10	11	12	13	5	6	7	8	9	10	11
13	14	15	16	17	18	19	14	15	16	17	18	19	20	12	13	14	15	16	17	18
20	21	22	23	24	25	26	21	22	23	24	25	26	27	19	20	21	22	23	24	25
27	28	29	30	..	..	..	28	29	30	31	..	..	..	26	27	28	29	30	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<b>OCTOBER</b>							<b>APRIL</b>							<b>OCTOBER</b>						
..	..	..	..	1	2	3	..	..	..	..	1	2	3	..	..	..	..	..	1	2
4	5	6	7	8	9	10	4	5	6	7	8	9	10	3	4	5	6	7	8	9
11	12	13	14	15	16	17	11	12	13	14	15	16	17	10	11	12	13	14	15	16
18	19	20	21	22	23	24	18	19	20	21	22	23	24	17	18	19	20	21	22	23
25	26	27	28	29	30	31	25	26	27	28	29	30	..	24	25	26	27	28	29	30
..	..	..	..	..	..	..	..	..	..	..	..	..	..	31	..	..	..	..	..	..
<b>NOVEMBER</b>							<b>MAY</b>							<b>NOVEMBER</b>						
..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	2	3	4	5	6
1	2	3	4	5	6	7	2	3	4	5	6	7	8	7	8	9	10	11	12	13
8	9	10	11	12	13	14	9	10	11	12	13	14	15	14	15	16	17	18	19	20
15	16	17	18	19	20	21	16	17	18	19	20	21	22	21	22	23	24	25	26	27
22	23	24	25	26	27	28	23	24	25	26	27	28	29	28	29	30	..	..	..	..
29	30	..	..	..	..	..	30	31	..	..	..	..	..	..	..	..	..	..	..	..
<b>DECEMBER</b>							<b>JUNE</b>							<b>DECEMBER</b>						
..	..	1	2	3	4	5	..	..	1	2	3	4	5	..	..	..	1	2	3	4
6	7	8	9	10	11	12	6	7	8	9	10	11	12	5	6	7	8	9	10	11
13	14	15	16	17	18	19	13	14	15	16	17	18	19	12	13	14	15	16	17	18
20	21	22	23	24	25	26	20	21	22	23	24	25	26	19	20	21	22	23	24	25
27	28	29	30	31	..	..	27	28	29	30	..	..	..	26	27	28	29	30	31	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

# UNIVERSITY CALENDAR

1925-26

## FALL QUARTER

September	17	Thursday	Payment of fees closes, except for new students
September	17-19		Entrance examinations
September	21-25		Examinations for removal of conditions
			Physical examinations for all new students
			Registration period, <sup>2</sup> colleges of Science, Literature, and the Arts, and Education
September	24-25		Registration days <sup>2</sup> for all colleges not included above
September	25	Friday	Payment of fees for new students closes
September	28	Monday	Fall quarter begins, 8:30 <sup>1</sup> a.m.
			First semester extension classes <sup>3</sup> begin
October	15	Thursday	Senate meeting, 4:30 p.m.
November	11	Wednesday	Armistice Day; a holiday
November	14	Saturday	Homecoming Day
November	26	Thursday	Thanksgiving Day; a holiday
December	3	Thursday	State Day Convocation
December	16-19		Final examination period
December	17	Thursday	Commencement Convocation
			Senate meeting, 4:30 p.m.
December	19	Saturday	Fall quarter ends, Christmas vacation begins, 5:20 p.m.
December	23	Wednesday	Payment of fees closes for all students in residence fall quarter <sup>4</sup>

## WINTER QUARTER

December	31	Thursday	} Registration days for new students in all colleges
January	2	Saturday	
January	4	Monday	Christmas vacation ends, winter quarter begins, 8:30 <sup>1</sup> a.m.
January	30	Saturday	First semester extension classes close
February	1	Monday	Second semester extension classes begin
February	12	Friday	Lincoln's Birthday; a holiday
February	18	Thursday	Charter Day Convocation
			Senate meeting, 4:30 p.m.
March	17-20		Final examination period
March	18	Thursday	Payment of fees closes for all students in residence winter quarter <sup>4</sup>
March	20	Saturday	Winter quarter ends, spring vacation begins, 5:20 p.m.

## THE COLLEGE OF PHARMACY

## SPRING QUARTER

March	26-27		Registration days for new students in all colleges
March	29	Monday	Spring vacation ends, spring quarter begins, 8:30 <sup>1</sup> a.m.
April	2	Friday	Good Friday; a holiday
May	13	Thursday	Cap and Gown Day Convocation
May	20	Thursday	Senate meeting, 4:30 p.m.
May	29	Saturday	Second semester extension classes close
June	9-12		Final examination period
June	12	Saturday	Spring quarter closes, 5:20 p.m.
June	13	Sunday	Baccalaureate service
June	14	Monday	Fifty-fourth annual commencement

## SUMMER SESSION

June	18-19		Summer Session first term begins, registration and payment of fees
June	21	Monday	Classes begin, 8:00 a.m.
July	31	Saturday	Registration and payment of fees for second term closes
			First term Summer Session closes
August	2	Monday	Second term classes begin
September	4	Saturday	Second term Summer Session closes

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

<sup>2</sup> Registration subsequent to the date specified will necessitate the approval of the college concerned. See also penalty fees for late registration, page 6.

<sup>3</sup> 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 and peculiar circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

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

<sup>4</sup> New students must pay fees on dates announced for registration.

## ADMINISTRATIVE OFFICERS

Lotus Delta Coffman, Ph.D., LL.D., President

William Watts Folwell, LL.D., President Emeritus

Frederick J. Wulling, Phm.G., Phm.D., LL.M., Dean of the College of Pharmacy, Professor of Pharmacology, and Director of the University Medicinal Plant Gardens

# THE COLLEGE OF PHARMACY

## GENERAL INFORMATION

The thirty-fourth year's course of the College of Pharmacy begins and ends as announced in the calendar on preceding pages.

*Admission by certificate.*—Diplomas or other evidences of the completion of an accredited four-year high school course, or of its educational equivalent, are required for admission. The high school course must have included:

- |  |         |
|--|---------|
| 1. English .....   | 4 units |
| or English .....   | 3 units |
| and a foreign language .....   | 2 units |
| 2. Mathematics   |         |
| Elementary algebra .....   | 1 unit  |
| Plane geometry .....   | 1 unit  |
| 3. Latin .....   | 1 unit  |
| 4. Physics .....   | 1 unit  |
| 5. Enough additional work to make in all 15 units, of which not more than 4 may be in Group F. |         |

Group F consists of high school, vocational, and miscellaneous subjects. The subjects are no longer designated by the University. The applicant is free to present in this division such subjects as are not listed in other groups, but which are certified by the superintendent or principal as being of acceptable nature and counted toward graduation.

The freshman class is limited to sixty students.

*Admission by examination.*—Students may take examinations in subjects for which they have no certificates. A high school training covers a minimum of 15 units, a unit being a school year of standard work in a given subject. State High School Board certificates and College Entrance Examination Board certificates are accepted in lieu of examinations in respective high school subjects.

*New students.*—All applicants for admission should request their high school principals or superintendents to send a complete transcript of their records to the registrar of the University as early as possible and not later than July 1. Upon receipt of the credentials, the registrar will notify the applicant concerning his admission and will forward directions for registration. (See calendar for registration dates.)

New students are admitted only at the beginning of the fall quarter.

*Old students.*—About September 1, the registrar will send a fee statement to the student's home address as it appears on the records of his office. Those who fail to receive the statement within a week should write to the registrar and ask for it. (See calendar for dates of registration and payment of fees.)

*Fees and other expenses.*—The quarterly tuition fee of \$35 for resident students and \$45 for non-resident students includes all laboratory fees, except

chemistry, and is payable before the beginning of each quarter. Certificates entitling the student to admission to classes will not be issued until fees have been paid.

Tuition fee (per quarter)	
Residents of Minnesota .....	\$35.00
Non-residents .....	45.00
Incidental fee (per quarter) .....	4.00
Deposit (first quarter only).....	10.00
Military deposit (required of all students taking military drill) .....	10.00
Special fees:	
Examination for removal of condition .....	1.00
Examination for credits (after the first six weeks in residence).....	5.00
Special examination .....	5.00
Chemistry deposit .....	5.00

Registration penalties.—A penalty fee for late registration, late change of registration, or late payment of fees shall be two dollars (\$2) and one dollar (\$1) additional for each day of delay after classes begin, provided that no student shall pay more than twelve dollars (\$12) of penalty in any given quarter.

Those desiring to take special work may pay fees on a clock hour basis, the rate being \$1.50 an hour for resident students and \$2 an hour for non-resident students.

*Graduation requirements.*—Regular attendance at lectures, recitations, and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven eighths of the total work of the course for which they have matriculated.

Every person upon whom any degree is conferred must be of good moral character; must have completed the required lecture and laboratory courses, the last year to be spent in this college; and must have passed examinations in the subjects required for graduation.

Drugstore experience is not a requirement for graduation.

*Advanced standing.*—Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies at accredited institutions, and must pass the examinations of all departments in which they desire credit, if such examinations are deemed necessary by the professors in charge. Students will not be permitted to substitute private work in any branch for the regular course work.

*Unclassed students.*—Academically qualified persons desiring to do less than the work of the regular course may be admitted as unclassified or special students provided there is laboratory room for them. They will not be rated in their work nor examined unless they make special request therefor. Work completed satisfactorily will be credited should the students subsequently enter the regular course, provided they meet the full entrance requirements. Registered pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities

*Examinations and standing.*—Examinations are held during the last week of each quarter, and are supplementary to the written and practical tests and quizzes that are held at frequent intervals during the year, and, with them, form largely the basis of final determination of fitness for promotion or graduation.

The standing of students is indicated by the letters A, B, C, D, (A highest, D lowest passing mark), E (condition), I (incomplete), and F (failure). Conditions may be removed as indicated below. 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.

In order to become eligible for final examinations students are required to attend at least seven eighths of the lectures in each course. This does not apply to laboratory courses, which must be taken in full.

Students having conditions in more than two major or in more than three minor subjects of the first year cannot enter upon the second year's work. Candidates for graduation must have removed all conditions before entering upon the third quarter of the graduating year.

Examinations for the removal of conditions will be offered the week preceding the opening of the fall quarter. Similar examinations will also be given during the first thirty days of the winter and spring quarters. Announcement of these examinations will appear in the general information bulletin and the *Official Daily Bulletin*. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given. A fee of one dollar is charged for a condition examination. Failure at the condition examination necessitates a repetition of the subject. Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

Absences will not be excused unless satisfactory reasons are given. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to probation or temporary or permanent suspension. Students are strongly advised to be present at the beginning of the school year. Any of the facilities afforded by the University are open to the students of this college, subject to the approval of the dean. Opportunity is offered to do advanced work in all branches. Textbooks may be obtained after coming to the University.

Students find their time fully occupied.

*Medical plant laboratory and garden.*—Students receive instruction in medicinal plant culture and in the harvesting, drying, preparing, and milling of drugs in the very representative medicinal plant garden and in the plant laboratory and conservatory. The garden and plant laboratory have been added to increase the educational facilities of the college. The college has no experience nor information concerning the commercial cultivation of medicinal plants.

*Dispensary prescription practice.*—The seniors, under competent direction and supervision, dispense the prescriptions written by the physicians in

the Out-Patient Department of the University Hospitals. During the past year upwards of twenty-six thousand prescriptions were filled, most of them formulated ones, only a negligible percentage calling for proprietaries.

*Electives in other university colleges.*—Students may elect certain subjects in other university colleges, if such election does not interfere with their regular work. Subjects elected must be approved by the dean.

*College training for pharmacists.*—The recognition of the need of substantial college training for pharmacists finds expression in many ways. In many states, including Minnesota, such training is now obligatory by law. In a number of other states credit is given for college work. Graduates of the three- or four-year course need only one additional year of drugstore experience before they become eligible for examination by the State Board of Pharmacy for full registration.

*Summer school.*—The College of Pharmacy offers no courses in purely pharmaceutical subjects but the summer school offers the following courses which are part of the regular three-year pharmacy course: general chemistry, qualitative chemistry, organic chemistry, general botany, physiology, and bacteriology. The following subjects, which are included in the four-year pharmacy course, are offered by the summer school: rhetoric, physics, modern languages, and animal biology.

Requests for summer school bulletins should be made directly to the university registrar.

*Minnesota State Pharmaceutical Association scholarship.*—The Minnesota State Pharmaceutical Association awards annually \$105 in cash and a token to that student who is a citizen of the United States, who has resided in Minnesota for the last five years, and who has earned the highest general rating in both the first and second years of the regular course in this college up to ten days before Cap and Gown Day. If such student should discontinue attendance at the college, the said sum is to be awarded to the student next highest in standing who meets the other requirements.

*The Fairchild scholarship.*—Mr. Samuel W. Fairchild offers a scholarship in the sum of \$300 to be awarded to that student in any of the colleges holding membership in the American Conference of Pharmaceutical Faculties who has had two years of drugstore experience, is a high school graduate, who has completed one year in a recognized college of pharmacy, and who passes the best competitive examination to be conducted by or under the auspices of a committee made up of members appointed jointly by the American Pharmaceutical Association, the American Conference of Pharmaceutical Faculties, and the National Association of Boards of Pharmacy. Fuller particulars may be had from the dean of the college.

*Lehn and Fink gold medal.*—Messrs. Lehn and Fink, of New York City, award annually a gold medal to that student in the College of Pharmacy who graduates with the highest general average rating from the four-year course leading to the degree bachelor of science in pharmacy.

*The Jacobson prize.*—David L. Jacobson, '99, offers annually a gold medal to that student who graduates with the highest general average rating

from the first graduate course in Pharmacy leading to the degree master of science in pharmacy.

*Positions for graduates.*—The demand for graduates of this college has always been greater than the supply and is continually growing. Practically all members of the senior class are engaged before graduation. This college is recognized in all states, including those in which state standards of efficiency have been established.

*State Board of Pharmacy.*—The State Board of Pharmacy meets at the college four times each year to examine candidates for registration. For information concerning the board or state examinations, address the secretary of the board, Mr. John Dargavel, 2943 Twenty-seventh Ave. So., Minneapolis.

*The American Conference of Pharmaceutical Faculties.*—This college is a member of the American Conference of Pharmaceutical Faculties, whose object is the promotion of higher pharmaceutical education. Through the influence of the conference, higher standards of education are being adopted from time to time by its members and others, evidenced by the fact that several states by law or by board of pharmacy ruling recognize the standards set by the conference. Member colleges must maintain certain minimum entrance and graduation requirements. This college exceeds these requirements.

*The Northwestern Branch of the American Pharmaceutical Association.*—The Northwestern Branch of the American Pharmaceutical Association has its headquarters at the College of Pharmacy. About four meetings are held annually. Students of pharmacy are eligible to membership in the branch, but are privileged to attend the meetings without becoming members.

*Communications.*—Communications not relating to registration should be addressed to the dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minnesota. Communications relating to registration or advanced standing should be addressed to the University Examiner, Registrar's Office, University of Minnesota.

For further information see general information bulletin.



## COURSE OF STUDY

Four graded courses leading respectively to the degrees pharmaceutical chemist, bachelor of science in pharmacy, master of science in pharmacy, and doctor of science in pharmacy, are authorized by the regents. Only the course leading to the first degree is described in this bulletin, but a limited number of applicants for advanced standing in the courses leading to the second and third degrees will be accepted now. These courses are graded, and the lower is a prerequisite for any higher. They cover respectively three, four, five, and six years.

*The present minimum course.*—This course extends over a period of three full university years. The curriculum is described in the following pages, but its division among the three years may be changed as necessity may warrant. All courses begin only with the fall or first quarter.

### OUTLINE OF THE REGULAR THREE-YEAR COURSE (Subject to change)

#### FRESHMAN

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Botany	Botany	Botany
General Chemistry	General Chemistry	Qualitative Chemistry
Military training	Military training	Military training
Pharmacy	Pharmacy	Pharmacy
Pharmac. Chemistr., Didactic	Pharmac. Chemistry, Didactic	Pharmac. Chemistry, Didactic
Pharmacognosy	Pharmacognosy	Pharmacognosy

#### JUNIOR

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Materia Medica	Materia Medica	Materia Medica
Pharmacognosy	Pharmacognosy	Pharmacognosy
Pharmac. Chemistry, Practical	Pharmac. Chemistry, Practical	Therapeutics
Military training	U. S. P. Testing	Operative Pharmacy
Organic Chemistry	Military training	Military training
	Organic Chemistry	

#### SENIOR

<i>First Quarter</i>	<i>Second Quarter</i>	<i>Third Quarter</i>
Dispensing	Dispensing	Dispensing
U. S. P. Assay	U. S. P. Assay	U. S. P. Assay
Bacteriology	Drug and Food Analysis	Mineralogy and Crystallog.
Drug and Food Analysis	Physiology	Drug and Food Analysis
Dispensary Practice	Dispensary Practice	Law and Ethics
Organic Pharmacy		Dispensary Practice

*The four-year course.*—The four-year course includes all of the regular three-year course and in addition rhetoric, 10 credits; any modern language, 10 credits; physics, 10 credits; and electives sufficient to total at least 15 additional credits. Students who bring high school credits in physics may elect animal biology in place of physics. Students who have completed

this academic or pre-pharmacy work in the College of Science, Literature, and the Arts, or in a college of corresponding standing, are eligible for entrance upon the second year of this course.

*Credit value.*—The credit values of courses were changed September, 1918. Now a credit value covers one period of lecture or recitation or two, and in some laboratory subjects three, periods of laboratory work per week per quarter. The numbers expressing the credit value of courses are now fifty per cent greater than formerly, when the college was on the semester basis.

*Statement of 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 class. Thus (3 cred.; jr., sr., grad.; 3-4; MTW II) means that the course carries three credits, is open to juniors, seniors, and graduates, demands Course 3-4 as a prerequisite, and meets on Monday, Tuesday, and Wednesday, at the second hour.

## DESCRIPTION OF COURSES

### BACTERIOLOGY AND IMMUNOLOGY

Professor Winford P. Larson, M.D.; Associate Professor Arthur T. Henrici, M.D.; Assistant Professor Robert G. Green, M.A., M.D.; Instructors Beryl S. Green, M.A., H. O. Halverson, M.S., Robert Starkey, Ph.D.

51f,w,s,su. General Bacteriology. Lecture and laboratory course. The principles and technique of general bacteriology. Studies in the morphologic and biologic characters of the common bacteria. Preparation of cultural media. Disinfectants and disinfection. Bacteriology of water and food products. (5 cred.; sr.; prereq., 1 yr. biol., 1 yr. chem.) Dr. Larson, Dr. Henrici, Dr. Green.

### BOOK RESEARCH AND SEMINAR WORK

Throughout the year students are required to do book research and seminar work in the pharmaceutical library during certain hours released for the purpose from the pharmaceutical laboratory and other periods. Beginning with the coming year it is proposed to provide regularly in the college schedule one two-hour period a week for library and seminar work during the second quarter of the graduating year. A room has been reserved for this purpose in the Pharmacy Building.

### BOTANY

Professors J. Arthur Harris, Ph.D., Head; Carl O. Rosendahl, Ph.D., Josephine E. Tilden, M.S.; Associate Professor Frederic K. Butters, Ph.D., Rodney B. Harvey, Ph.D.; Assistant Professors William S. Cooper, Ph.D., Ned L. Huff, M.A.; Instructors Ernest Dopp, M.A., Ethel M. Mygrant, B.A., M.S.; Teaching Assistants Harriet George, M.A., Ethel Sue Horton, M.A., Jessie P. Rose, M.A., Jerry A. Vacha, M.S., Raymond Wallace, B.A.; Assistants Esther M. Goering, B.S., Johanna Kildahl, Ph.D., Edna K. Lockwood, Abraham B. Stoesz, B.A.

17f-18w-19s. General Botany and Greenhouse Work. Study of external forms of flowering plants with the relations, modifications, and functions of their several organs; special study of the flower with the outline of classification of flowering plants. Lectures, laboratory work, field work. (9 cred.; fr.; no prereq.) Mr. Butters and assistants.

### CHEMISTRY

Professors William H. Hunter, Ph.D., M. Cannon Sneed, Ph.D.; Instructors Walter M. Lauer, Ph.D., J. Lewis Maynard, B.A., Henry N. Stephens, Ph.D.

- 4f-5w. General Inorganic Chemistry. A study of the general laws of chemistry and of the non-metals, the metals, and their compounds. (8 cred.; fr.; prereq., high school chem.) Mr. Stephens.
- 14f-15w. General Inorganic Chemistry. A study of the general laws of chemistry and of the non-metals and their compounds. (10 cred.; fr.; no prereq.) Mr. Maynard.
- 16s. Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibrium, oxidation and reduction, and other subjects pertinent to qualitative analysis. (5 cred.; fr.; prereq., 5 or 15.) Mr. Maynard.
- 31f-32w. Elementary Organic Chemistry. A discussion of the important classes of organic compounds, both aliphatic and aromatic. The laboratory work includes the preparation of typical substances. Primarily for dentistry and pharmacy students. (8 cred.; soph.; prereq., 5 or 15.) Mr. Lauer.

## CLINICAL MICROSCOPY

Professor.....; Instructor.....

- 1s. Clinical Chemistry and Microscopy. Includes (a) the microscopic study of urine, its colors, sediments, and finer chemical tests and (b) the microscopic study of urine sediments, blood, pus, epithelial cells, casts, etc. Optional. (1 cred.; sr.; no prereq.)

## DISPENSARY PRESCRIPTION PRACTICE

Instructor Hallie Bruce, Phm.G.; Assistant Vivian Vogel, Phm.C.

- 1f,w,s. Dispensary Prescription Practice. The prescription-dispensing for the Out-Patient Department of the University Hospital is in charge of the College of Pharmacy. The senior students do the prescription work under competent direction. (3 cred.; sr.; prereq., Pharm. 5.) Miss Bruce, Miss Vogel.

## FIRST AID TO THE INJURED

Lecturer Charles N. McCloud, Phm.D., M.D., and assistant.

- 1s. Emergency Cases. A series of lectures and demonstrations designed to qualify the pharmacists to administer upon emergency cases before the arrival of the physician. (1 cred.; sr.; no prereq.) Dr. McCloud.

## MATERIA MEDICA

Professors Edwin L. Newcomb, P.D., Ph.M., Pharm.D., Frederick J. Wulling, Phm.G., Phm.D., LL.M.; Instructor Earl B. Fischer, B.S., and assistants.

- 1f,w,s. Inorganic Materia Medica. This course runs concurrently and in close relationship with Pharmacy 8 and 11, and includes chiefly the

- medical properties and doses of inorganic official bodies. (1 cred.; fr.; no prereq.) Mr. Wulling and assistants.
- 2f,w,s. Organic Materia Medica. The identity, sources, botanical origins, families, constituents, preparations and doses of the U. S. P., and of some unofficial vegetable drugs are studied in this course. (6 cred.; fr.; no prereq.) Mr. Newcomb, Mr. Fischer, and assistants.

### MILITARY SCIENCE AND TACTICS

- Professor Bernard Lentz, Major, Infantry, U.S.A.; Assistant Professors Nyal L. Adams, Captain, Coast Artillery Corps, U.S.A.; Myron J. Conway, First Lieutenant, Infantry, U.S.A.; Julian H. Gist, Captain, Infantry, U.S.A.; Edward Montgomery, Major, Coast Artillery Corps, U.S.A.; Wilton B. Persons, B.S. (E.E.), Captain, Signal Corps, U.S.A.; Don F. Pratt, Captain, Infantry, U.S.A.; William F. Rehm, Captain, Infantry, U.S.A.; Henry H. Rutherford, B.A., M.D., Lieutenant Colonel, Medical Corps, U.S.A.; Arthur R. Walk, Captain, Infantry, U.S.A.; Instructors Alfred Brandt, Master Sergeant, U.S.A.; John Coop, Sergeant, U.S.A.; Aubrey R. Dunkum, Staff Sergeant, U.S.A.; Joseph Havlicek, Regimental Commissary Sergeant, U.S.A., Retired; Ernest R. Mylk, Sergeant, U.S.A.; Harry E. Strider, Master Sergeant, U.S.A.
- 1f-2w. First Year Basic Course R.O.T.C. Infantry. Practical and theoretical instruction in school of soldier squad and company; elementary subjects of military training; infantry weapons and equipment. (No cred.; fr.; no prereq.; MWF IV; A.)
- 3s. First Year Basic Course. Same as 1f-2w. (No cred.; fr.; prereq., 1-2; W VII, VIII, IX; A.)
- 4f-5w. Second Year Basic Course R.O.T.C. Infantry. Practical instruction in school of platoon and company; military sketching and map-reading; infantry weapons including machine gun and automatic rifle; minor tactics. (No cred.; fr., jr.; prereq., 1-2-3; MWF IV; A.)
- 6s. Second Year Basic Course R.O.T.C. Infantry. Same as 4f-5w. (No cred.; fr., jr.; prereq., 4-5; W VII, VIII, IX; A.)
- 51f-52w. First Year Advanced Course R.O.T.C. Infantry. Field engineering; infantry weapons, including trench mortars, 37 mm. gun, grenades, pistol; minor tactics and musketry. (No cred.; jr.; prereq., 1-2-3, 4-5-6; MWF II, III, IV, VI, VIII; TThS I, II, III, IV; TTh, VI, VII, VIII, IX; A.)
- 53s. First Year Advanced Course R.O.T.C. Same as 51f-52w. (No cred.; jr.; prereq., 51-52; W VII, VIII, IX; A.)
- 54f-55w. Second Year Advanced Course R.O.T.C. Infantry. Minor tactics; administration; military law; military history and policy of the United States; rules of land warfare. (No cred.; sr.; prereq., 51-52, 53; MWF II, III, IV, VI, VIII; TThS I, II, III, IV; TTh VI, VII, VIII, IX; A.)
- 56s. Second Year Advanced Course R.O.T.C. Same as 54f-55w. (No cred.; sr.; prereq., 54-55; W VII, VIII, IX; TThS IV; A.)

## PHARMACY

Professors Frederick J. Wulling, Phm.G., Phm.D., LL.M., Gustav Bachman, Phm.D., Phm.M.; Associate Professor Charles H. Rogers, D.Sc. in Phm.; Instructors Hallie Bruce, Phm.G., Charles V. Netz, Phm.C., B.S., Del D. Turner, Phm.C.,.....

- 1f. History of Pharmacy. This course embraces the study of the history of pharmacy, including the U. S. Pharmacopoeia through all of its revisions and the literature of pharmacy. ( $\frac{3}{4}$  cred.; fr., jr.; no prereq.) Mr. Wulling, Mr. Rogers.
- 2f. This course includes the study and preparation of the active constituents of many vegetable drugs, scale salts of iron, plasters, soaps, oleoresins, collodions, effervescing salts, etc. ( $6\frac{1}{2}$  cred.; jr.; prereq., 4f,6w,8s.) Mr. Bachman, Mr. ...., Mr. Turner.
- 3f. Metrology. A critical study of weights and measures and balances; specific gravity, specific volume; allegation, etc. ( $4\frac{1}{2}$  cred.; fr., jr.; no prereq.) Mr. Rogers, Mr. Netz.
- 5w. The Physics of Pharmacy. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. ( $4\frac{1}{2}$  cred.; fr., jr.; prereq., 3.) Mr. Rogers, Mr. Netz.
- 7w,s. Pharmaceutical Processes. A study of the various laboratory processes employed in pharmaceutical manufacture. (5 cred.; fr., jr.; prereq., 5.) Mr. Rogers, Mr. Netz.
- 2w,s. Pharmacopoeial Preparations. This course includes the study and preparation of official bodies for which the Pharmacopoeia gives formulae and processes. ( $7\frac{1}{2}$  cred.; fr., jr.; prereq., 7.) Mr. Rogers, Mr. Netz, and assistant.
- 4f,w,s. Pharmacy Quiz. A thoro review of the work covered in Courses 3f, 5w, 7s, and 2s. ( $4\frac{1}{2}$  cred.; fr., jr.; prereq., 3, 5, 7, 2.) Mr. Rogers, Mr. Netz.
- 6w,s. Identification of Inorganic U. S. P. Preparations. The study of the appearance and physical properties of inorganic official preparations. (2 cred.; fr., jr.; prereq., 2.) Mr. Rogers, Mr. Netz.
- 9f. Pharmaceutical Chemical Philosophy. This course treats of the principles underlying chemistry and elucidates chemical facts and phenomena in their pharmaceutical aspects. (3 cred.; fr., jr.; no prereq.) Mr. Wulling.
- 11w. The Pharmaceutical Chemistry of the Non-Metals. A study of the description, properties, pharmacy, and manufacture of the non-metals used in pharmacy, including their U. S. P. preparations. (3 cred.; fr., jr.; prereq., 9.) Mr. Wulling.
- 8s. U. S. P. Inorganic Salts. Especial reference to sources, description, properties, and manufacture. (3 cred.; fr., jr.; prereq., 9.) Mr. Wulling.
- 13s. Classification of Pharmaceutical Organic Compounds. A preparation for Pharmacy 15. ( $1\frac{1}{2}$  cred.; jr., sr.; prereq., Chemistry 31f and 32w.) Mr. Wulling, Mr. Rogers.

- 15f,w,s. **Pharmaceutical Organic Compounds and Their Preparations.** Includes the critical study of cellulin and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes and animal fats, alkaloids, glucocides, animal drugs and products, etc. (9 cred.; jr., sr.; prereq., 13, Chemistry 31f and 32w.) Mr. Rogers.
- 17w. **Pharmacopoeial Qualitative Analysis.** A critical study of the identity, purity, limit, and percentages tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound. (5½ cred.; jr.; prereq., 11w and Chem. 16s.) Mr. Bachman, Mr. Turner, .....
- 18w,s. **Pharmacopoeial Quantitative Analysis.** This course includes the gravimetric, volumetric, and gasometric determinations of the U. S. Pharmacopoeia, but not Pharmaceutical Assay (12w). (15 cred.; sr.; prereq., 17.) Mr. Bachman, Mr. Turner, .....
- 19f,w,s. **Prescription Incompatibility.** Therapeutic, pharmaceutical, and chemical incompatibility is taken up in lecture and recitation work preliminary to Course 21. (2 cred.; sr.; prereq., 17w.) Mr. Bachman, .....
- 21f,w,s. **Prescription Dispensing.** This course runs concurrently and in co-operation with Dispensary Prescription Practice 1f,w,s, and includes the critical study of the prescription and practical work in dispensing a wide range of prescriptions taken from actual medical practice. (13 cred.; sr.; prereq., 17w.) Mr. Bachman, Miss Bruce, Mr. Turner.
- 8a,w,s. **Manufacture of Pharmaceutical Inorganic Salts.** The preparation of upwards of forty pharmaceutical salts included in this course. (6 cred.; jr., sr.; prereq., 8s, Chemistry 16s.) Mr. Rogers, Mr. Netz, and assistants.
- 10f. **National Formulary.** This lecture and laboratory course includes a partial study of the National Formulary and the making of a number of its more important preparations. (1½ cred.; jr., sr.; prereq., 15; 8a.) Mr. Bachman, Mr. Turner, .....
- 12s. **Pharmaceutical Assay.** The quantitative determination of alkaloidal and other active constituents of a number of the potent U. S. P. organic drugs and preparations. (2 cred.; sr.; prereq., 17w.) Mr. Bachman, Mr. Turner, .....
- 14s. **Synthetic Remedies.** The study of the pharmaceutical chemistry of synthetic chemicals in medical use. (1 cred.; jr., sr.; prereq., 15f,w,s.) Mr. Rogers.
- 16w. **Homeopathic Pharmacy.** A brief exposition of the principles underlying the preparation of homeopathic remedies, including some laboratory work. (1 cred.; jr.; no prereq.) Mr. Wulling, Mr. Bachman.  
Optional.
- 25w,s. **Identification of U. S. P. Salts.** The study of the physical identity of the more important official inorganic and organic salts. (2 cred.; jr., sr.; prereq., 8, 15.) Mr. Bachman, Mr. Turner, .....

- 20s. Microchemistry. Work in the microchemistry of pharmacy is included in the work of a number of other courses, but will soon be offered as a separate course. (No cred.; no prereq.) Mr. Newcomb, Mr. Rogers.
- 27f. Mathematics of Pharmacy. While students are required to have a preparation in arithmetic, algebra, and geometry, before entering, they receive frequent drills throughout the year. Examinations in the subject are required. (1 cred.; fr., jr.; prereq., 3.) Mr. Wulling, Mr. Bachman, Mr. Rogers, Miss Bruce, .....
- 29f,w,s. Drug and Food Analysis. A course designed to prepare students for commercial pharmaceutical analytical work. (24 cred.; sr.; prereq., Chemistry 31f and 32w.) Mr. Rogers, Mr. Netz, and assistant.
- 51f,w. Metrology, Elementary. For nurses. (1 cred.; fr., jr.; no prereq.) Mr. Wulling.

#### PHARMACEUTICAL AND BUSINESS LAW

Professor Frederick J. Wulling, Phm.G., Phm.D., LL.M.

- 1s. Law for Pharmacists. The lectures introduce the subjects of contracts, agency, commercial paper, insurance, etc., in their application to the practice of pharmacy, and discuss the liability of retail pharmacists. (2 cred.; sr.; no prereq.) Mr. Wulling.
- 2s. Minnesota Pharmacy Laws. The study of the statute laws of Minnesota affecting the practice of pharmacy. The lectures are given by special lecturers experienced in the application and operation of pharmacy laws. ( $\frac{1}{3}$  cred.; sr.; no prereq.)

#### PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY

Professor Frank F. Grout, Ph.D.

- 1s. Mineralogy. A study of the occurrence and properties of minerals of pharmaceutical importance; ores of metals used in pharmacy; non-metallic minerals and mineral waters in their mineralogic and geologic relation. (1 cred.; sr., grad.; no prereq.) Mr. Grout and assistant.
- 2s. Crystallography. A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks. (1 cred.; sr., grad.; prereq., 1.) Mr. Grout.

#### PHARMACOGNOSY

Professor Edwin L. Newcomb, P.D., Ph.M., Pharm.D.; Instructor Earl B. Fischer, B.S.; Assistant Charles E. Smyithe.

- 1f. Medicinal Plant Study and Drug Preparations. The principles underlying the preparation of plant drugs, including the study of plants cultivated in the medicinal plant garden, and herbarium work. (1 cred.; fr.; no prereq.; ar.; ar). Mr. Newcomb, Mr. Fischer, and assistants.
- 2w,s. The Pharmacognosy of the Thallophytes and Archegoniates. In this course some of the drugs and economic products obtained from the



- thallophytes and archegoniates are studied. (5 cred.; fr.; prereq., 1f.) Mr. Newcomb, Mr. Fischer, and assistants.
- 3f. Drug Collection and Preparation. Scientific methods of drug collection and preparation of about fifty drugs from plants grown in the medicinal plant garden. (3 cred.; jr.; prereq., 1f.) Mr. Newcomb, Mr. Fischer, and assistants.
- 4s,w. Pharmaco-Histology and Pharmacognosy of the Angiosperms. Includes micrometry and the detailed study of the inner structure of parts of the higher plants as illustrated by the study of the whole and powdered, vegetable and animal drugs, and their adulterants. (10 cred.; jr.; prereq., 2w,s,3f, Botany 17f,18w.) Mr. Newcomb, Mr. Fischer, and assistants.
- 5s. Field Work. The classes are taken on field searches for native medicinal plants. The study of the distinguishing characteristics of certain orders, families, and genera of medicinal plants is included in this work. (2 cred.; jr.; prereq., 4w.) Mr. Newcomb.
- 6w. Physiological Drug Assay. Optional. The pharmacopoeial and the more important unofficial methods of biologic assay of drugs and their preparations are studied. Four-year course only. (3 cred.; sr.; prereq., 4s,w.) Mr. Newcomb.
- 7w,s. Advanced Pharmacognosy. Designed to give students a working knowledge of the use of the more important microscopical accessories in advance pharmacognostic work. Four-year course only. (3 cred.; sr.; prereq., 4s,w.) Mr. Newcomb.

#### PHYSICAL EDUCATION FOR MEN

Professor Fred W. Luehring, Ph.M., Director; Associate Professors Louis J. Cooke, M.D., Assistant Director, Louis S. Keller, M.A.; Instructors Emil Iverson, Blaine McKusick, LL.B., Walter R. Smith, B.A., Director of Intramural Athletics, Harold T. Taylor, M.A., Niels Thorpe; Assistant Lloyd S. Boyce.

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.

- 4f. Personal Hygiene. One hour per week; first quarter. Examination at close of course. (No cred.; all; no prereq.) Dr. Cooke.

*A special lecture* on sex hygiene is given sometime during the first ten days of the autumn quarter, with required attendance on the part of all freshmen.

#### PHYSICAL EDUCATION FOR WOMEN

Professor J. Anna Norris, M.D., Director; Assistant Professors Gertrude M. Baker, B.A., May S. Kissock, B.A., Alice H. Tolg, M.D.; Instructors Irene A. Clayton, B.S., Rhea M. Coxe, Grace E. Denny, B.S., Helen Hazelton, B.S., Marion McGimsey, Katherine Sias, B.A.

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 upperclass students; gives courses in hygiene; organizes neuromuscular activity leading toward organic strength, nervous stability, conscious motor control, correct bodily 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 Woman'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 is required of all newly entering students (see Course 4). Physical examinations or consultations required annually of all students.

For elective classes in gymnastics, dancing, swimming, field hockey, basket-ball, baseball, and other activities, see bulletin of the College of Science, Literature, and the Arts.

For requirements for a teacher's certificate, see bulletin of the College of Education.

- 4f. Preliminary Hygiene. One lecture a week. The most essential aspects of the care of the body. (No cred.; all new students; no prereq.) Dr. Norris.

#### PHYSIOLOGY

Professors Elias P. Lyon, Ph.D., M.D., Frederick H. Scott, Ph.D., M.B., D.Sc., Jesse F. McClendon, Ph.D.; Associate Professor Chauncey J. V. Pettibone, Ph.D.; Assistant Professor Esther Greisheimer, Ph.D., M.D.

- 4f,w,s,su. Human Physiology. Lectures and laboratory. (5 qtr. cred.; S.L.A., H.E., and others; prereq., elem. biol. and chem.) Dr. Lyon, Dr. Griesheimer, and others.

5f,w,su. Same as Course 4 without laboratory. Pharmacy students.

- 57f,su. Physiologic Chemistry. (4 qtr. cred.; dent. stud. and others; prereq., org. chem.) Dr. Pettibone.

For other courses see Medical School bulletin.

#### THERAPEUTICS AND TOXICOLOGY

Associate Professor Edgar D. Brown, Ph.D., M.D.

- 1s. Therapeutics and Toxicology. Drugs are studied in groups as governed by their medicinal and toxic properties. Remedial measures other than those depending upon drugs are fully considered. Poisonous action and doses of drugs also receive consideration. (3 cred.; jr.; prereq., Pharmacognosy 5, Mat. Med. 1.) Dr. Brown.

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

*The School of Chemistry*  
*Part I*

*Announcement of Courses for the Years*  
**1924-1926**



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# THE SCHOOL OF CHEMISTRY

## FACULTY AND STAFF

### ADMINISTRATION

Lotus Delta Coffman, Ph.D., LL.D., President  
William Watts Folwell, LL.D., President Emeritus  
Ora Miner Leland, B.S., C.E., Dean of the School of Chemistry and the  
College of Engineering and Architecture

### CHEMISTRY

#### *General Inorganic Chemistry*

M. Cannon Sneed, Ph.D., Professor of General Inorganic Chemistry and  
Chief of the Division  
Lillian Cohen, Ph.D., Assistant Professor of General Inorganic Chemistry  
Raymond E. Kirk, M.S., Assistant Professor of General Inorganic  
Chemistry  
Norville C. Pervier, Ph.D., Assistant Professor of General Inorganic  
Chemistry  
Lloyd H. Reyerson, Ph.D., Assistant Professor of General Inorganic  
Chemistry  
Hervey H. Barber, B.A., Instructor in General Inorganic Chemistry, in  
charge of stockroom service  
Gladstone B. Heisig, M.S., M.A., Instructor in General Inorganic Chemistry  
J. Lewis Maynard, B.A., Instructor in General Inorganic Chemistry  
Henry N. Stephens, Ph.D., Instructor in General Inorganic Chemistry  
Lawton B. Beckwith, B.A., Assistant in General Inorganic Chemistry  
Albert L. Chaney, B.A., Assistant in General Inorganic Chemistry  
H. Marjorie Crawford, M.S., Assistant in General Inorganic Chemistry  
Walter S. Dyer, B.S., Assistant in General Inorganic Chemistry  
F. Anton Gray, B.S., Assistant in General Inorganic Chemistry  
Leonard W. Hartkemeier, B.S. (Chem.), M.S. (Ch.E.), Assistant in Gen-  
eral Inorganic Chemistry  
Roscoe E. Jackman, B.A., Assistant in General Inorganic Chemistry  
Elsie I. Kilburn, B.A., Assistant in General Inorganic Chemistry  
Anne N. Lohmann, B.A., Assistant in General Inorganic Chemistry  
Paul E. Millington, B.A., Assistant in General Inorganic Chemistry  
Mary L. Morse, M.S. (Chem.), Assistant in General Inorganic Chemistry  
Caryl Sly, M.S., Assistant in General Inorganic Chemistry  
Ben E. Sorenson, M.S. (Ch.E.), Assistant in General Inorganic Chemistry  
Leslie F. Stone, B.S. (Chem.), Assistant in General Inorganic Chemistry

#### *Analytical Chemistry*

<sup>1</sup>Paul H. M.-P. Brinton, Ph.D., Professor of Analytical Chemistry and  
Chief of the Division  
Isaac W. Geiger, Ph.D., Associate Professor of Analytical Chemistry

<sup>1</sup> On sabbatic furlough, 1924-25.

Landon A. Sarver, Ph.D., Instructor in Analytical Chemistry  
Arthur E. Stoppel, Ph.D., Instructor in Analytical Chemistry  
Reuben B. Ellestad, B.S. (Chem.), Assistant in Analytical Chemistry  
Tohru Kameda, Assistant in Analytical Chemistry

*Organic Chemistry*

William H. Hunter, Ph.D., Professor of Organic Chemistry and Chief of the Division  
George B. Frankforter, Ph.D., Professor of Industrial Organic Chemistry  
Lee I. Smith, Ph.D., Assistant Professor of Organic Chemistry  
Walter M. Lauer, Ph.D., Instructor in Organic Chemistry  
Arthur C. Beckel, B.S. (Chem.), Assistant in Organic Chemistry  
Theodore T. Budrow, B.S. (Chem.), Assistant in Organic Chemistry  
Miles A. Dahlen, B.S. (Ch.E.), Assistant in Organic Chemistry

*Physical Chemistry*

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Lawrence M. Henderson, Ph.D., Assistant Professor of Physical Chemistry  
Ralph E. Beard, B.S., Assistant in Physical Chemistry  
Vlon N. Morris, M.S., Assistant in Physical Chemistry  
Lloyd E. Swearingen, M.S., Assistant in Physical Chemistry

*Technological Chemistry*

Everhart P. Harding, Ph.D., Associate Professor of Technological Chemistry  
Ralph E. Brewer, M.S., Instructor in Technological Chemistry  
Philip J. Riley, M.S., Assistant in Technological Chemistry

CHEMICAL ENGINEERING

Charles A. Mann, Ph.D., Professor of Chemical Engineering and Chief of the Division  
<sup>1</sup>George H. Montillon, M.S. (Ch.E.), Assistant Professor of Chemical Engineering  
Ralph E. Montonna, Ph.D., Assistant Professor of Chemical Engineering  
Robert C. Ernst, M.S. (Ch.E.), Instructor in Chemical Engineering  
Elliott L. McMillen, B.S. (Ch.E.), Assistant in Chemical Engineering

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Hertha R. Freche, B.A., Shevlin Fellow  
Rudolph Krantz, B.S. (Ch.E.), Research Fellow in Engineering Experiment Station

DRAWING AND DESCRIPTIVE GEOMETRY

William H. Kirchner, B.S., Professor of Drawing and Descriptive Geometry and Head of the Department  
Robert W. French, B.S. (C.E.), Associate Professor of Drawing and Descriptive Geometry

<sup>1</sup> Absent on leave, 1924-25.

Henry C. T. Eggers, Assistant Professor of Drawing and Descriptive Geometry

Robert F. Schuck, B.S. (E.E.), Assistant Professor of Drawing and Descriptive Geometry

Leon Archibald, B.Sc., Instructor in Drawing and Descriptive Geometry

John O. Cederberg, Jr., Instructor in Drawing and Descriptive Geometry

Alex S. Levens, B.S. (C.E.), Instructor in Drawing and Descriptive Geometry

William S. Williams, B.S. (E.E.), Instructor in Drawing and Descriptive Geometry

#### ECONOMICS

George W. Dowrie, Ph.D., Professor of Economics, Head of the Department, and Dean of the School of Business

Joseph E. Cummings, M.A., Assistant Professor of Economics

Alvin H. Hansen, Ph.D., Professor of Economics

Ernest A. Heilman, Ph.D., Associate Professor of Accounting

Bruce D. Mudgett, Ph.D., Professor of Economics

Harry J. Ostlund, B.A., Assistant Professor of Accounting

John J. Reighard, M.A., Assistant Professor of Accounting

J. Warren Stehman, Ph.D., Associate Professor of Economics

Roland S. Vaile, M.A., Associate Professor of Economics

Jeremiah S. Young, Ph.D., Professor of Political Science

Jay L. O'Hara, B.A., Lecturer in Economics

Ben W. Palmer, M.A., LL.B., Lecturer in Political Science

William H. Stead, M.A., Instructor in Economics

Arthur R. Upgren, B.A., Instructor in Economics

#### ELECTRICAL ENGINEERING

George H. Shepardson, M.A., M.E., D.Sc., Professor of Electrical Engineering and Head of the Department

Milo E. Todd, B.A., E.E., Assistant Professor of Electric Power Engineering

Edwin R. Martin, E.E., Assistant Professor of Electric Power Engineering

#### ENGLISH

Joseph M. Thomas, Ph.D., Professor of English and Head of the Department of English

—————, Instructor in English

#### GEOLOGY AND MINERALOGY

William H. Emmons, Ph.D., Professor of Geology and Mineralogy and Head of the Department

W. Horatio Brown, E.M., Ph.D., Instructor in Geology and Mineralogy

## GERMAN

Carl Schlenker, B.A., Professor of German and Head of the Department  
 James Davies, Ph.D., Assistant Professor of German  
 George Lussky, Ph.D., Assistant Professor of German

## MATHEMATICS AND MECHANICS

William E. Brooke, B.C.E., M.A., Professor of Mathematics and Mechanics  
 and Head of the Department  
 Hans H. Dalaker, Ph.D., Professor of Mathematics and Mechanics  
 Henry E. Hartig, B.S., E.E., Assistant Professor of Mathematics and  
 Mechanics  
 Carl A. Herrick, M.E., Assistant Professor of Mathematics and Mechanics  
 Raymond R. Herrmann, E.E., Assistant Professor of Mathematics and  
 Mechanics  
 William F. Holman, Ph.D., Professor of Mathematics and Mechanics  
 Jacob O. Jones, M.C.E., Associate Professor of Hydraulics  
 William M. McClintock, M.A., Assistant Professor of Mathematics and  
 Mechanics  
 George C. Priester, B.E., M.S., Assistant Professor of Mathematics and  
 Mechanics  
<sup>1</sup>Roderick W. Siler, B.S., Assistant Professor of Mathematics and Mechanics  
 Hugh B. Wilcox, B.S. (E.E.), M.S., Assistant Professor of Mathematics  
 and Mechanics  
 Charles Boehnlein, B.S., M.E., Instructor in Mathematics and Mechanics  
 Harry A. Doeringsfeld, C.E., Instructor in Mathematics and Mechanics  
 Elmer W. Johnson, E.E., M.E., Instructor in Mathematics and Mechanics  
 Oscar C. Lee, B.S. (E.E.), Instructor in Mathematics and Mechanics  
 Forrest E. Miller, B.S. (A.E.), Instructor in Mathematics and Mechanics  
 Walter R. Warne, Ph.B., B.Pd., Instructor in Mathematics and Mechanics

## MECHANICAL ENGINEERING

John J. Flather, Ph.B., M.M.E., Professor of Mechanical Engineering and  
 Head of the Department  
 John V. Martenis, M.E., Associate Professor of Machine Design  
 S. Carl Shipley, B.S., M.E., Professor of Machine Construction and Super-  
 intendent of Shops  
 Charles F. Shoop, B.S., B.S. (M.E.), Associate Professor of Steam Engi-  
 neering  
 John Flodin, B.S., M.E., Instructor in Machine Design  
 Thomas P. Hughes, Instructor in Forging  
 John H. Moffett, Met.E., Instructor in Foundry Practice  
 Dayton A. Rogers, Instructor in Machine Shop Practice  
<sup>2</sup>George L. Tuve, B.S., M.E., Instructor in Steam Engineering

## METALLOGRAPHY

Oscar E. Harder, Ph.D., Professor of Metallography  
 Ralph L. Dowdell, Met.E., Instructor in Metallography  
 Ludwig J. Weber, B.S., Ch.E., Instructor in Metallography

<sup>1</sup> On sabbatic furlough, 1924-25.

<sup>2</sup> Absent on leave, 1924-25.

## METALLURGY

William R. Appleby, M.A., Professor of Metallurgy and Dean of the School of Mines

Peter Christianson, B.S., E.M., Professor of Metallurgy

Levi B. Pease, M.S., Professor of Metallurgy

## MILITARY SCIENCE AND TACTICS

Bernard Lentz, Major, Infantry, U.S.A., Professor of Military Science and Tactics and Head of the Department

Henry H. Rutherford, B.A., M.D., Lieutenant Colonel, Medical Corps, U.S.A., Assistant Professor of Military Science and Tactics

Frederick R. Wunderlich, D.D.S., Major, Dental Corps, U.S.A., Assistant Professor of Military Science and Tactics

Roger Hilsman, Captain, Infantry, Assistant Professor of Military Science and Tactics

Leo J. Farrell, Captain, Infantry, U.S.A., Assistant Professor of Military Science and Tactics

Andrew C. Tychem, Captain, Infantry, U.S.A., Assistant Professor of Military Science and Tactics

Newton W. Speece, Captain, Infantry, U.S.A., Assistant Professor of Military Science and Tactics

Myron J. Conway, First Lieutenant, Infantry, U.S.A., Assistant Professor of Military Science and Tactics

Joseph Havlicek, Regimental Commissary Sergeant, U.S.A., Retired, Instructor in Military Science and Tactics

John McWilliams, First Sergeant, U.S.A., Retired, Instructor in Military Science and Tactics

Alfred Brandt, Technical Sergeant, Instructor in Military Science and Tactics

Harry E. Strider, Technical Sergeant, Instructor in Military Science and Tactics

Aubrey R. Dunkum, Technical Sergeant, Instructor in Military Science and Tactics

Ernest R. Mylk, Private, First Class, Spec. 4th Class, Instructor in Military Science and Tactics

## PHYSICAL EDUCATION FOR MEN

Fred W. Luehring, Ph.M., Professor of Physical Education and Director of Physical Education and Athletics for Men

Louis J. Cooke, M.D., Associate Professor of Physical Education and Assistant Director of Physical Education and Athletics for Men

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

Emil Iverson, Instructor in Physical Education for Men

Blaine McKusick, B.A., LL.D., Instructor in Physical Education for Men

Harold T. Taylor, M.A., Instructor in Physical Education for Men

Niels Thorpe, Instructor in Physical Education for Men

Max Herseth, Assistant in Physical Education for Men



## PHYSICAL EDUCATION FOR WOMEN

- J. Anna Norris, M.D., Professor of Physical Education and Director of Physical Education for Women  
 Gertrude M. Baker, B.A., Assistant Professor of Physical Education for Women  
 May S. Kissock, B.A., Assistant Professor of Physical Education for Women  
 Alice J. H. Tolg, M.D., Assistant Professor of Physical Education for Women  
 Irene Clayton, B.S., Instructor in Physical Education for Women  
 Rhea M. Coxé, Instructor in Physical Education for Women  
 Grace Denny, B.S., Instructor in Physical Education for Women  
 Helen Hazelton, B.A., Instructor in Physical Education for Women  
 Katherine Sias, B.S., Instructor in Physical Education for Women

## PHYSICS

- Henry A. Erikson, B.E.E., Ph.D., Professor of Physics and Chairman of the Department  
 Gregory Breit, Ph.D., Assistant Professor of Physics  
 Louallen F. Miller, Ph.D., Associate Professor of Physics  
 John T. Tate, Ph.D., Professor of Physics  
 Joseph Valasek, Ph.D., Assistant Professor of Physics  
 John H. Van Vleck, Ph.D., Assistant Professor of Physics  
 Anthony Zeleny, Ph.D., Professor of Physics  
 J. William Buchta, Ph.D., Instructor in Physics

## PHYSIOLOGIC CHEMISTRY

- Jesse F. McClendon, Ph.D., Professor of Physiologic Chemistry  
 Chauncey J. V. Pettibone, Ph.D., Associate Professor of Physiologic Chemistry  
 William W. Swanson, B.A., M.S., Instructor in Physiologic Chemistry

## PREVENTIVE MEDICINE AND PUBLIC HEALTH

- Harold S. Diehl, M.A., M.D., Assistant Professor of Preventive Medicine and Public Health and Director of the Health Service  
 Harold A. Whittaker, B.A., Assistant Professor of Preventive Medicine and Public Health  
 R. Wilson Archibald, B.A., D.V.M., Instructor in Preventive Medicine and Public Health and Bacteriologist  
 James A. Childs, C.E., Instructor in Preventive Medicine and Public Health and Engineer  
 Lawrence H. Cady, B.A., M.D., Assistant

## GENERAL INFORMATION

The School of Chemistry occupies a large modern building, recently completed, which is located on the new campus of the University. It is 180 by 200 feet and has six floors. Its laboratories are designed to afford facilities for instruction in the various branches of chemistry. The departmental 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 School of Chemistry offers three courses which lead to degrees, namely, (1) the four-year course in Chemistry; (2) the course in Chemical Engineering; and (3) the five-year course in Arts and Chemistry. The four-year course leads to the degree of bachelor of science in chemistry, while the five-year course in Arts and Chemistry leads to the degrees of bachelor of arts after four years and bachelor of science in chemistry at the end of the fifth year. These courses offer students a thoro training in the fundamentals of chemistry and related subjects. Each serves as a basis for specialization in chemistry and forms a suitable foundation for graduate work. Graduates of these courses secure positions in colleges, in governmental bureaus, and in the chemical industries, as teachers, analysts, or research assistants.

The course in Chemical Engineering leads to the degree of bachelor of science in chemical engineering at the end of four years, and to the degree of master of science in chemical engineering at the end of the fifth year which is taken in the Graduate School. It aims to give the student a broad foundation in chemistry, engineering, and allied sciences. The professional degree of chemical engineer will be conferred upon those who have received the degree of bachelor of science in chemical engineering, or its equivalent, when they have completed an additional year's college work in the Graduate School, have had four years of practical experience in positions of responsibility in chemical engineering, and have presented a satisfactory thesis based upon their professional work. The Master's degree for work in chemical engineering will be accepted in lieu of the additional year of college work required for the professional degree. While the graduates of this course are fitted to hold positions in the general fields of chemistry, they are especially prepared to undertake work in the manufacturing, operating, or research departments of industrial plants. The expansion of chemical industries and other branches of chemical activities in this country as a result of war conditions has created many new opportunities for chemical engineering graduates.

*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. While the regular matriculation takes place in the fall, it is possible for students to enter the School of Chemistry in January, at the opening of the winter quarter, if they meet the full requirements.

*Entrance requirements.*—1. English, four units; or English, three units, and foreign language, two units.

2. Mathematics: elementary algebra, one unit; plane geometry, one unit; higher algebra,\* one-half unit; solid geometry,\* one-half unit.

3. Enough additional work to make in all fifteen units, of which not more than four may be in Group F. Two units of German, one of chemistry, and one of physics are strongly recommended.

*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 period of thirty-six weeks. In laboratory, drawing, and other manual courses, twice this amount of time is required for one unit.

Group A English: 3 or 4 units.

Group B Languages: Latin, Greek, German, French, Spanish, Scandinavian, 1 to 4 units each.

Group C History and social sciences: European history, 2 units; English and senior American history,  $\frac{1}{2}$  unit each; economics, sociology, economic history of England, and economic history of the United States,  $\frac{1}{2}$  unit each; American government, commercial geography, and history of commerce,  $\frac{1}{2}$  unit or 1 unit each.

Group D Mathematics: Elementary algebra and plane geometry, 1 unit each; unified mathematics, 2 units; higher algebra, solid geometry, and trigonometry,  $\frac{1}{2}$  unit each.

\* NOTE.—Students desiring to enter the School of Chemistry who have not the specified credits in higher algebra and solid geometry, but who present the full fifteen acceptable units, will be admitted subject to their taking the necessary course or courses for the satisfaction of these requirements during their first quarter, and without credit. They must expect, however, to attend the University Summer Session the following summer in order to obtain the regular third quarter's work in mathematics. To avoid this irregularity in their courses, students are urged to obtain the required higher algebra and solid geometry in high school or the University Summer Session or Extension Division before entering this school. It is also very desirable that physics and chemistry be included in the high school course. If chemistry is not presented for entrance, the student will find it necessary to take a quarter of freshman chemistry, five credits, in addition to the regular course. This will usually require attendance at the following Summer Session.

Group E Natural sciences: General science, physics, and chemistry, 1 unit each; botany and zoology,  $\frac{1}{2}$  or 1 unit each; physiology, astronomy, geology, and physiography,  $\frac{1}{2}$  unit each.

Group F Vocational and miscellaneous subjects: Not more than four units in studies of this group may be counted towards admission. The subjects are no longer designated by the University. The applicant is free to present in this division such studies as are not listed in Groups A, B, C, D, and E, but which are certified by the superintendent or principal as being of acceptable nature and counted toward graduation.

*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 School of Chemistry.

*Registration.*—The hours for registration in the School of Chemistry are from 9:00 to 12:00 a.m. and from 2:00 to 4:30 p.m., on Thursday and Friday, September 25 and 26, 1924. Fees must be paid before registration can be effected. Each student will obtain a statement of his fees at the office of the registrar, Library Building.

All students entering the college for the first time must present their credentials to the registrar at the University, who will notify the 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 School of Chemistry* for the procedure of registration.

Students will not be allowed to register for less than 14 or more than 19 credit hours without the approval of the Students' Work Committee.

No change in registration will be permitted later than 10 days after the beginning of the quarter.

*Fees.*—The following fees are charged:

Tuition fee (per quarter):	
Residents of Minnesota .....	\$30.00
Nonresidents .....	40.00
Military deposit (required of all who register for military drill).....	10.00
Deposit* (first quarter only) .....	5.00
Health fee (per quarter) .....	2.00
Minnesota Union or Shevlin Hall fee (per quarter) .....	1.00
Special fees:	
Examination for removal of conditions .....	1.00
Examinations for credit (after first six weeks in residence) ....	5.00
Special examinations .....	5.00
Chemistry deposit .....	5.00

*Registration penalties.*—A penalty fee for late registration, late change of registration, or late payment of fees shall be two dollars (\$2) and one dollar (\$1) additional for each day of delay after classes begin, provided that no student shall pay more than twelve dollars (\$12) of penalty in any given quarter.

*Students exempt from fees.*—Fellows, scholars, assistants, and instructors, and other members of the teaching staff and scientific bureaus or experiment stations, when regularly enrolled as students in the Graduate School are not required to pay tuition fees.

\* The following charges are made against the general deposit for each student in addition to such charges as may be incurred for lockers, library penalties, laboratory breakage, etc.:

<i>Minnesota Daily</i> , a quarter .....	0.50
Post-office box, a quarter .....	.20
<i>University Address Book</i> .....	.35

*Expenses.*—Detailed statements regarding living expenses may be found in the bulletin of general information.

*Junior review examinations.*—In the spring quarter of their junior year, all students registered in the School of Chemistry will be given special examinations in general inorganic chemistry and qualitative and quantitative analysis. It is the purpose of the examinations to indicate any portions of these fundamental subjects of which the student may have insufficient working knowledge, in order that he may review them before entering upon more advanced work. For those who fail to pass at this time, re-examinations will be held at the opening of the senior year.

*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 practicable, and must be defrayed by the individual student. They amount to from \$75 to \$100 per student.

*Theses.*—Each senior in the course in Chemistry is required to prepare and submit a thesis based upon his original investigations. This work amounts to five credits per quarter throughout the senior year and each student is therefore expected to devote at least fifteen hours per week to it.

The subject of the thesis should be filed in the dean's office not later than November 1. The preliminary draft of the thesis should be submitted to the chief of the division concerned before June 1, and the final copy on or before June 10. A bound copy, 8½ by 11 inches, in the prescribed form, will be furnished by the student to be placed in the chemistry library.

*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 class in laboratory, drawing, field work, 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 report-writing 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.

*Requirements for graduation in Chemistry.*—To obtain the degree of bachelor of science in chemistry the student must satisfactorily complete all of the required courses and in addition a sufficient number of approved electives to make a total of at least 210 credits. If high school chemistry was not presented for entrance, the five extra hours required in freshman chemistry increase the total requirement to 215 credits. Fifteen elective credits must be taken in chemistry.

*Requirements for graduation in Chemical Engineering.*—The degree of bachelor of science in chemical engineering requires the satisfactory completion of all the required courses together with a sufficient number of approved electives to make a total of 218 credits. In the absence of high school chemistry for entrance, this total requirement becomes 223 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 Session following the junior year. Thus the term requirements of the two courses are equal in amount and average  $17\frac{1}{2}$  credits per quarter for 12 quarters.

*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 application 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 duPont Fellowship in Chemistry.*—This fellowship was founded by E. I. duPont 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.

*Research fellowships.*—In the Engineering Experiment Station there are two research fellowships which are open to engineering graduates, including chemical engineers. Each of these bears an annual stipend of \$750. The holder is required to give twenty hours per week to such research service as may be assigned to him. In addition he is expected to carry work in the Graduate School toward an advanced degree.

*Assistants.*—The School of Chemistry employs twenty-six assistants at \$650 to \$750 per annum. 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.

*Reserve Officers Training Corps.*—The War Department has established at this University units of infantry, coast (heavy) artillery, and signal corps in which both basic and advanced courses are given. The basic course is required for the first two years; the advanced course is elective for the third and fourth years.

Students of the School of Chemistry may enroll in the advanced course of the infantry 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

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.

*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.

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 entitled *Handbook for Students in the School of Chemistry*. Each student is expected to observe these instructions.

*Changes in bulletin.*—The faculty of the School of Chemistry reserves the right to change its 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.

*American Chemical Society.*—The Minnesota section of the American Chemical Society has its headquarters at the University. All students who are interested are cordially invited to attend its meetings.

## CURRICULA

### CHEMISTRY AND CHEMICAL ENGINEERING

#### FRESHMAN AND SOPHOMORE YEARS

The freshman and sophomore years are the same in Chemistry as in Chemical Engineering, so that the student may postpone his choice between these two curricula until the beginning of his junior year.

*Mathematics.*—Freshmen entering without high school higher algebra will take Course 9 (Higher Algebra); and those who have had higher algebra will register for Course 11 (College Algebra). At the end of the first two weeks those in both courses who have shown sufficient ability will proceed in Course 11 for the remainder of the fall quarter. The rest of the class will take Course 9, and will follow it with Courses 11, 12, and 13 during the winter and spring quarters and the *following Summer Session*, respectively.

Those entering without solid geometry must take Mathematics 10 (Solid Geometry) in their first quarter instead of drawing. They should take Drawing 7w-8s in the winter and spring quarters, three credits each.

*Chemistry.*—Students entering without high school chemistry will take Chemistry 6-7-8 (General Inorganic Chemistry) during their freshman year and Chemistry 12 (Qualitative Analysis) during the *following Summer Session*.

*German.*—If two years of high school German are presented for entrance, the student may complete the requirement in this subject by taking German 27, 28, 29 in the sophomore year. Without high school German, he will take German 24, 25, 26 in the sophomore year and German 27, 28, 29 in the junior year.

#### REGULAR FRESHMAN YEAR

For students satisfying the requirements of algebra, solid geometry, and chemistry.

##### *First Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M. and M. 11	College Algebra .....	5	5	..	..
Chemistry 9	General Inorganic Chemistry .....	5	1	3	5
English 4	Rhetoric and Composition .....	3	3	..	..
Drawing 4	Drawing and Descriptive Geometry .....	2	..	..	6
M.E. 12, 13, or 17	Shop .....	2	..	..	6
Mil. Sci. 1	First Year Basic Course .....	..	..	..	3

##### *Second Quarter*

M. and M. 12	Trigonometry .....	5	5	..	..
Chemistry 10	General Inorganic Chemistry .....	5	1	3	5
English 5	Rhetoric and Composition .....	3	3	..	..
Drawing 5	Drawing and Descriptive Geometry .....	2	..	..	6
M.E. 12, 13, or 17	Shop .....	2	..	..	6
Mil. Sci. 2	First Year Basic Course .....	..	..	..	3



*Third Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M. and M. 13	Analytic Geometry .....	5	5	..	..
Chemistry 12	Qualitative Analysis .....	5	2	1	6
English 6	Rhetoric and Composition .....	3	3	..	..
Drawing 6	Drawing and Descriptive Geometry .....	2	..	..	6
M.E. 12, 13, or 17	Shop .....	2	..	..	6
P.H. 2	Hygiene and First Aid .....	..	..	1	..
Mil. Sci. 3	First Year Basic Course .....	..	..	..	3

## REGULAR SOPHOMORE YEAR

*First Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
M. and M. 24	Differential Calculus .....	5	5	..	..
Chemistry 13	Qualitative Analysis .....	5	2	..	9
Physics 3	Elements of Mechanics and Sound.....	3	1	3	..
Physics 4	Elements of Mechanics and Sound Lab. ..	1	..	..	2
German 24	Beginning German <sup>1</sup> .....	4	4	..	..
or					
German 27	Narrative Prose <sup>2</sup> .....	3	3	..	..
Mil. Sci. 4	Second Year Basic Course .....	..	..	..	3

*Second Quarter*

M. and M. 25	Integral Calculus .....	5	5	..	..
Chemistry 20	Quantitative Analysis .....	5	1	1	10
Physics 23	Heat .....	3	1	3	..
Physics 24	Heat Laboratory .....	1	..	..	2
German 25	Beginning German <sup>1</sup> .....	4	4	..	..
or					
German 28	Advanced Chemical German <sup>2</sup> .....	3	3	..	..
Mil. Sci. 5	Second Year Basic Course .....	..	..	..	3

*Third Quarter*

M. and M. 84	Technical Mechanics .....	5	5	..	..
Chemistry 21	Quantitative Analysis .....	5	1	1	10
Physics 43	Magnetism and Electricity .....	3	1	3	..
Physics 44	Electrical Laboratory .....	1	..	..	2
German 26	Beginning German <sup>1</sup> .....	4	4	..	..
or					
German 29	Advanced Chemical German <sup>2</sup> .....	3	3	..	..
Mil. Sci. 6	Second Year Basic Course .....	..	..	..	3

## THE COURSE IN CHEMISTRY

(For freshman and sophomore years see pages 14 and 15)

## JUNIOR YEAR

*First Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Chemistry 35	Organic Chemistry .....	5	1	3	6
Chemistry 123	Advanced Analytical Chemistry .....	3	..	1	7
Chemistry 140	Physical Chemistry .....	5	1	3	6
German 27	Narrative Prose <sup>3</sup> .....	3	3	..	..
	Electives to complete program <sup>4</sup> .....				

<sup>1</sup> For those who have not had two years of high school German.<sup>2</sup> For those who have had two years of high school German.<sup>3</sup> Students who have completed German 29 will take an elective in place of German each quarter of the junior year.<sup>4</sup> For list of suggested electives see page 18. A total of 15 elective credits must be taken in Chemistry for graduation.

## SCHOOL OF CHEMISTRY

*Second Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Chemistry 36	Organic Chemistry .....	5	1	3	6
Chemistry 124	Advanced Analytical Chemistry .....	3	..	1	7
Chemistry 141	Physical Chemistry .....	5	1	3	6
German 28	Advanced Chemical German <sup>2</sup> .....	3	3	..	..
	Electives to complete program <sup>3</sup> .....				

*Third Quarter<sup>1</sup>*

Chemistry 37	Organic Chemistry .....	5	1	3	6
Chemistry 142	Physical Chemistry .....	5	1	3	6
German 29	Advanced Chemical German <sup>2</sup> .....	3	3	..	..
	Electives to complete program <sup>3</sup> .....				
Chemistry 51	Junior Review Exam. (General Inorg.)..	0	2	..	..
Chemistry 52	Junior Review Exam. (Qualitative) ....	0	1	..	..
Chemistry 53	Junior Review Exam. (Quantitative) ...	0	2	..	..

## SENIOR YEAR

*First Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Chemistry 96	Thesis .....	5	..	..	15
Chemistry 161	Food Analysis .....	3	..	1	6
	Electives to complete program <sup>3</sup> .....				

*Second Quarter*

Chemistry 97	Thesis .....	5	..	..	15
Chemistry 162	Food Analysis .....	3	..	1	6
	Electives to complete program <sup>3</sup> .....				

*Third Quarter*

Chemistry 98	Thesis .....	5	..	..	15
Chemistry 163	Food Analysis .....	3	..	1	6
	Electives to complete program <sup>3</sup> .....				

## THE COURSE IN CHEMICAL ENGINEERING

(For freshman and sophomore years see pages 14 and 15)

## JUNIOR YEAR

*First Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Chemistry 35	Organic Chemistry .....	5	1	3	6
Chemistry 167	Methods of Technical Analysis .....	3	..	1	6
M. and M. 85	Strength of Materials (with lab.) .....	4	3	..	3
M.E. 38	Machine Design .....	3	..	1	6
German 27	Narrative Prose <sup>2</sup> .....	3	3	..	..

<sup>1</sup> Students who plan to take Industrial Chemistry next year must register for Chemical Machinery 171 in this quarter.

<sup>2</sup> Students who have completed German 29 will take an elective in place of German each quarter of the junior year.

<sup>3</sup> For list of suggested electives see page 18. A total of 15 elective credits must be taken in Chemistry for graduation.

*Second Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Chemistry 36	Organic Chemistry .....	5	1	3	6
Chemistry 168	Methods of Technical Analysis .....	3	..	1	6
M. and M. 86	Hydraulics (with lab.) .....	3	..	2	3
M.E. 147	Heat Engines .....	4	..	3	6
German 28	Advanced Chemical German <sup>1</sup> .....	3	3	..	..

*Third Quarter*

Chemistry 37	Organic Chemistry .....	5	1	3	6
Chemistry 171	Chemical Machinery .....	4	1	4	..
M.E. 148	Heat Engines .....	3	..	3	4
E.E. 43	Electric Power .....	3	..	2	3
German 29	Advanced Chemical German <sup>1</sup> .....	3	3	..	..
Chemistry 51	Junior Review Exam. (General Inorg.)	0	2	..	..
Chemistry 52	Junior Review Exam. (Qualitative) ....	0	1	..	..
Chemistry 53	Junior Review Exam. (Quantitative) ....	0	2	..	..

## SUMMER SESSION

Summer practice consisting of Courses 174f,su-175w,su, Chemical Manufacture, will be taken by students in Chemical Engineering in the regular Summer Session between the junior and senior years. It is required for the degree of bachelor of science in chemical engineering.

## SENIOR YEAR

*First Quarter*

Course No.	Title	Credits	Rec.	Lect.	Lab.
Chemistry 140	Physical Chemistry .....	5	1	3	6
Chemistry 172	Industrial Inorganic Chemistry .....	4	1	4	..
E.E. 44	Electric Power .....	3	..	2	3
	Electives to complete program <sup>2</sup> .....				

*Second Quarter*

Chemistry 141	Physical Chemistry .....	5	1	3	6
Chemistry 173	Industrial Organic Chemistry .....	4	1	4	..
E.E. 45	Electric Power .....	3	..	2	3
	Electives to complete program <sup>2</sup> .....				
Chemistry 187	Inspection Trip, spring vacation .....	2	..	..	..

*Third Quarter*

Chemistry 142	Physical Chemistry .....	5	1	3	6
Chemistry 178	Chemical Engineering Calculations .....	3	3	..	..
	Electives to complete program <sup>2</sup> .....				

## ENGINEERING ADMINISTRATION

The following group of elective courses has been prepared for those advanced students in this college who desire a broad training for service in executive and administrative positions. There is an increasing demand for engineers who have such training, and students whose scholastic

<sup>1</sup> Students who have completed German 29 will take an elective in place of German each quarter of the junior year.

<sup>2</sup> In one of the quarters 3 credits must be elected in metallography, mineralogy, or metallurgy. See page 18 for list.

records are of high grade are encouraged to include this entire series of electives in their junior and senior years. The more advanced courses may be taken in a postgraduate year, also.

## SOPHOMORE YEAR

*First Quarter*

Course No.	Title	Credits
Econ. 8	Principles of Economics .....	3

*Second Quarter*

Econ. 9	Principles of Economics .....	3
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*Third Quarter*

Econ. 10	Principles of Economics .....	3
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## JUNIOR YEAR

*First Quarter*

Course No.	Title	Credits
Econ. 29	Principles of Accounting .....	3

*Second Quarter*

Econ. 91	Business Organization .....	3
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*Third Quarter*

Econ. 92	Business Finance .....	3
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## SENIOR YEAR

*First Quarter*

Course No.	Title	Credits
Econ. 161	Labor Problems .....	3
Econ. 85	Principles of Marketing .....	3

*Second Quarter*

Econ. 168	Personnel Management .....	3
Econ. 73	Traffic and Rates .....	3

*Third Quarter*

Econ. 28	Business Law .....	3
Econ. 154	Public Utilities .....	3
Econ. 93	Cost Accounting .....	3

## SUGGESTED ELECTIVES

Drawing 9s, 41f, 42w, 43s  
 Economics 8f, 9w, 10s  
 Metallurgy 3f, 4w, 5s, 109f, 109w, 106f, 107w, 108s  
 Mineralogy 67f  
 Metallography 160f-161w-162s  
 Political Science 1f,w,s, 7f,w,s, 11f,w  
 Quantitative Analysis 125s, 127f, 128w, 129s  
 Technical Analysis 161f, 162w, 163s, 164w, 166s  
 Inorganic Chemistry 101s, 102w, 103f, 104w, 105s  
 Organic Chemistry 131f, 133s, 134w, 137f, 138w, 139s  
 Physical Chemistry 143f, 144w, 145f, 150f, 152f,w,s, 156w  
 Chemical Engineering 174f, 175w, 176f, 177w, 178s, 183f, 184s, 185s,  
 186s, 187f

## THE FIVE-YEAR COURSE IN ARTS AND CHEMISTRY

The degree of bachelor of arts is given at the end of the fourth year and the degree of bachelor of science in chemistry or master of arts (major in chemistry, in Graduate School) at the end of the fifth year.

## FRESHMAN, SOPHOMORE, AND JUNIOR YEARS

During the first three years of the course the student is registered in the College of Science, Literature, and the Arts and is subject to its rules. He must complete the requirements of the Junior College and 45 credits in the Senior College, approved by the dean of the School of Chemistry and the assistant dean for the Senior College, and must secure 135 honor points. This work must include the following subjects:

Mathematics, 6, 7, 30, 50, 51, 52  
 Physics, 3-4, 23-24, 43-44  
 Advanced Chemical German, 28-29, and prerequisites  
 Technical Drawing, 41-42-43  
 General Inorganic Chemistry, 6-7-8 or 9-10  
 Qualitative Analysis, 12-13  
 Quantitative Analysis, 20-21

Programs which include the necessary courses to be taken by students who have had high school chemistry and two years of German and for those who enter without German or chemistry are given below.

## SENIOR YEAR

During his fourth year he must complete the work required in the junior year of the four-year course in Chemistry of the School of Chemistry and must maintain a standing equivalent to that required by this college for graduation.

The degree of bachelor of arts is voted by the College of Science, Literature, and the Arts at the end of the fourth year, and the student must present a total of not less than 180 credits and 180 honor points, including the required work mentioned above.

## FIFTH YEAR

The fifth year is the same as the fourth year of the four-year course in Chemistry, and upon its completion the student will be entitled to the degree of bachelor of science in chemistry. Students may register in the Graduate School for this year, if they so desire, to obtain the degree of master of arts with a major in chemistry.

## SUGGESTED PROGRAMS

## I. For Students Entering with Chemistry and Two Years of German

*Freshman Year*

FALL		WINTER		SPRING	
	Credits		Credits		Credits
English A .....	5	English B .....	5	English C .....	5
Chemistry 9 .....	5	Chemistry 10 .....	5	Chemistry 12 .....	5
Mathematics 6 .....	5	Mathematics 7 .....	5	Mathematics 30 .....	5

## SCHOOL OF CHEMISTRY

*Sophomore Year*

FALL		WINTER		SPRING	
	Credits		Credits		Credits
German 27	3	German 28	3	German 29	3
Mathematics 50	5	Mathematics 51	5	Mathematics 52	5
Chemistry 13	5	Chemistry 20	5	Chemistry 21	5
Drawing 41	2	Drawing 42	2	Drawing 43	2

*Junior Year*

FALL		WINTER		SPRING	
	Credits		Credits		Credits
Chemistry 35	5	Chemistry 36	5	Chemistry 37	5
Physics 3-4	4	Physics 23-24	4	Physics 43-44	4
Social Science Subject	5	Social Science Subject	5	Electives	5-8
Electives	3	Electives	3		

## II. For Students Entering without German or Chemistry

*Freshman Year*

FALL		WINTER		SPRING	
	Credits		Credits		Credits
English A	5	English B	5	English C	5
Chemistry 6	5	Chemistry 7	5	Chemistry 8	5
Mathematics 6	5	Mathematics 7	5	Mathematics 30	5

*Sophomore Year*

FALL		WINTER		SPRING	
	Credits		Credits		Credits
German 1	5	German 2	5	German 3	5
Social Science Subject	5	Social Science Subject	5	Chemistry 12	5
Mathematics 50	5	Mathematics 51	5	Mathematics 52	5

*Junior Year*

FALL		WINTER		SPRING	
	Credits		Credits		Credits
Chemistry 13	5	Chemistry 20	5	Chemistry 21	5
Physics 3-4	4	Physics 23-24	4	Physics 43-44	4
Drawing 41	2	Drawing 42	2	Drawing 43	2
German 10	5	German 28	3	German 29	3

## DESCRIPTION OF COURSES

### CHEMISTRY

#### GENERAL INORGANIC CHEMISTRY

- 1f-2w-3s. General Inorganic Chemistry. A study of general laws of chemistry and of the non-metals and their compounds. 2. A continuation of Course 1. 3. Metals and their compounds. Continuation of Course 2. Four credits per quarter. No prerequisite.
- 4f-5w. General Inorganic Chemistry. A study of the general laws of chemistry and of the non-metals and their compounds. More intensive than Courses 1f, 2w, 3s. Four credits per quarter. Prerequisite: high school chemistry.
- 6f-7w-8s. General Inorganic Chemistry. Includes a study of general laws of chemistry and of non-metals and their compounds. 7. Continuation of Course 6. 8. A study of metals and their compounds. Five credits per quarter. No prerequisite.
- 9f,w-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. Five credits per quarter. Prerequisite: one year of high school chemistry.
- 11s,f. Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibrium, oxidation and reduction, etc. Four credits. Prerequisite: 3 or 5.
- 12f,s-13f,w. Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibrium, oxidation and reduction, etc. Five credits per quarter. Prerequisite: 8 or 10.
- 14f-15w. General Inorganic Chemistry. (Engineers, miners, and pharmacists.) Includes a study of the general laws of chemistry and of the non-metals, the metals, and their compounds. 15. Continuation of Course 14. Five credits per quarter. No prerequisite.
- 16s. Qualitative Chemical Analysis. (Engineers, miners, and pharmacists.) Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibrium, oxidation and reduction, and other subjects pertinent to qualitative analysis. Five credits. Prerequisite: 5 or 15.
- 18f,w,s,su. Elementary Chemistry for Nurses. A brief study of chemical and physical changes; elements and compounds; the fundamental laws of chemistry; the qualitative and quantitative composition of foods, air, and water. Fifty-five actual hours.
- 19s. Teachers' Course. A consideration of the fundamental principles of chemistry with particular reference to the teaching of chemistry in the high school. Discussion of such topics as training of the teacher,

laboratory equipment, etc. Three credits. Prerequisites: general chemistry and qualitative analysis.

- 51s. Junior Review Examination in General Inorganic Chemistry. Required of all juniors in the School of Chemistry. Second week of the spring quarter.
- 52s. Junior Review Examination in Qualitative Analysis. Required of all juniors in the School of Chemistry. Second week of the spring quarter.
- 101s. History of Chemistry. The 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. Two credits. Prerequisite: 36.
- 102w. Advanced Qualitative Analysis. This course includes an analysis of minerals, alloys, paints, and the methods of detecting some of the rarer elements. Two or three credits. Prerequisite: 21.
- 103f-104w-105s. Advanced Inorganic Chemistry. A discussion of the periodic system and the chemistry of the elements and their compounds and of special subjects of inorganic chemistry such as valency, oxidation and reduction, complex ions, etc. Three credits per quarter. Prerequisites: 21, 36.
- 301f-302w-303s. Research in Inorganic Chemistry. Credits to be arranged.

#### ANALYTICAL CHEMISTRY

- 20w-21s. 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 20, Gravimetric Analysis; Course 21, Volumetric Analysis. Five credits per quarter. Prerequisite: 13.
- 27f,w. Quantitative Analysis. (Pre-med.) An introductory course covering the general principles and methods of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention given to proper laboratory practice. Four credits. Prerequisite: 11 or 13.
- 28f,w,s. Quantitative Analysis. (Dentists, engineers, miners.) A short introductory course covering general principles of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention given to proper laboratory practice. Three credits. Prerequisite: 11 or 16.
- 53s. Junior Review Examination in Quantitative Analysis. Required of all juniors in the School of Chemistry. Second week of the spring quarter.
- 120w-121s. Quantitative Analysis. Discussion of the general principles, methods, and procedure of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention given to proper laboratory practice. Five credits per quarter. Prerequisite: 13.
- 123f-124w-125s. Advanced Analytical Chemistry. A systematic survey by general lectures with typical procedures selected for laboratory practice. Drill in application of modern chemical theory to analytical problems.



- Sanitary analysis of water is included in spring quarter. One lecture, seven laboratory hours per week. Three credits. Prerequisite: 21 or 27.
- 127f-128w-129s. Chemistry of the Rare Elements. Chemical relations and general reactions of those rarer elements not considered in more general courses. Analyses of commercially important ores and compounds of these elements are made. One lecture and six hours laboratory per week. Three credits per quarter. Prerequisite: 21. (Not offered in 1924-25.)
- 227f-228w-229s. Selected Topics in Analytical Chemistry. Analytical problems of an advanced nature presenting special difficulties will be selected for study and investigation in the laboratory, in the library, and by conference. Open only to graduate students who have had 18 credits of quantitative analysis, and who have a reading knowledge of French and German. Two, three, or four credits per quarter. (Not offered in 1924-25.)
- 321f-322w-323s. Research in Quantitative Analysis. Credits to be arranged.

## ORGANIC CHEMISTRY

- 31f-32w. Elementary Organic Chemistry. (Dentists, pharmacists.) A discussion of the important classes of organic compounds, both aliphatic and aromatic. The laboratory work includes the preparation of typical substances. Four credits per quarter. Prerequisite: 11.
- 31w-32s. Elementary Organic Chemistry. (Pre-med.) A discussion of the important classes of organic compounds, both aliphatic and aromatic. The laboratory work includes the preparation of typical substances. Four credits per quarter. Prerequisite: 11.
- 35f-36w-37s. Organic Chemistry. An introduction to the chemistry of carbon compounds. The laboratory work will include the preparation of characteristic substances. Five credits per quarter. Prerequisite: 15 credits in chemistry.
- 131s. Organic Analysis. Practice in the identification of organic compounds, and the modern methods of quantitative organic analysis. Three credits. Prerequisite: 37.
- 132w. The Rise and Development of Organic Chemistry. Includes biological and other phases necessary to a complete discussion of the subject. Two credits. Prerequisite: 37.
- 133f. Reagents in Organic Chemistry. A discussion of typical reagents used in organic reactions: their limits of applicability, methods of use, and types of substances with which they react. Three credits. May be accompanied by appropriate laboratory work in Chemistry 138. Prerequisite: 37.
- 134f. The Terpenes. Includes a complete review of the terpenes proper, together with a discussion of the gums and resins and other allied compounds. May be accompanied by appropriate laboratory work in Chemistry 138. Two credits. Prerequisite: 37. (Not offered in 1924-25.)

- 135f-136w-137s. Organic Chemistry. Full discussion of aliphatic and aromatic series with preparation of some of the more important compounds. Certain other work of special nature will also be required. Offered to graduate students taking their minor in chemistry. Five credits per quarter. Prerequisite: 13.
- 138f,w,s. Advanced Organic Chemistry Laboratory Work. Difficult preparations and problems. It is intended primarily to supplement the students' knowledge of the methods of organic chemistry. Students may also register for this course who desire appropriate laboratory work for other advanced courses. Two to five credits. Prerequisite: 37.
- 139f,w,s. Advanced Organic Chemistry Laboratory Work. Selected laboratory problems of an advanced nature, including some original work. An introduction to research work. These advanced laboratory courses may be taken under any member of the Division of Organic Chemistry. Two to five credits. Prerequisite: 37.
- 191f-192w-193s. Advanced Organic Chemistry. An introduction to the literature of organic chemistry. Structure, reaction, mechanism, and relation of physical properties to constitution. May be accompanied by appropriate laboratory work in Chemistry 138-139. Three credits per quarter. Prerequisite: 37.
- 231f-232w-233s. Organic Chemistry Seminar. One hour a week. One credit. Open only to students taking research in organic chemistry.
- 331f-332w-333s. Research in Organic Chemistry. Credits to be arranged.

#### PHYSICAL CHEMISTRY

- 140f-141w-142s. Physical Chemistry. A general survey of the subject. Three lectures and one recitation. Laboratory work three or six hours per week. Three, four, or five credits, depending on the amount of laboratory work. Prerequisites: two years college chemistry, one year college physics.
- 143f,w. Physical Chemistry. (Designed chiefly for medical and biological students) Four credits per quarter. Prerequisite: 32.
- 146f-147w-148s. Advanced Physical Chemistry. Three lectures and one recitation. Laboratory work for one three-hour period may be taken if desired. Three credits per quarter, or four with laboratory. Prerequisites: 142s and calculus.
- 149s. Principles of Colloidal Chemistry. Two credits. Prerequisite: 141.
- 150s. Application of Colloidal Chemistry. Two credits. Prerequisite: 141. (Not offered in 1924-25.)
- 151s. Radiochemistry. The occurrence, methods of isolation, and physico-chemical properties of the radioactive substances, together with a brief consideration of the chemical, geological, and biological bearing of the subject. Two credits. Prerequisite: 141 or Physics 148.
- 152f,w,s. Laboratory Course in Radiochemistry. To accompany or follow Course 151. Credits arranged.

- 156w. Application of Physical Chemistry to Organic Chemistry. Illustrations of the use of physicochemical methods in organic research. Three credits. Prerequisites: 130, 142.
- 157f-158w-159s. Colloid Chemistry Laboratory. Credits and hours to be arranged. Must be preceded or accompanied by Physical Chemistry 149 or 150.
- 243f-244w-245s. Thermodynamics and Chemistry. A detailed study of the principles of thermodynamics and their application to physical and chemical phenomena. Four credits per quarter. Prerequisites: 142 and calculus. (Not offered in 1924-25.)
- 246f-247w-248s. Kinetic Theory and Atomistics. Kinetic theory of gases and liquids, crystal structure, structure of atom, quantum theory. Four credits per quarter. Prerequisites: 142 and calculus.
- 250f-251w-252s. Physical Chemistry Seminar. One hour a week. For students taking advanced courses in physical chemistry. One credit per quarter.
- 253f-254w-255s. Advanced Physical Chemistry Laboratory. To accompany or follow any of the advanced courses in physical chemistry. Credits arranged. Prerequisite: 142.
- 341f-342w-343s. Research in Physical Chemistry, Including Work in Electrochemistry, Radiochemistry, and Colloids. Credits to be arranged.

## TECHNOLOGICAL CHEMISTRY

- 60w,s. Power Plant Chemistry. (Engineers.) Proximate analysis of coal, determination of calorific power; technical analysis of flue gases and furnace gases; examination of boiler waters; lubricating oils. Three credits. Prerequisite: 16.
- 161f-162w-163s. Food Analysis. A course including the chemical analysis of the various food materials and food products and the detection of food adulterants. Three credits per quarter. Prerequisite: 21.
- 164w. Exact Gas Analysis. One or two credits. Prerequisite: 21.
- 166s. Microchemistry. The precipitation, examination, and identification of minute quantities of substances and the examination of food materials, fibers, etc., by means of the microscope. One or two credits. Prerequisite: 21.
- 167f. Gas and Fuel Analysis. The chemical analysis of solid and gaseous fuels with a determination of their calorific value and methods of testing municipal gas. Three credits. Prerequisite: 20 and 21.
- 168w. Petroleum and Petroleum Products. Examination and testing of petroleum products, principally gasoline, illuminating and lubricating oils. Three credits. Prerequisite: 20 and 21.
- 169f,w,s. General Technical Analysis. Includes a large range of topics, textiles and paper, paint and varnishes, asphalt and tars, boiler waters, soaps, edible oils and fats and various other food materials and food products. One, two, or three credits. Prerequisite: 21.
- 361f-362w-363s. Research Work in Technological Chemistry. Credits to be arranged.

## CHEMICAL ENGINEERING

- 171s. Chemical Machinery. Principles and materials of construction, operation and uses of chemical machinery. Lectures and recitations. Laboratory work in operating and testing. Visits to chemical plants. Four credits. Prerequisites: 21, 36.
- 172f. Industrial Inorganic Chemistry. Operations common to chemical industries, chemistry involved, apparatus used, marketing of products, utilization of by-products, trade journals. Topics: acids and alkalis, salts, chlorine, ammonia, glass, pigments, etc. Lectures and recitations. Four credits. Prerequisite: 171.
- 173w. Industrial Organic Chemistry. Similar to above but covering organic field. Destructive distillation of coal, wood, oil, explosives, dyes, paper, vegetable and animal oils, fats, waxes, soap, sugar, starch, etc. Lectures and recitations. Four credits. Prerequisite: 172.
- 174f,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. Two or more credits. Prerequisite: 171.
- 175w,su. Chemical Manufacture. (Organic.) Similar to above but covering the organic field. Laboratory. Two or more credits. Prerequisite: 171.
- 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. Four credits per quarter. Prerequisite: 142.
- 178s. Chemical Engineering Calculations. Problems in combustion, drying, evaporation, filtration, and general chemical processes. Three credits. Prerequisite: 173.
- 179s. Advanced Applied Electrochemistry. The more recent developments in the manufacture of inorganic and organic products. Credits arranged. Prerequisites: 142, 176, 177.
- 180f-181w-182s. Design of Chemical Equipment and Plants. Laying out of plants and design of equipment based on collected data for the same. Classroom and laboratory work. Two credits each per quarter. Prerequisite: 173.
- 183f. Chemistry of Explosives. The history and development of modern explosives, their manufacture and uses. Lectures, required reading, and reports. Four credits. Prerequisite: 173.
- 184s. Organic Dyestuffs. The technical chemistry of commercial dyes and their intermediates. Class and laboratory. Five credits. Prerequisite: 173.
- 185s. Advanced Chemical Manufacture. Problems in the manufacture of special chemicals on a large scale, using the industrial chemistry laboratory. Two or more credits. Prerequisites: 174, 175.

- 186s. 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 students who have completed the sophomore year in the School of Chemistry or College of Engineering. Three credits.
- 187s. Inspection Trip. Various industrial plants in the Middle West are visited by the class on a trip which lasts about ten days at the spring vacation period. Written reports covering the plants must be submitted. Required of seniors in Chemical Engineering. Two credits. Prerequisite: 173.
- 271f-272w-273s. Seminar. Presentation and discussion of papers concerning the newer developments in chemical industries. One credit per quarter.
- 371f-372w-373s. Research in Chemical Engineering, Industrial Inorganic and Industrial Organic Chemistry, Applied Electrochemistry and Electric Furnace Work and Chemical Manufacture. Credits to be arranged.

## DRAWING AND DESCRIPTIVE GEOMETRY

- 4f-5w-6s. Engineering Drawing and Descriptive Geometry. The elements of drafting, including the study of polyhedra and other problems of solid and constructive geometry. An elementary course in descriptive geometry including graphical methods of representation, correlated in part with analytical geometry. Required of freshmen who satisfy the entrance requirements in mathematics. Two credits per quarter. Prerequisite: solid geometry.
- 7w-8s. Engineering Drawing and Descriptive Geometry. This course covers the same subject-matter as Course 4-5-6. It is required of freshmen who take Mathematics 9-10 during the first quarter. Three credits per quarter. Prerequisite: solid geometry.
- 9f,w,s. Drafting. Developments and intersections. Assembly drawings, outline drawings, diagrammatic layout, and detail drawings of experimental and industrial installations. Three credits per quarter. Prerequisite: Drawing 6 or 8.
- M.&M.1of,w. Solid Geometry. Lines and planes in space, dihedral and polyhedral angles; polyhedrons, cylinders, cones, similarity, prismoid formula, sphere area, volumes, numerical exercises in area, volumes, weights. Three hours per week but without credit.
- 38f-39w-40s. Graphs and Charts. The theory and construction of graphic charts and diagrams. This course can be entered at any quarter, also can be continued from one quarter through the following quarter. Two credits per quarter. Prerequisites: Drawing 9, Mathematics and Mechanics 26.
- 41f,w-42f,w-43f,w. Technical Drawing. Theoretical and practical graphics, the reading and making of working plans. Projections, sketching, lettering, conventions, renderings, and translations. Two credits per quarter. No prerequisite.

- 44f,w,s. Lettering. A practical course in plain lettering and the making of graphs and charts. One credit per quarter. Prerequisite: none.
- 45f,w,s-46f,w,s. Alphabets. Construction and analysis of various types of letterings. Demonstrations and exercises. Open to juniors and seniors. Two credits per quarter. Prerequisite: none.

## ECONOMICS.

- 8f-9w-10s. General Economics. (Engineers.) 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. Three credits. No prerequisite.
- 28f,w,s. Business Law. A course in business law arranged for engineers, including the law of contracts, suretyship, agency, partnership, corporations, negotiable instruments, conveyance patents, and riparian rights. Offered to juniors, seniors and sophomores with six credits in economics. Three credits.
- 29f. Principles of Accounting. (Engineers.) The purpose and principles of account classification; capital and revenue; accruals; valuation; depreciation; preparation and interpretation of balance sheets, income accounts, and other statements. Three hours of lecture and one laboratory period a week. Four credits. No prerequisite.
- 51f-52w-53s. Business Law. Principles governing ordinary business transactions. Contracts—formation, operation, interpretation, breach, and discharge. Agency and service. Negotiable instruments. Business associations—partnerships and private corporations. Property—personal and real. Three credits per quarter. Prerequisite: nine credits in economics or political science.
- 72f,s. Economics of Transportation.
- 73w. Railway Traffic and Rates. Railway transportation from standpoint of the business man and shipper. Freight-shipping documents. Classification and tariffs, time and preference freight, private car lines, industrial trackage and terminal service, express rates and service, special passenger rates. Three credits. Prerequisites: 8, 9.
- 85f,s. Principles of Marketing. A general course dealing with the mechanics and operation of markets: classification, organization, market agencies as factors in production. The price-making process; control of supply, assumption of risk, incidence of marketing costs. Wastes of competition. Three credits. Prerequisites: 8, 9.
- 91w. Principles of Organization and Management. (Engineers.) Types of operating organization; specialization; co-ordination of men and departments, planning; delegation of authority; means of control; establishment and maintenance of standards for materials, operation, machinery; scientific management; personnel problems. Three credits. Prerequisite: seniors without prerequisite or juniors with 8 and 9 or equivalent.

- 92s. Business Finance. (Engineers.) A study of the principles of financing business concerns. Banking facilities from the viewpoint of the business man. The organization and financial management of corporations with special reference to the various types of corporate securities. Three credits. Prerequisites: 8, 9, or equivalent.
- 93s. Cost Accounting. (Engineers.) Principles of manufacturing cost accounting. Use of accounting records and reports to control materials, labor, and indirect factory expenses. Special factory cost problems. Three credits. Prerequisite: 29.
- 131f-132w-133s.\* Cost Accounting. General principles of cost accounting; elements of costs; methods of arriving at costs, and of distribution overhead; application of cost accounting principles to selling, banking, mining, farming, etc. Three credits per quarter. Prerequisite: 29.
- 154s. Public Utilities. Economic and legal bases of classification. Relative advantages of public ownership and regulation. Central and municipal regulation compared. The basis of rates; relative rates; rates and service. Summary of the theories of valuation. Three credits. Prerequisite: 57.
- 161f,w. Labor Problems and Trade Unionism.
- 167w. Personnel Administration. Managerial policy for various types of organization on labor. Special attention to job analysis, employment, incentives, and regularization of employment.
- 168s. Advanced Personnel Administration. Special attention to employee-training, joint relations, health and safety, and methods of personnel research, e.g., by analysis of labor turnover.

## ELECTRICAL ENGINEERING

- 43s-44f-45w. Electric Power. An elementary study of the problems involved in the generation, distribution, measurement, and utilization of electric power. Lectures, recitations, and laboratory work supplemented by numerous problems. Three credits per quarter. Prerequisite: physics.

## ENGLISH

- 4f-5w-6s. Rhetoric and Composition. Practical training in the art of writing, the principles of structure, and analysis of specimens of good prose. Three credits per quarter. No prerequisite.

GEOLOGY AND MINERALOGY<sup>1</sup>

- 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. Three credits. Prerequisite: 6 quarter credits of chemistry at University.

\* All quarters must be completed before credit is given for any quarter.

<sup>1</sup> For other courses in the Department of Geology and Mineralogy, see bulletin for the College of Science, Literature, and the Arts.

## GERMAN

- Sequences.*—For students entering without German, Courses 24-25-26, 27, 28-29. For students entering with two years of preparatory German, Courses 27, 28-29.
- 24f-25w-26s. Beginning German. Pronunciation, conversation, grammar, and composition; readings and easy prose. Four credits per quarter. No prerequisite.
- 27f. Narrative Prose. Reading, grammar review. Three credits. Prerequisite: 26 or two years preparatory German.
- 28w-29s. Advanced Chemical German. Selections from more difficult works on chemistry. Three credits per quarter. Prerequisite: 27.

## MATHEMATICS AND MECHANICS

## MATHEMATICS

- 9f,w. Higher Algebra. (High school.) Fundamental rules, fractions, linear simultaneous equations, graphs, theory of exponents, surds, complex quantities, quadratic equations, numerical exercises. Without credit.
- 10f,w(su). Solid Geometry. See Course 10f,w, under Department of Drawing and Descriptive Geometry.
- 11f,w,s. College Algebra. Theory of quadratic equations, interpretation of complex results, graphical representation, indeterminate equations, ratio, proportion, variation, progressions, series, undetermined coefficients, binomial theorem, logarithms, theory of equations, derivatives, Horner's method. Five credits. Prerequisite: higher algebra.
- 12w,s,su. Trigonometry. Rectangular co-ordinates, angles, trigonometric functions, solution of plane right triangles, reduction formulas, fundamental relations, addition formulas, double angles, half angles, identities and equations, inverse functions, oblique triangles, De Moivre's theorem, spherical right triangles. Five credits. Prerequisite: 11.
- 13f,w,s(su). Analytic Geometry. Co-ordinates, systems, equations, locus, straight line, second degree equations, polar co-ordinates, parametric equations, derivatives, tangents, normals, conic sections, rotation of axes, empirical equations, space co-ordinates, plane, line quadric surfaces, cylinders, space curves, tangent lines, planes. Five credits. Prerequisite: 12.
- 24f,w. Differential Calculus. Rules for differentiating, simple applications of derivative, maxima and minima, differentials, rates, change of variables, radius of curvature, mean value, indeterminate forms, partial differentiation, series, Taylor's theorem, asymptotes, singular points, applications to geometry of space. Five credits. Prerequisite: 13.
- 25w,s. Integral Calculus. Standard elementary forms, definite integral, rational fractions, integration by substitution, integration by parts, reduction formulas, integration a process of summation, successive and partial integration, elementary ordinary differential equations. Five credits. Prerequisite: 24.



## MECHANICS

- 26f,s,su. Technical Mechanics. (Statics.) Five credits. Prerequisite: 25.
- 84s. Technical Mechanics. (For chemical engineers.) 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. Five credits. Prerequisite: 25.

## MATERIALS

- 85f. Strength of Materials with Laboratory. (For chemical engineers.) Mechanical and elastic properties of materials of construction, beams, shafts, columns, combined stresses, dynamic stresses. Four credits. Prerequisite: 84.

## HYDRAULICS

- 86w. Hydraulics with Laboratory. (For chemical engineers.) Hydrostatics, Bernoulli's theorem, flow through orifices, pipes, and over weirs, dynamic action of jets and streams, flow of gases through pipes. Three credits. Prerequisite: 84.

## MECHANICAL ENGINEERING

- 12f,w,s. Elementary Shop Practice in Foundry. Floor- and machine-molding, iron-, brass-, and aluminum-casting. Inspection trips and reports. One hour lecture and five hours laboratory. Two credits. No prerequisite.
- 13f,w,s. Elementary Shop Practice in Forging. Forging and welding wrought iron and steel; hardening, tempering, and annealing high carbon steel. One hour lecture and five hours laboratory per week. Two credits. No prerequisite.
- 17f,w. Elementary Shop Practice in Machine Shop. An elementary course in machine shop work arranged especially for students in Chemical Engineering. One hour lecture and five hours laboratory per week. Two credits. No prerequisite.
- 38f. Machine Design. Calculation and design of machine parts: riveted joints, screwed fastenings, bearings, rotating pieces, flexible connections, gears, engine details, rope driving. Arranged for students in Chemical Engineering. Lectures and drafting. Three credits. Prerequisite: M. & M. 26.
- 147w. Heat Engines. Elementary thermodynamics. Properties of steam; calorimeters, pyrometry; types and details of steam engines; valve gears; governors; compound engines; condensers, pumps. Combustion and fuels; evaporation; steam boilers, smoke prevention. Includes four hours laboratory work per week. Four credits. Prerequisite: M. & M. 84.
- 148s. Heat Engines. Elementary study of steam turbines and gas engines; gas producers. Refrigeration. Air compressors. Includes four hours work in laboratory each week. Three credits. Prerequisite: 147.

## METALLOGRAPHY

- 160f. Metallography. (Chemists.) 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. Laboratory work. Three credits. Prerequisite: Chemistry 21.
- 161w. Advanced Metallography. (Chemists.) Metallography and heat treatment of iron and steel, including alloy steels, commercial uses of various steels, and engineering specifications. Laboratory work. Three credits. Prerequisite: 160.
- 162s. Advanced Metallography. (Chemists.) Metallography of the non-ferrous metals with a study of the constitution diagrams, properties, and uses of important commercial alloys. Laboratory work. Three credits. Prerequisite: 160.
- 163f-164w-165s. Advanced Metallography. Technical and scientific research. The study of steel rails, automobile and locomotive parts, tool steels, etc. Special problems in metallography with outside reading. Seminar work on the recent advances in metallography.
- 201f-202w-203s. Advanced Metallography for Graduate Students. Intended primarily for research work.

## METALLURGY

- 3f. General Metallurgy. Combustion, fuels, refractory materials, furnaces, and fluxes. Lectures and recitations. Three credits. Prerequisite: Chemistry 8 or equivalent.
- 4w. Metallurgy of Pig Iron. General principles of iron blast furnace practice. Construction of furnace, handling of stock and products, principles of regulations. Lectures and recitations. Three credits. Prerequisite: Metallurgy 3.
- 5s. Metallurgy of Wrought Iron and Steel. General principles involved in the production of wrought iron and steel. Lectures and recitations. Three credits. Prerequisite: Metallurgy 4.
- 106f. Metallurgy of the Base Metals. Lead, copper, zinc, and mercury. Consideration of smelting methods and principles involved in refining. Lectures and recitations. Four credits. Prerequisite: Metallurgy 3.
- 107w. Metallurgy of Base Metals. Continuation of Course 106. Four credits. Prerequisite: Metallurgy 106.
- 108s. Metallurgy of the Precious Metals. Principles involved and methods used in the extraction of gold, silver, and other precious metals. Lectures and recitations. Four credits. Prerequisite: Metallurgy 107.
- 109f. Metallurgy of Base Metals. (Chemists, mechanical engineers.) Special consideration is given to mechanical appliances. Lectures and recitations. Three credits. Prerequisite: Chemistry 8 or equivalent.

109w. Metallurgy of Base Metals. (Chemists, electrical engineers.) Special consideration is given to electrical appliances. Lectures and recitations. Three credits. Prerequisite: Chemistry 8 or equivalent.

## MILITARY SCIENCE AND TACTICS

## REQUIRED WORK

All physically fit male students 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. No credits allowed for this work.

## 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 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. The University allows 18 credits for the two years' Advanced Course R.O.T.C. work, which may be applied towards graduation.

1f-2w-3s. First Year Basic Course R.O.T.C. No prerequisite.

Infantry. Practical and theoretical instruction in school of soldier, squad and company; elementary subjects of military training; infantry equipment.

Coast Artillery. Duties of heavy artillery soldier; military customs and methods; elementary topography; practical study of one gun and one carriage.

4f-5w-6s. Second Year Basic Course. R.O.T.C. Prerequisite: 1-2-3.

Infantry. Practical instruction in school of platoon and company; military sketching and map-reading; infantry weapons; minor tactics.

\* Students in Chemical Engineering who wish to take the Advanced Course, R.O.T.C. in their junior year may postpone some of the required work until their senior year, but this should be done only after consultation with Professor C. A. Mann.

- Coast Artillery. Duties of non-commissioned officer of heavy artillery: guns, carriages, ammunition and accessories; elementary topography (preparation of precise maps); construction and operation of motor vehicles.
- 51f-52w-53s. First Year Advanced Course. R.O.T.C. Three credits per quarter. Prerequisite: 4-5-6.
- Infantry. Field engineering; infantry weapons including trench mortars, 37 mm. gun, grenades, and pistol; minor tactics.
- Coast Artillery. Duties of a heavy artillery officer; guns, carriages, and determination of geodetic data; motor transport (advanced).
- 54f-55w-56s. Second Year Advanced Course, R.O.T.C. Three credits per quarter. Prerequisite: 51-52-53.
- Infantry. Minor tactics; administration; military law; military history and policy of the United States; rules of land warfare.
- Coast Artillery. Duties of heavy artillery officer; administrative methods; military law; military policy of the United States; tactics of infantry; field engineering; problems in employment of heavy artillery and in the use of heavy artillery against armored ships.

#### PHYSICAL EDUCATION FOR MEN

*General statement.*—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 courses as their physical condition may indicate.

For a special four-year professional course in physical education and athletic coaching, see bulletin of the College of Education. Students interested in this course should consult Professor L. F. Keller before registering.

- 1f-2w-3s. Freshman Physical Education. Mass activities, corrective exercise, apparatus work, swimming, games, and efficiency test. Credit.\* No prerequisite.
- 4f,w,s. Freshman Hygiene. Credit.\* No prerequisite.
- 7f-8w-9s. Advanced Leaders. One hour of instruction; two hours leading squads in Physical Education 1-2-3 or 16-17-18 under supervision. One credit per quarter. Prerequisite: 1-2-3 or instructor's permission.
- 10f-11w-12s. Minor Sports. Study of nature and function of play; use of leisure time; rules, theory, technique and values of different sports. Fall: golf, soccer, handball, boxing. Winter: winter sports, wrestling, tumbling. Spring: swimming, indoor baseball, volley-ball, tennis. Lecture one hour, practice three hours. Two credits per quarter. Prerequisite: 1-2-3 or instructor's permission.
- 16f-17w-18s. Drill Substitution. By petition in substitution for military science. Examiner, Dr. L. J. Cooke. No credit. No prerequisite.

\* Course 1-2-3, 4 carries a total of three credits. The entire course must be completed before credit is received for any quarter. Preventive Medicine 12 may be offered as a substitute for Course 4.

- 30s. Athletic Training and First Aid. Principles governing conditioning of men for various sports; diet, sleep, exercise, bathing, massage. Over-training, its cause, diagnosis, prevention and cure. Prevention and first aid treatment of common athletic injuries. Two credits. No prerequisite.

### PHYSICAL EDUCATION FOR WOMEN

This department aims to promote the health 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; 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 bodily 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 Woman'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 is required of all newly entering students (see Courses 1-2-3 and 4) and of all sophomores, who are permitted as free a choice among the sophomore courses as their physical condition permits (see "sophomore" courses; students who cannot swim must register for Course 22-23 during their sophomore year). Physical examinations or consultations required annually of all students.

For a special four-year professional course designed to prepare graduates for the responsible direction of physical education activities see bulletin for the College of Education.

Six credits toward the degree can be gained by taking courses in exercise. (Courses 43-44-45, 66-67-68, 69-70-71.)

For further information see bulletin of the College of Science, Literature, and the Arts and of the College of Education.

- 1f-2w-3s. Elementary Physical Training. Lighter forms of gymnastics, apparatus work, orthopedic exercise, folk dancing, indoor and outdoor games. Individual health consultations. No credit. Prerequisite: none. Required of all new students.
- 4f. Preliminary Hygiene. One lecture a week. The most essential aspects of the care of personal health. No credit. Prerequisite: none. Required of all new students.

### PHYSICS

- 3f. Elements of Mechanics and Sound. Mechanics of solids, fluids, wave motion, and sound; simpler fundamental principles. First part of a general course, 3, 23, 31, 43. Course 4 should be taken with this course. Three lectures, one quiz hour a week. Three credits. Prerequisites: trigonometry, equivalent of Mathematics 12.

- 4f. 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. One credit. Prerequisite: 3 or registration in 3.
- 23w. Heat. A study of the principles underlying heat phenomena. Course 24 should be taken in conjunction with this course. Three lectures, one quiz hour a week. Three credits. Prerequisite: 3.
- 24w. Heat Laboratory. The laboratory part supplementing Course 23. One two-hour session in the laboratory a week. One credit. Prerequisites: 4, 23 or registration in 23.
- 31f.s. Optics. A study of the principles underlying light phenomena. Course 32 should be taken in conjunction with this course. Three lectures, one quiz hour a week. Three credits. Prerequisite: 3.
- 32f.s. Optics Laboratory. The laboratory part supplementing Course 31. One two-hour session in the laboratory a week. One credit. Prerequisites: 4, 31, or registration in 31.
- 35w. Optics. Experimental demonstration of optical phenomena and a brief study of the fundamental optical principles. Two lectures a week. Designed for those who cannot take the fuller course. Two credits. Prerequisite: 3.
- 43s. Magnetism and Electricity. A study of the principles underlying magnetic and electric phenomena. Course 44 should be taken in conjunction with this course. Three lectures, one quiz hour a week. Three credits. Prerequisite: 3.
- 44s. Electrical Laboratory. The laboratory part supplementing Course 43. One two-hour session in the laboratory a week. One credit. Prerequisites: 4, 43, or registration in 43.
- 101f-103w-105s. Theoretical Physics. An intensive analytical survey of the 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. Five lectures a week. Five credits per quarter. Prerequisites: 12 credits in physics, calculus.
- 102f. Laboratory Arts. Designed to acquaint students with the methods used in glass-blowing, silvering, etching, metal to glass seals, making quartz fibers, soldering, spinning, spot welding, etc., as a preparation for general experimental work.
- 104w. Precision Mechanics. Standard methods of precise measurements of length, mass, and time.
- 111f-113w-115s. Elements of Mathematical Physics. A study of the fundamental principles and standard methods involved in the mathematical analysis of physical problems. Three lectures a week. Three credits per quarter. Prerequisites: 105, calculus.
- 112f-114w-116s. Elementary Physical Investigation. The experimental or theoretical study of physical phenomena, the nature or laws of which are not as yet understood. Three credits per quarter. Prerequisites: 106, calculus.

- 122s. Pyrometry and Heat. An experimental study of pyrometry, heat quantity, heat transfer, hygrometry, and gas liquefaction. One lecture, two three-hour sessions in the laboratory a week. Three credits. Prerequisites: 23, 24.
- 132w. Applied Optics. Special experimental work in spectrometry, optical instruments, photometry, absorption, polarized light. Two three-hour laboratory periods a week. Prerequisites: 31, 32.
- 144f. Electrical Measurements. Devoted mainly to the study of potentiometer methods, capacity, inductance, and magnetic flux. Three two-hour laboratory periods a week. Three credits. Prerequisites: 43, 44.
- 146w. Electrical Measurements of Precision. Precision measurements of electromotive force, current, resistance, capacity, inductance, and magnetic flux. Use of apparatus of highest precision. Special problems. Three two-hour laboratory periods a week. Three credits. Prerequisite: 144.
- 148s. Radioactivity. An analytical study of the theories and methods of investigation supplemented by laboratory technique. Those pursuing this course should continue with Chemistry 151, Radiochemistry.
150. Conduction through Gases. An analytical study of the theories and methods of investigation, supplemented by laboratory technique.

## PHYSIOLOGIC CHEMISTRY

- 100w-101s. Physiologic Chemistry. The components of the animal body; foods, digestion, the excreta, and metabolism. Third year medical students and others. Three credits per quarter. Prerequisites: physics and Chemistry 130.
- 100x-101x. Physiologic Chemistry Laboratory. Three credits per quarter.

## PREVENTIVE MEDICINE AND PUBLIC HEALTH

- 2s. Hygiene and First Aid to the Sick and Injured. Lectures, demonstrations, and recitations. Promotion of health. Sources, routes, and prevention of communicable diseases. One hour per week during spring quarter. No credit.
- 102f,w,s,su. Sanitation. Sanitary supervision of water and milk supplies, sewerage systems and sewage, refuse, and garbage disposal systems. Practical work including field investigations, laboratory examinations, interpretation of results, recommendations to correct unsatisfactory conditions, report-writing and office procedure. Open only to graduate students and seniors who have had Bacteriology 101; Chemistry 21 or 27, and 32 or 37; Physics 22, 32, 42. Credits and hours arranged.

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

*School of Chemistry*

*Part II*

*Announcement of Program for the Year*  
*1925-1926*



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1925							1926													
JULY							JANUARY							JULY						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	1	2	3	4	..	..	..	..	..	1	2	..	..	..	..	1	2	3
5	6	7	8	9	10	11	3	4	5	6	7	8	9	4	5	6	7	8	9	10
12	13	14	15	16	17	18	10	11	12	13	14	15	16	11	12	13	14	15	16	17
19	20	21	22	23	24	25	17	18	19	20	21	22	23	18	19	20	21	22	23	24
26	27	28	29	30	31	..	24	25	26	27	28	29	30	25	26	27	28	29	30	31
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AUGUST							FEBRUARY							AUGUST						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	..	..	..	1	..	1	2	3	4	5	6	1	2	3	4	5	6	7
2	3	4	5	6	7	8	7	8	9	10	11	12	13	8	9	10	11	12	13	14
9	10	11	12	13	14	15	14	15	16	17	18	19	20	15	16	17	18	19	20	21
16	17	18	19	20	21	22	21	22	23	24	25	26	27	22	23	24	25	26	27	28
23	24	25	26	27	28	29	28	..	..	..	..	..	..	29	30	31	..	..	..	..
30	31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
SEPTEMBER							MARCH							SEPTEMBER						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	..	1	2	3	4	5	..	1	2	3	4	5	6	..	..	..	1	2	3	4
6	7	8	9	10	11	12	7	8	9	10	11	12	13	5	6	7	8	9	10	11
13	14	15	16	17	18	19	14	15	16	17	18	19	20	12	13	14	15	16	17	18
20	21	22	23	24	25	26	21	22	23	24	25	26	27	19	20	21	22	23	24	25
27	28	29	30	..	..	..	28	29	30	31	..	..	..	26	27	28	29	30	..	..
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OCTOBER							APRIL							OCTOBER						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	1	2	3	..	..	..	..	1	2	3	..	..	..	..	..	1	2	3
4	5	6	7	8	9	10	4	5	6	7	8	9	10	3	4	5	6	7	8	9
11	12	13	14	15	16	17	11	12	13	14	15	16	17	10	11	12	13	14	15	16
18	19	20	21	22	23	24	18	19	20	21	22	23	24	17	18	19	20	21	22	23
25	26	27	28	29	30	31	25	26	27	28	29	30	..	24	25	26	27	28	29	30
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NOVEMBER							MAY							NOVEMBER						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	1	2	3	4	5	6	..	2	3	4	5	6	1	..	1	2	3	4	5	6
8	9	10	11	12	13	14	9	10	11	12	13	14	15	7	8	9	10	11	12	13
15	16	17	18	19	20	21	16	17	18	19	20	21	22	14	15	16	17	18	19	20
22	23	24	25	26	27	28	23	24	25	26	27	28	29	21	22	23	24	25	26	27
29	30	..	..	..	..	..	30	31	..	..	..	..	..	28	29	30	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
DECEMBER							JUNE							DECEMBER						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	..	1	2	3	4	5	..	..	1	2	3	4	5	..	..	..	1	2	3	4
6	7	8	9	10	11	12	6	7	8	9	10	11	12	5	6	7	8	9	10	11
13	14	15	16	17	18	19	13	14	15	16	17	18	19	12	13	14	15	16	17	18
20	21	22	23	24	25	26	20	21	22	23	24	25	26	19	20	21	22	23	24	25
27	28	29	30	31	..	..	27	28	29	30	..	..	..	26	27	28	29	30	31	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

# UNIVERSITY CALENDAR

1925-26

## FALL QUARTER

September	17	Thursday	Payment of fees closes, except for new students
September	17-19		Entrance examinations
September	21-25		Examinations for removal of conditions Physical examinations for all new students
September	24-25		Registration period, <sup>2</sup> colleges of Science, Literature, and the Arts, and Education Registration days <sup>2</sup> for all colleges not included above
September	25	Friday	Payment of fees for new students closes
September	28	Monday	Fall quarter begins, 8:30 <sup>1</sup> a.m. First semester extension classes <sup>3</sup> begin
October	15	Thursday	Senate meeting, 4:30 p.m.
November	11	Wednesday	Armistice Day; a holiday
November	14	Saturday	Homecoming Day
November	26	Thursday	Thanksgiving Day; a holiday
December	3	Thursday	State Day Convocation
December	16-19		Final examination period
December	17	Thursday	Commencement Convocation Senate meeting, 4:30 p.m.
December	19	Saturday	Fall quarter ends, Christmas vacation begins, 5:20 p.m.
December	23	Wednesday	Payment of fees closes for all students in residence fall quarter <sup>4</sup>

## WINTER QUARTER

December	28-30		Entrance examinations
January	2	Saturday	Registration
January	4	Monday	Christmas vacation ends, winter quarter begins, 8:30 <sup>1</sup> a.m.

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

<sup>2</sup> Registration subsequent to the dates specified will necessitate the approval of the college concerned. See also penalty fees for late registration, page 49, General Information bulletin.

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 and peculiar circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

<sup>3</sup> This date does not refer to correspondence study courses which may be started at any time during the year.

<sup>4</sup> New students must pay fees on dates announced for registration.

## SCHOOL OF CHEMISTRY

January	30	Saturday	First semester extension classes close
February	1	Monday	Second semester extension classes begin
February	12	Friday	Lincoln's Birthday; a holiday
February	18	Thursday	Charter Day Convocation Senate meeting, 4:30 p.m.
February	22	Monday	Washington's Birthday; a holiday
March	17-20		Final examination period
March	18	Thursday	Payment of fees closes for all students in residence winter quarter <sup>2</sup>
March	20	Saturday	Winter quarter ends, spring vacation begins, 5:20 p.m.

## SPRING QUARTER

March	22-24		Entrance examinations
March	27	Friday	Registration
March	29	Monday	Spring vacation ends, spring quarter be- gins, 8:30 <sup>1</sup> a.m.
April	2	Friday	Good Friday; a holiday
May	13	Thursday	Cap and Gown Day Convocation
May	20	Thursday	Senate meeting, 4:30 p.m.
May	29	Saturday	Second semester extension classes close
May	31	Monday	A holiday (May 30, Sunday, Memorial Day)
June	9-12		Final examination period
June	12	Saturday	Spring quarter closes, 5:20 p.m.
June	13	Sunday	Baccalaureate service
June	14	Monday	Fifty-fourth annual commencement

## SUMMER SESSION

June	18-19		Summer Session first term begins, regis- tration and payment of fees
June	21	Monday	Classes begin, 8:00 a.m.
July	31	Saturday	Registration and payment of fees for second term closes First term Summer Session closes
August	2	Monday	Second term classes begin
September	4	Saturday	Second term Summer Session closes

<sup>1</sup> First hour classes begin at 8:00 in the Medical School and at 8:15 at University Farm.

<sup>2</sup> New students must pay fees on dates announced for registration.

# SCHOOL OF CHEMISTRY

## ADMINISTRATION

O. M. Leland, Dean.....	127C
I. W. Geiger, Chairman, Students' Work Committee....	127C
H. H. Barber, Supplies.....	226C

## OFFICES OF OUTSIDE DEPARTMENTS

Drawing and Descriptive Geometry	208E	Metallography	306M
Economics	113B	Metallurgy	103M
Electrical Engineering	135EE	Military Science and Tactics	A
English	221F	Physical Education for Men	106A
Geology and Mineralogy	108P	Physical Education for Women	101WGM
German	211F	Physics	20Ph
Mathematics and Mechanics	114E	Physiologic Chemistry	307MH
Mechanical Engineering	105ME	Preventive Medicine and Public Health	MH

## ABBREVIATIONS

*Buildings.*—A, Armory; B, Business; C, Chemistry; E, Engineering; EE, Electrical Engineering; Ex, Experimental Engineering; F, Folwell Hall; M, Mines; ME, Mechanical Engineering; MH, Millard Hall; P, Pillsbury; Ph, Physics; PPI, Power Plant Lab.; WGM, Women's Gymnasium.

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).

Ar.	To be arranged or assigned
Cred.	Credits
f,w,s,su	Quarters: fall, winter, spring, and summer session
Lab.	Laboratory
Lect.	Lecture
MTWThFS	Monday, Tuesday, etc.
Pre-med.	Pre-medical
Prereq.	Prerequisite
Rec.	Recitation
Sec.	Section

# PROGRAM

1925-26

## CHEMISTRY

### GENERAL INORGANIC CHEMISTRY

No.	Title	Hour	Day	Room	Instructor
1f-2w-3s	General Inorganic Chemistry..... (4 cred. per qr.; no prereq.)				
	Sec. 1 (Pre-med., pre-dent, jr., architects)				
	Lect.	VI	MWF	225C	Mr. Reyerson
	Lab.	VI-VII	TTh	110C	Mr. Reyerson
		or			
	Lab.	VIII-IX	TTh	110C	Mr. Reyerson
	Sec. 2 (Agr.) fall, winter				
	Lect.	VII	MWF	100C	Mr. Pervier
	Lab.	VIII-IX	MW	110C	Mr. Pervier
	Sec. 2 (Agr.) spring				
	Lect.	VII	MF	325C	Mr. Pervier
		IV	S	325C	Mr. Pervier
	Lab.	VIII-IX	MF	110C	Mr. Pervier
4f-(5w)	General Inorganic Chemistry..... (4 cred. per qr.; prereq., high school chem.)				
	Sec. 1 (Engrs.)				
	Lect.	I	TThS	100C	Mr. Heisig
	Lab.	VI-VIII	F	110C	Mr. Heisig
	Quiz.	VIII	M	100C	
	Sec. 2 (Engrs.)				
	Lect.	IV	TS	100C	Mr. Kirk
		VI	Th	100C	Mr. Kirk
	Lab.	II-IV	M	110C	Mr. Kirk
	Quiz.	VIII	M	100C	
	Sec. 3 (Engrs.)				
	Lect.	I	TThS	100C	Mr. Heisig
	Lab.	III-V	T	110C	Mr. Heisig
	Quiz.	VIII	M	100C	
	Sec. 4 (Pharm., phys. ed.)				
	Lect.	I	MWF	325C	Mr. Stephens
	Lab.	VII-VIII	TTh	110C	Mr. Stephens
	Sec. 5 (Pre-dent, pre-med.,)				
	Lect.	VI	MWF	100C	Mr. Stephens
	Lab.	VI-VII	TTh	210C	Mr. Stephens
		or			
	Lab.	VIII-IX	TTh	210C	Mr. Stephens
(4f)-5w	General Inorganic Chemistry..... (See 4f-(5w) )				
	Sec. 1 (Engrs.)				
	Lect.	IV	TS	100C	Mr. Kirk
		VI	Th	100C	Mr. Kirk
	Lab.	VI-VIII	F	110C	Mr. Heisig
	Quiz.	VIII	M	100C	
	Sec. 2 (Engrs.)				
	Lect.	I	TThS	100C	Mr. Heisig
	Lab.	II-IV	S	110C	Mr. Kirk
	Quiz.	VIII	M	100C	

GENERAL INORGANIC CHEMISTRY

No.	Title	Hour	Day	Room	Instructor
	Sec. 3 (Pharm., phys. ed.)				
	Lect.	I	MWF	325C	Mr. Stephens
	Lab.	VII-VIII	TTh	110C	Mr. Stephens
	Sec. 4 (Pre-dent, pre-med.,)				
	Lect.	VI	MWF	100C	Mr. Stephens
	Lab.	VI-VII	TTh	210C	Mr. Stephens
	or	VIII-IX	TTh	210C	Mr. Stephens
6f-7w-8s	General Inorganic Chemistry..... (5 cred. per qr.; no prereq.)				
	Lect.	II	MWF	225C	Miss Cohen
	Lab.	I-III	ThS	210C	Miss Cohen
9f-10w	General Inorganic Chemistry..... (5 cred. per qr.; prereq., high school chem.)				
	Sec. 1 (Agr.)				
	Lect.	VII	MWF	225C	Mr. Reyerson
	Lab.	VIII-IX	MWF	110C	Mr. Reyerson
	Sec. 2 (S.L.A.)				
	Lect.	II	MWF	110C	Mr. Sneed
	Lab.	I-III	ThS	290C	Mr. Sneed
	Sec. 3 (Chem.) fall				
	Lect.	II	MWF	100C	Mr. Sneed
	Lab.	I-III	Th	290C	Mr. Sneed
		II-IV	S	290C	Mr. Sneed
	Sec. 3 (Chem.) winter				
	Lect.	II	MWF	100C	Mr. Sneed
	Lab.	I-III	ThS	290C	Mr. Sneed
9w-10s	General Inorganic Chemistry..... (See 9f-10w)				
	Lect. (Both secs.)	III	MWF	100C	Mr. Kirk
	Lab. Sec. 1 (Engrs.)	V-VI	MWF	290C	Mr. Kirk
	2 (Others)	VIII-IX	MWF	290C	Mr. Kirk
11f	Qualitative Chemical Analysis..... (4 cred.; prereq., 3 or 5)				
	Lect.	IV	MWF	225C	Miss Cohen
	Lab.	VI-VII	MW	290C	Miss Cohen
11s	Qualitative Chemical Analysis..... (See 11f)				
	Lect.	VI	MWF	100C	Mr. Stephens
	Lab.	VI-VII	TTh	210C	Mr. Stephens
	or	VIII-IX	TTh	210C	Mr. Stephens
12f	Qualitative Chemical Analysis..... (5 cred.; prereq., 8 or 10)				
	Lect.	I	TThS	317C	Mr. Maynard
	Lab.	VI-VIII	MW	290C	Mr. Maynard
12s	Qualitative Chemical Analysis..... (See 12f)				
	Lect.	II	MWF	100C	Mr. Sneed
	Lab.	I-III	ThS	290C	Mr. Sneed
13f	Qualitative Chemical Analysis..... (5 cred.; prereq., 12)				
	Lect.	VI	MW	111C	Mr. Kirk
	Lab.	VII-IX	MW	290C	Mr. Kirk
		VI-VIII	F	290C	Mr. Kirk
13w	Qualitative Chemical Analysis..... (See 13f)				
	Lect.	I	TTh	115C	Mr. Maynard
	Lab.	VI-VIII	MWF	290C	Mr. Maynard

## SCHOOL OF CHEMISTRY

No.	Title	Hour	Day	Room	Instructor
14f-15w	General Inorganic Chemistry..... (5 cred. per qr.; no prereq.)				
	Sec. 1 (Engrs.)				
	Lect.	II	TThS	100C	Mr. Heisig
	Lab. (Fall)	VI-IX	T	110C	Mr. Heisig
		II-III	F	110C	Mr. Heisig
	Lab. (Winter)	VI-IX	T	110C	Mr. Heisig
		VI-VII	Th	110C	Mr. Heisig
	Sec. 2 (Miners)				
	Lect.	II	TThS	111C	Mr. Pervier
	Lab.	VIII-IX	T	290C	Mr. Pervier
		VI-IX	Th	290C	Mr. Pervier
	Sec. 3 (Pharm., phys. ed.)				
	Lect.	I	MWF	115C	Mr. Maynard
	Lab.	VI-VIII	TTh	110C	Mr. Maynard
16s	Qualitative Chemical Analysis..... (5 cred.; prereq., 5 or 15)				
	Sec. 1 (Engrs.)				
	Lect.	VII	MWF	100C	Mr. Kirk
	Lab.	IV-V	T	110C	Mr. Kirk
		VI-IX	Th	110C	Mr. Kirk
	Sec. 2 (Engrs.)				
	Lect.	I	TThS	100C	Mr. Heisig
	Lab.	VI-IX	M	110C	Mr. Heisig
		VI-VII	W	110C	Mr. Heisig
	Sec. 3 (Engrs.)				
	Lect.	II	TThS	100C	Mr. Heisig
	Lab.	VIII-IX	W	110C	Mr. Heisig
		VI-IX	F	110C	Mr. Heisig
	Sec. 4 (Miners)				
	Lect.	II	TThS	111C	Mr. Pervier
	Lab.	VII-IX	MF	290C	Mr. Pervier
	Sec. 5 (Pharm.)				
	Lect.	I	MWF	325C	Mr. Maynard
	Lab.	VI-VIII	TTh	110C	Mr. Maynard
17s	Glassblowing ..... (1 cred.; jr., sr., grad.)	Ar	Ar	Ar	Mr. Stephens
19s	Teachers' Course ..... (3 cred.; prereq., general chem. and qual. anal.)	IV	MWF	315C	Mr. Geiger
51s	Junior Review Examination (General Inorganic) ..... (No cred.; required of all juniors in School of Chem.)	Ar	Ar	ArC	Mr. Sneed
52s	Junior Review Examination (Quali- tative Analysis) ..... (See 51s)	Ar	Ar	ArC	Mr. Sneed
101s	History of Chemistry..... (2 cred.; prereq., 36)	Ar	Ar	ArC	Miss Cohen
102w	Advanced Qualitative Analysis.... (2 or 3 cred.; prereq., 20 and 21)	Ar	Ar	290C	Mr. Sneed
103f-104w-105s	Advanced Inorganic Chemistry..... (3 cred. per qr.; prereq., 20, 21, and 36)	IV	MWF	111C	Mr. Sneed
301f-302w-303s	Research in Inorganic Chemistry... (Cred. ar.)	Ar	Ar	ArC	Mr. Sneed

## ANALYTICAL CHEMISTRY

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## ANALYTICAL CHEMISTRY

No.	Title	Hour	Day	Room	Instructor	
20w-21s	Quantitative Analysis .....					
	(5 cred. per. qr.; prereq., 13)					
	Lect. (Both secs.)	VI	M	325C	Mr. Geiger	
	Sec. 1 (Chem.) Rec.	VI	W	315C		
	Lab.	VII-IX	MW	310C		
		VI-IX	F	310C		
	Sec. 2 (Others) Rec.	VI	F	315C		
	Lab.	VII-IX	MF	310C		
		VI-IX	W	310C		
27f	Quantitative Analysis (Pre-med.)...					
	(4 cred.; prereq., 11 or 13)					
	Lect. (All secs.)	VI	M	325C	Mr. Geiger	
	Sec. 1 Rec.	V	W	315C		
	Lab.	VII-IX	MW	310C		
		VI-IX	F	310C		
	Sec. 2 Rec.	VI	F	315C		
	Lab.	VII-IX	MF	310C		
		VI-IX	W	310C		
	Sec. 3 Rec.	VI	Th	315C		
	Lab.	VI-IX	T	310C		
		VII-IX	Th	310C		
		I-III	S	310C		
27w	Quantitative Analysis (Pre-med.)...					
	(See 27f)					
	Lect. (Both secs.)	VI	W	325C	Mr. Sarver	
	Sec. 1 Rec.	VI	F	115C		
	Lab.	VI-IX	M	310C		
		VII-IX	WF	310C		
	Sec. 2 Rec.	VI	Th	315C		
	Lab.	VI-IX	T	310C		
		VII-IX	Th	310C		
		I-III	S	310C		
27s	Quantitative Analysis .....					
	(See 27f)					
	Lect.	VI	T	325C	Mr. Sarver	
	Rec.	VI	Th	315C		
	Lab.	VII-IX	TTh	310C		
		I-III	S	310C		
28f	Quantitative Analysis (Mech. engrs.)					
	(3 cred.; prereq., 11 or 16)					
	Lect.	VI	M	315C	Mr. Sarver	
	Lab.	VII-IX	M	310C		
		VI-IX	W	310C		
28w	Quantitative Analysis .....					
	(See 28f)					
	Sec. 1 (Miners, elec. engrs.)					
	Lect.	VI	T	325C	Mr. Stoppel	
	Lab.	VII-IX	T	310C		
		VI-IX	Th	310C		
	Sec. 2 (Mech. engrs.)					
	Lect.	VI	M	215C	Mr. Stoppel	
	Lab.	VII-IX	M	310C		
		VI-IX	W	310C		
53s	Junior Review Examination (Quantitative Analysis) .....	Ar	Ar	ArC	Mr. Brinton	
	(No cred.; required of all juniors in School of Chem.)					



## SCHOOL OF CHEMISTRY

No.	Title	Hour	Day	Room	Instructor
120w-121s	Quantitative Analysis . . . . .	VI-IX	MWF	ArC	Mr. Geiger
	(5 cred. per qr.; prereq., 13)				
123f-124w-125s	Advanced Analytical Chemistry . . . .				
	(3 cred. per qr.; prereq., 20 and 21 or 27)				
	Lect.	VI	T	315C	Mr. Brinton
	Lab.	VII-IX	T	310C	
		VII-IX	Th	310C	
127f-128w-129s	Chemistry of the Rare Elements . . . .	Ar	Ar	ArC	Mr. Brinton
	(3 cred. per qr.; prereq., 20 and 21)				
227f-228w-229s	Selected Topics in Analytical Chemistry . . . . .	Ar	Ar	ArC	Mr. Brinton
	(2 to 4 cred. per qr.; prereq., 18 cred. of quant. anal. and a reading knowledge of French and German)				
321f-322w-323s	Research in Quantitative Analysis . .	Ar	Ar	ArC	Mr. Brinton, Mr. Geiger
	(Cred. ar.)				
ORGANIC CHEMISTRY					
31f-32w	Elementary Organic Chemistry (Dents., pharm.)				
	(4 cred. per qr.; prereq., 11)				
	Lect. (All secs.)	VI	MWF	490C	Mr. Lauer
	Rec. Sec. 1	VII	M	111C	
	2	VII	W	111C	
	3	VII	M	115C	
	4	VII	F	111C	
	5	VII	W	115C	
	6	VII	F	115C	
	Lab. (Secs. to be ar.)	VII-IX	MW	390C	Mr. Lauer
	or	VII-IX	MF	390C	
	or	VII-IX	WF	390C	
31w-32s	Elementary Organic Chemistry (Pre-med.)				
	(See 31f-32w)				
	Lect. (All secs.)	IV	MWF	100C	Mr. Smith
	Lab. Sec. 1 (Limit 85)	VI-VIII	TTh	390C	Mr. Smith
	2 (35 pre-med. only)	VI-VIII	WF	390C	
	3	I-III	TTh	390C	
35f-36w-37s	Organic Chemistry . . . . .				
	(5 cred. per qr.; prereq., 15 cred. in chem.)				
	Lect. (All secs.)	III	MWF	325C	Mr. Hunter
	Sec. 1 (Chem) Rec.	IV	T	111C	Mr. Hunter
	Lab. fall, winter	I-III	TTh	390C	
	Lab. spring	VI-VIII	TTh	390C	
	Sec. 2 (Others) Rec.	III	Th	111C	Mr. Lauer
	Lab.	VI-VIII	TTh	390C	Mr. Lauer
131s	Organic Analysis . . . . .				
	(3 cred.; prereq., 37)				
	Lect.	Ar	Ar	ArC	Mr. Lauer
	Lab.	Ar	Ar	390C	Mr. Lauer
132w	The Rise and Development of Organic Chemistry . . . . .	Ar	Ar	ArC	Mr. Frankforter
	(2 cred.; prereq., 37)				
133f	Reagents in Organic Chemistry . . . .	II	MWF	325C	Mr. Smith
	(3 cred.; prereq., 37)				

PHYSICAL CHEMISTRY

No.	Title	Hour	Day	Room	Instructor
134f	The Terpenes ..... (2 cred.; prereq., 37)	Ar	Ar	ArC	Mr. Frankforter
135f-136w-137s	Organic Chemistry ..... (5 cred. per qr.; prereq., 13)				
	Lect.	III	MWF	325C	Mr. Hunter
	Rec.	III	Th	111C	Mr. Lauer
	Lab.	VI-VIII	TTh	390C	Mr. Lauer
138f,w,s-139f,w,s	Advanced Organic Chemistry Lab- oratory ..... (2 to 5 cred.; prereq., 37)	Ar	Ar	390C	Mr. Hunter
191f-192w-193s	Advanced Organic Chemistry..... (3 cred. per qr.; prereq., 37)	III	TThS	315C	Mr. Hunter
231f-232w-233s	Organic Chemistry Seminar..... (1 cred. per qr.; open only to stu- dents taking research in organic chem.)	Ar	Ar	ArC	
331f-332w-333s	Research in Organic Chemistry.... (Cred. ar.)	Ar	Ar	ArC	Mr. Hunter, Mr. Frank- forter, Mr. Lauer, Mr. Smith

PHYSICAL CHEMISTRY

140f-141w-142s	Physical Chemistry ..... (3 to 5 cred. per qr.; prereq., 2 yrs. col. chem., 1 yr. col. physics)				
	Lect. (Both secs.)	IV	MWF	325C	Mr. MacDougall
	Sec. 1 (Chem.) Rec.	IV	S	111C	
	Lab.	VI-VIII	MW	15C	Mr. MacDougall
				117C	
	Sec. 2 (Others) Rec.	IV	S	115C	Mr. MacDougall
	Lab.	VI-VIII	F	15C	Mr. MacDougall
				117C	
143f,w	Physical Chemistry ..... (4 cred.; prereq., 32)				
	Lect. (Both secs.)	VI	TTh	225C	Mr. Taylor
		VI	F	325C	Mr. Taylor
	Lab. Sec. 1	I-III	MW	15C	Mr. Taylor
	2	VII-IX	TTh	117C	Mr. Taylor
146f-147w-148s	Advanced Physical Chemistry..... (3 cred. per qr. or 4 with lab.; prereq., 142 and calculus)	Ar	Ar	ArC	Mr. Taylor
149s	Principles of Colloidal Chemistry... (Not offered in 1925-26) (2 cred.; prereq., 141)				
150s	Applications of Colloidal Chemistry. Ar (2 cred.; prereq., 141)	Ar	Ar	ArC	Mr. Reyerson
157f-158w-159s	Colloid Chemistry Laboratory..... Ar (Cred. ar.; prereq., cred. or regis. in 149 or 150)	Ar	Ar	ArC	Mr. Reyerson
243f-244w-245s	Thermodynamics and Chemistry.... II (4 cred. per qr.; prereq., 142 and calculus)	II	TThS	315C	Mr. MacDougall
246f-247w-248s	Kinetic Theory and Atomistics.... (Not offered in 1925-26) (4 cred. per qr.; prereq., 142 and calculus)				

## SCHOOL OF CHEMISTRY

No.	Title	Hour	Day	Room	Instructor
250f-251w-252s	Physical Chemistry Seminar..... (1 cred. per qr.; for students taking advanced courses in physical chem- istry)	IV	T	315C	Mr. MacDougall, Mr. Reyerson, Mr. Taylor
253f-254w-255s	Advanced Physical Chemistry Lab- oratory ..... (Cred. ar.; prereq., 142)	Ar	Ar	ArC	Mr. MacDougall
341f-342w-343s	Research in Physical Chemistry.... (Cred. ar.)	Ar	Ar	ArC	Mr. MacDougall, Mr. Reyerson, Mr. Taylor

## TECHNOLOGICAL CHEMISTRY

60f,w,s	Power Plant Chemistry (Engineers) (3 cred.; prereq., 16)				
	Lect.	IV		W 215C	Mr. Harding
	Lab.	VI-IX		MW 10C	Mr. Brewer
69w	Boiler Water and Petroleum Pro- ducts ..... (2 or 3 cred.; prereq., 60)				
	Lect.	I		T 215C	Mr. Harding
	Lab.	VI-IX		T 10C	Mr. Harding
		or		TTh 10C	Mr. Brewer
69s	Boiler Water and Petroleum Pro- ducts ..... (See 69w)				
	Lect.	IV		M 215C	Mr. Harding
	Lab.	VI-IX		M 10C	Mr. Harding
		or		MF 10C	Mr. Brewer
161f-162w-163s	Food Analysis ..... (3 cred. per qr.; prereq., 20 and 21)				
	Lect.	IV		T 215C	Mr. Harding
	Lab.	II-III		F 217C	Mr. Harding
		VI-IX		F 217C	Mr. Brewer
164w	Exact Gas Analysis..... (1 or 2 cred.; prereq., 20 and 21)	Ar	Ar	ArC	Mr. Harding
166s	Microchemistry ..... (1 or 2 cred.; prereq., 20 and 21)	Ar	Ar	ArC	Mr. Harding
167f	Gas and Fuel Analysis..... (3 cred.; prereq., 20 and 21)				
	Lect. (Both secs.)	I		S 215C	Mr. Harding
	Sec. 1 Rec.	II		S 215C	Mr. Harding
	Lab.	I-III		TTh 10C	Mr. Harding
	Sec. 2 Rec.	IV		M 215C	Mr. Brewer
	Lab.	VI-VIII		TTh 10C	Mr. Brewer
168w	Petroleum and Petroleum Products.. (3 cred.; prereq., 20 and 21)				
	Lect. (Both secs.)	I		S 215C	Mr. Harding
	Sec. 1 Rec.	II		S 215C	Mr. Harding
	Lab.	I-III		TTh 10C	Mr. Harding
	Sec. 2 Rec.	II		W 215C	Mr. Brewer
	Lab.	VI-VIII		TTh 10C	Mr. Brewer
169f,w,s	General Technical Analysis..... (1 to 3 cred.; prereq., 20 and 21)	Ar	Ar	ArC	Mr. Harding
361f-362w-363s	Research in Technological Chem- istry ..... (Cred. ar.)	Ar	Ar	ArC	Mr. Harding

CHEMICAL ENGINEERING

No.	Title	Hour	Day	Room	Instructor
76f-77w	Applied Electrochemistry for Engineers ..... (3 cred. per qr.; open to soph. and jr. engrs.)	Ar	Ar	ArC	Mr. Mann
78f	Engineering Chemistry ..... (3 cred.; prereq., 16)	IV	MWF	115C	Mr. Montonna
171s	Chemical Machinery ..... (4 cred.; prereq., 20, 21, and 36)	I	MTWThF	111C	Mr. Mann
172f	Industrial Inorganic Chemistry..... (4 cred.; prereq., 171)	I	MTWThF	111C	Mr. Mann, Mr. Montonna
173w	Industrial Organic Chemistry..... (4 cred.; prereq., 172)	I	MTWThF	111C	Mr. Mann, Mr. Montonna
174f,su	Chemical Manufacture (Inorganic). Ar (2 or more cred.; prereq., 171)	Ar	Ar	90C	Mr. Mann, Mr. Montillon, Mr. Montonna
175w,su	Chemical Manufacture (Organic).. Ar (2 or more cred.; prereq., 171)	Ar	Ar	90C	Mr. Mann, Mr. Montillon, Mr. Montonna
176f-177w	Applied Electrochemistry ..... (4 cred. per qr.; prereq., 142)				
	Lect.	I	MWF	215C	Mr. Montillon
	Lab.	VI-VIII	W or Th	25C	Mr. Ernst
178s	Chemical Engineering Calculations.. (3 cred.; prereq., 173)	II	MWF	111C	Mr. Montonna, Mr. Ernst
179s	Advanced Applied Electrochemistry.. Ar (Cred. ar.; prereq., 142, 176, and 177)	Ar	Ar	ArC	Mr. Mann
180f-181w-182s	Design of Chemical Equipment and Plants ..... (2 cred. per qr.; prereq., 173)	II-IV	M	410C	Mr. Montillon, Mr. Ernst
183f	Chemistry of Explosives..... (4 cred.; prereq., 173)	VI-VIII	M	410C	(Not offered in 1925-26)
184s	Organic Dyestuffs ..... (5 cred.; prereq., 173)	Ar	Ar	ArC	Mr. Frankforter
185s	Advanced Chemical Manufacture.... Ar (2 or more cred.; prereq., 174 and 175)	Ar	Ar	ArC	Mr. Montonna
186s	Gas Manufacture and Distribution.. Ar (3 cred.; open to jrs. in School of Chem. or Col. of Eng.)	Ar	Ar	ArC	Mr. Montillon
187s	Inspection Trip ..... (2 cred.; prereq., 173)	I-VIII	(Spring vacation)		Mr. Montillon
188w	Chemistry and Technology of Cellulose ..... (3 cred.; prereq., 37 or equiv.)	Ar	Ar	ArC	Mr. Montonna
271f-272w-273s	Chemical Engineering Seminar..... Ar (1 cred. per qr.; open to students taking advanced courses in chemical engineering)	Ar	Ar	ArC	Mr. Montonna
371f-372w-373s	Research in Chemical Engineering.. Ar (Cred. ar.)	Ar	Ar	ArC	Mr. Mann, Mr. Frankforter, Mr. Montillon, Mr. Montonna

## SCHOOL OF CHEMISTRY

## DRAWING AND DESCRIPTIVE GEOMETRY

No.	Title	Hour	Day	Room	Instructor
4f	Engineering Drawing ..... (2 cred.; prereq., solid geometry)				
	Sec. 1	VII-VIII	MW	445C	Mr. Schuck,
		I-II	T	445C	Mr. Williams
	2	VIII-IX	MW	443C	
		III-IV	T	443C	
5w	Engineering Drawing ..... (2 cred.; prereq., 4)	VIII-IX	MW	445C	Mr. Williams
		I-II	T	445C	
6s	Engineering Drawing and Descrip- tive Geometry ..... (2 cred.; prereq., 5)	VIII-IX	M	1E	Mr. Williams
		I-II	T	1E	
		VII-VIII	F	1E	
7w	Engineering Drawing ..... (3 cred.; prereq., M.&M. 10)	VIII-IX	M	445C	Mr. Schuck
		II-IV	T	445C	
		VII-IX	W	445C	
8s	Engineering Drawing and Descrip- tive Geometry ..... (3 cred.; prereq., 7)	VIII-IX	M	455C	Mr. Schuck
		I-II	T	455C	
		VII-VIII	ThF	455C	
9f,w,s	Drafting ..... (2 to 6 cred.; prereq., 6 or 8)	Ar	Ar	Ar	Mr. Schuck
M.&M.10f	Solid Geometry ..... (No cred.; no prereq.)	VII	MWTh	205E	Mr. Archibald
38f-39w-40s	Graphs and Charts ..... (2 cred. per qr.; prereq., 23, 27, or 29 and M.&M. 26)	I	WF	203E	Mr. Eggers
44f,w,s	Lettering ..... (1 cred.; no prereq.)				
	Sec. 1	IV	T	203E	Mr. Levens,
	2	II	Th	203E	Mr. Quaid
45f,w,s-46f,w,s	Alphabets ..... (2 cred. per qr.; no prereq.)	II	TTh	206E	Mr. Kirchner, Mr. Schuck

## ECONOMICS

No.	Title	Hour	Day	Room	Instructor
8f-9w-10s	General Economics ..... (3 cred. per qr.; no prereq.)				
	Sec. 1	I	MWF	107E	Mr. O'Hara
	2	I	MWF	21E	
	3	III	MWF	135E	
	4	IV	MWF	205E	
	5	IV	MWF	329EE	
				206E (winter)	
25w-26s	Principles of Accounting ..... (4 cred. per qr.; prereq., 8 and 9)				
	Lect. Sec. 1	II	MWF	303B	Mr. Heilman
	2	I	TThS	303B	
	3	III	MWF	303B	
	4	IV	MWF	301B (winter)	
				302B (spring)	
	5	VI	MWF	302B (winter)	

ECONOMICS

No.	Title	Lab. Sec. 1	Hour	Day	Room	Instructor
			VI-VII	T	303B	
		2	III-IV	W	302B (winter)	
					301B (spring)	
		3	VIII-IX	M	303B	
		4	VIII-IX	W	303B	
		5	II-III	S	302B	
		6	VII-VIII	F	301B (winter)	
					303B (spring)	
		7	VI-VII	W	303B	
		8	VII-VIII	T	301B (winter)	
28f,s	Business Law .....		I	MWF	135E	Mr. Palmer
	(3 cred.; prereq., 8 and 9)					
29f	Principles of Accounting.....					
	(3 cred.; no prereq.)					
		Sec. 1	I	MWF	22E	Mr. Heilman
		2	IV	MWF	136EE	
51f-52w-53s	Business Law .....					
	(3 cred. per qr.; prereq., 9 cred. in econ. or pol. sci.)					
		Lect. (All secs.)	II	WF	OLAud	Mr. Young
		Sec. 1	I	M	218aOL	
		2	II	M	218aOL	
		3	IV	M	218aOL	
		4	VI	M	218aOL	
		5	I	T	218aOL	
		6	II	T	218aOL	
		7	IV	T	218aOL	
		8	VI	T	218aOL	
72f	Economics of Transportation.....					
	(3 cred.; prereq., 8 and 9)					
		Sec. 1	VI	MWF	202B	Mr. Cummings
		2	VII	MWF	109B	
73w	Railway Traffic and Rates.....		VI	MWF	102B	Mr. Cummings
	(3 cred.; prereq., 8 and 9)					
85f	Principles of Marketing.....					
	(3 cred.; prereq., 8 and 9)					
		Lect. (All secs.)	I	T	209B	Mr. Vaile
		Sec. 1	I	ThS	202B	
		2	I	WF	209B	
		3	III	ThS	213B	
		4	IV	WF	215B	
85s	Principles of Marketing.....					
	(See 85f)					
		Lect. (All secs.)	I	T	109B,	Mr. Vaile
		Sec. 1	I	ThS	109B	
		2	I	WF	109B	
		3	III	TTh	213B	
		4	IV	WF	213B	
91w	Principles of Organization and Management .....		I	MWF	22E	Mr. O'Hara
	(3 cred.; prereq., jr. with 8 and 9, sr. no prereq.)					
92s	Business Finance .....		I	MWF	22E	Mr. Stehman
	(3 cred.; prereq., 8 and 9)					
93s	Cost Accounting .....		IV	MWF	201PPI	Mr. Ostlund
	(3 cred.; prereq., 29)					

## SCHOOL OF CHEMISTRY

No.	Title	Hour	Day	Room	Instructor
131f-132w-133s*	Cost Accounting .....	II	TThS	109B	Mr. Ostlund
	(3 cred. per qr.; prereq., 29)			303B (spring)	
154s	Public Utilities .....	I	MWF	102B	Mr. Reighard
	(3 cred.; prereq., 92)				
161f	Labor Problems and Trade Unionism .....	III	TThS	202B	Mr. Hanson
	(3 cred.; prereq., jr., sr., 8 and 9)				
167w	Personnel Administration .....				
	(3 cred.; prereq., 8 and 9)				
	Sec. 1	II	TThS	202B	Mr. Stead
	2	III	TThS	213B	
168s	Advanced Personnel Administration .....	II	TThS	209B	Mr. Stead
	(3 cred.; prereq., 167)				

## ELECTRICAL ENGINEERING

No.	Title	Hour	Day	Room	Instructor
43s-44f-45w	Electric Power .....				
	(3 cred. per qr.; prereq., physics 43 and 44)				
	Lect.	II	TTh	138EE	Mr. Johnson
		III	S	138EE	
	Lab.	I-II	S	107EE	

## ENGLISH

No.	Title	Hour	Day	Room	Instructor
4f-5w-6s	Rhetoric and Composition .....				
	(3 cred. per qr.; no prereq.)				
	Sec. 1	III	MWF	315C	
	2	III	MWF	225C	

## GEOLOGY AND MINERALOGY

No.	Title	Hour	Day	Room	Instructor
67w	Mineralogy of Chemical Materials...				
	(3 cred.; prereq., 6 qr. cred. chem. at Univ.)				
	Lect.	III	MWThF	104P	Mr. Gruner
	Lab.	III-IV	T	100P	Mr. Gruner

## GERMAN

No.	Title	Hour	Day	Room	Instructor
24f-25w-26s	Beginning German .....	IV	MTWF	209½F	Mr. Davies
	(4 cred. per qr.; no prereq.)				
27f	Narrative Prose .....	II	MWF	209½F	
	(3 cred.; prereq., 26 or 2 yrs. prep. German)				
28w-29s	Advanced Chemical German .....	II	MWF	209½F	
	(3 cred. per qr.; prereq., 27)				

\*The entire course must be completed before credit is given for any quarter.

MATHEMATICS AND MECHANICS

MATHEMATICS AND MECHANICS

MATHEMATICS

No.	Title	Hour	Day	Room	Instructor
9f	Higher Algebra .....	VI	MTWThF	21E	Mr. Brooke
	(No cred.; no prereq.)				
10f	See course 10f under Department of Drawing and Descriptive Geometry.				
11f	College Algebra .....	VI	MTWThF	22E	Mr. Holman
	(5 cred.; prereq., higher algebra)				
11w	College Algebra .....	VI	MTWThF	5E	
	(See 11f)				
12w	Trigonometry .....	VI	MTWThF	22E	Mr. McClintock
	(5 cred.; prereq., 11)				
12s	Trigonometry .....	VI	MTWThF	22E	
	(See 12w)				
13f	Analytic Geometry .....	V	MTWFS	203E	Mr. Warne
	(5 cred.; prereq., 12)				
13s	Analytic Geometry .....	VI	MTWThF	205E	
	(See 13f)				
24f	Differential Calculus .....	III	MWThFS	5E	
	(5 cred.; prereq., 13)				
24w	Differential Calculus .....	III	MWThFS	5E	
	(See 24f)				
25w	Integral Calculus .....	III	MWThF	136EE	
	(5 cred.; prereq., 24)	III	S	106E	
25s	Integral Calculus .....	III	MWThFS	5E	
	(See 25w)				

MECHANICS

26f	Technical Mechanics (Statics).....				
	(5 cred.; prereq., 25)				
	Sec. 1	V	MTWFS	136E	Mr. Herrick
	2	IV	MTWFS	136E	
26s,su	Technical Mechanics (Statics).....				
	(See Engineering bulletin. Chemists allowed to take Course 26 only by special permission of the Students' Work Committee.)				
84s	Technical Mechanics .....	III	MWThFS	7E	Mr. Hartig
	(5 cred.; prereq., 25)				

MATERIALS

85f	Strength of Materials with Laboratory .....				
	(4 cred.; prereq., 84)				
	Lect.	I	MWF	104E	Mr. Hartig
	Lab.	VI-VII	M	Ex	

HYDRAULICS

86w	Hydraulics with Laboratory.....				
	(7 cred.; prereq., 84)				
	Lect.	I	MF	104E	
	Lab.	VI-VII	W	Ex	



## SCHOOL OF CHEMISTRY

## MECHANICAL ENGINEERING

No.	Title	Hour	Day	Room	Instructor
12f	Foundry .....				
	(2 cred.; no prereq.)				
	Lect.	I		S 102ME	Mr. Moffett
12w	Foundry .....				
	(See 12f)				
	Lect.	VII		M 102ME	Mr. Moffett
12s	Foundry .....				
	(See 12f)				
	Lect.	VII		M 204ME	Mr. Moffett
13f	Forge .....				
	(2 cred.; no prereq.)				
	Lect.	I		S 204ME	Mr. Hughes
13w	Forge .....				
	(See 13f)				
	Lect.	VII		M 204ME	Mr. Hughes
13s	Forge .....				
	(See 13f)				
	Lect.	VII		M 102ME	Mr. Hughes
17f	Machine Shop .....				
	(2 cred.; no prereq.)				
	Lect.	I		S 204PP1	Mr. Shipley
17w	Machine Shop .....				
	(See 17f)				
	Lect.	VII		M 206PP1	Mr. Shipley
38f	Machine Design .....				
	(3 cred.; prereq., M.&M. 26 or 84)				
	Lect.	IV		W 204ME	Mr. Martenis
147w	Heat Engines .....				
	(4 cred.; prereq., M.&M. 84)				
	Lect.	IV		MWF 201Ex	
148s	Heat Engines .....				
	(3 cred.; prereq., 147)				
	Lect.	IV		MWF 201Ex	

METALLOGRAPHY

No.	Title	Hour	Day	Room	Instructor
160f-161w-162s	Metallography ..... (3 cred. per qr.; prereq., Chem. 20 and 21)				
	Lect.	II	MW	306M	Mr. Harder
	Lab. Sec. 1	VI-VIII	Th	306M	Mr. Harder
	2	Ar	Ar	306M	Mr. Dowdell, Mr. Weber
163f-164w-165s	Advanced Metallography ..... (Cred. ar.)	Ar	Ar	M	Mr. Harder
201f-202w-203s	Advanced Metallography for Graduate Students ..... (Cred. ar.)	Ar	Ar	M	Mr. Harder

METALLURGY

No.	Title	Hour	Day	Room	Instructor
3f	General Metallurgy ..... (3 cred.; prereq., Chem. 8 or equiv.)	I	TThS	108M	Mr. Christianson
4w	Metallurgy of Pig Iron..... (3 cred.; prereq., 3)	I	TThS	108M	Mr. Christianson
5s	Metallurgy of Wrought Iron and Steel ..... (3 cred.; prereq., 4)	I	TThS	108M	Mr. Christianson
106f-107w	Metallurgy of Base Metals..... (4 cred. per qr.; prereq., 3)	I III	F TThS	108M 108M	Mr. Pease Mr. Pease
108s	Metallurgy of Precious Metals..... (4 cred.; prereq., 107)	I III	F TThS	108M 108M	Mr. Pease Mr. Pease
109f,w	Metallurgy of Base Metals..... (3 cred.; prereq., Chem. 8 or equiv.)	IV	MWF	108M	Mr. Christianson, Mr. Pease

MILITARY SCIENCE AND TACTICS

No.	Title	Hour	Day	Room	Instructor
1f-2w	First Year Basic Course, R.O.T.C. (Artillery and Signal Corps).... (No. cred.; no prereq.)				
	Sec. 1	I	MWF	A	Ar
	2	IX	MWF	A	Ar
3s	First Year Basic Course, R.O.T.C. (Artillery and Signal Corps).... (No cred.; prereq., 1 and 2)	VII-IX	T	A	Ar
4f-5w	Second Year Basic Course, R.O.T.C. (Artillery and Signal Corps).... (No cred.; prereq., 1, 2, and 3)				
	Sec. 1	I	MWF	A	Ar
	2	IX	MWF	A	Ar
6s	Second Year Basic Course, R.O.T.C. (Artillery and Signal Corps).... (No cred.; prereq., 4 and 5)	VII-IX	T	A	Ar
51f-52w	First Year Advanced Course, R.O.T.C. (Artillery) ..... (3 cred.; prereq., 4, 5, and 6)				
	Rec.	II	MWF	A	Maj. Montgomery
	Lab.	VIII-IX	M	A	

## SCHOOL OF CHEMISTRY

No.	Title	Hour	Day	Room	Instructor
53s	First Year Advanced Course, R.O.T.C. (Artillery) .....				
	(3 cred.; prereq., 52)				
	Rec.	II		MWF A	Maj. Montgomery
	Lab.	III		T A	
		IX		T A	
54f-55w	Second Year Advanced Course, R.O.T.C. (Artillery) .....				
	(3 cred.; prereq., 53)				
	Rec.	III		MWF A	Maj. Montgomery
	Lab.	VIII-IX		W A	
56s	Second Year Advanced Course, R.O.T.C. (Artillery) .....				
	(3 cred.; prereq., 55)				
	Rec.	III		MWF A	Maj. Montgomery
	Lab.	VIII-IX		T A	

## PHYSICAL EDUCATION FOR MEN

No.	Title	Hour	Day	Room	Instructor
1f-2w-3s	Freshman Physical Education..... (Cred.;* no prereq.)				
	Sec. 1	II		TTh A	
	2	III		TTh A	
	3	VI		TTh A	
	4	VII		TTh A	
	5	VIII		TTh A	
4f,w	Freshman Hygiene .....				
	(Cred.;* no prereq.)				
	Sec. 1	II		T 301F	Dr. Cooke and others
	2	III		W 301F	
	3	IV		S 301F	
	4	IV		T 301F	
4s	Freshman Hygiene .....				
	(See 4f,w)				
	Sec. 1	II		T 301F	Dr. Cooke and others
	2	IV		T 301F	
	3	II		S 301F	
7f-8w-9s	Advanced Leaders .....				
	(1 cred. per qr.; prereq., 1, 2, and 3 or permission)				
	Sec. 1	IV		T A	
		II		TTh	
	2	IV		T A	
		III		TTh	
	3	IV		T A	
		VI		TTh	
	4	IV		T A	
		VII		TTh	
	5	IV		T A	
		VIII		TTh	
	6	II		MWF A	
	7	III		MWF A	
	8	IV		MWF A	

\* Course 1-2-3 and 4 carries a total of three credits. The entire course must be completed before credit is received for any quarter. Preventive Medicine 12s may be offered as a substitute for 4.

Course 1f-2w-3s carries no credit when taken in place of military science and tactics by foreign students and others in the School of Chemistry.

PHYSICS

No.	Title	Hour	Day	Room	Instructor
10f-11w-12s	Minor Sports .....				
	(2 cred. per qr.; prereq., 1, 2, and 3 or permission)				
	Lect.	IV		S A	
	Lab.	IV		MWF	
16f-17w-18s	Drill Substitution .....				
	(No cred.; no prereq.)				
	Sec. 1	II	MWF	A	Mr. Iverson
	2	III	MWF	A	
	3	IV	MWF	A	
30s	Athletic Training and First Aid....	I	MWF	A	Dr. Cooke
	(2 cred.; no prereq.)				

PHYSICAL EDUCATION FOR WOMEN

No.	Title	Hour	Day	Room	Instructor
1f-2w-3s	Elementary Physical Training.....	II	MWF	3,151,153WGm	Ar
	(No cred.; no prereq.)				
		IV	MWF	3,151,153WGm	Ar
		VI	MWF	3,151,153WGm	Ar
		VIII	MWF	3,151,153WGm	Ar
4f	Preliminary Hygiene .....	III	TThS	3,151,153WGm	Ar
	(No cred.; no prereq.)				
		I	M	201WGm	Dr. Norris
		II	T		
		III	W		
		IV	M		
4w	Preliminary Hygiene .....	VI	T		
	(See 4f)	III	W	201WGm	Dr. Norris

PHYSICS

No.	Title	Hour	Day	Room	Instructor
3f	Elements of Mechanics and Sound..				
	(3 cred.; prereq., trig. equiv. of M.&M. 12)				
	Lect.	II	MWF	30Ph	Mr. Erickson
	Quiz	II	Th	305E	
	or	IX	Th	100C	
3w	Elements of Mechanics and Sound..				
	(See 3f)				
	Lect.	VIII	MWF	30Ph	Mr. Erikson
	Quiz	IX	T	100C	
3s	Elements of Mechanics and Sound..				
	(See 3f)				
	Lect.	III	TThS	30Ph	Mr. Erikson
	Quiz.	VI	F	305E	
4f	Elements of Mechanics Laboratory..	VI-VII	Th	16Ph	Mr. Erikson
	(1 cred.; prereq., 3 or registration in 3)	I-II	Th	16Ph	Mr. Erikson
4w,s	Elements of Mechanics Laboratory..				
	(See 4f)				
	Sec. 1	VI-VII	T	16Ph	Mr. Erikson
	2	VIII-IX	T	16Ph	and assistants
	3	I-II	Th	16Ph	

## SCHOOL OF CHEMISTRY

No.	Title	Hour	Day	Room	Instructor
23f	Heat ..... (3 cred.; prereq., 3)				
	Lect.	III	TThS	30Ph	Mr. Miller
	Quiz	IX	Th	30Ph	
23w	Heat ..... (See 23f)				
	Lect.	II	MWF	30Ph	Mr. Miller
	Quiz	II	Th	305E	
		or IX	Th	100C	
24f	Heat Laboratory ..... (1 cred.; prereq., 4, 23, or registration in 23)				
	Sec. 1	VI-VII	M	23Ph	Mr. Miller and assistants
	2	VIII-IX	M	23Ph	
	3	VI-VII	T	23Ph	
	4	VIII-IX	T	23Ph	
24w	Heat Laboratory ..... (See 24f)	VI-VII	Th	23Ph	Mr. Miller
31f,s	Optics ..... (3 cred.; prereq., 3)				
	Lect.	I	TThS	30Ph	Mr. Valasek
	Quiz	IX	Th	30Ph	
32f,s	Optics Laboratory ..... (1 cred.; prereq., 4, 31, or registration in 31)				
	Sec. 1	VI-VII	Th	23Ph	Mr. Valasek
	2	VI-VII	F	23Ph	
	3	VIII-IX	F	23Ph	
35w	Optics ..... (2 cred.; prereq., 3)				
	Lect.	VI	TTh	30Ph	Mr. Valasek
	Quiz	IX	T	30Ph	
43w	Electricity ..... (3 cred.; prereq., 3)				
	Lect.	III	TThS	30Ph	Mr. Zeleny
	Quiz	IX	Th	100C	
43s	Electricity ..... (See 43w)				
	Lect.	II	MWF	30Ph	Mr. Zeleny
	Quiz	II	Th	305E	
		or IX	Th	100C	
44w	Electricity Laboratory ..... (1 cred.; prereq., 4, 43, or registration in 43)				
	Sec. 1	VI-VII	T	31Ph	Mr. Zeleny and assistants
	2	VIII-IX	T	31Ph	
	3	VI-VII	W	31Ph	
44s	Electricity Laboratory ..... (See 44w)	VI-VII	Th	31Ph	Mr. Zeleny

PHYSIOLOGIC CHEMISTRY

No.	Title	Hour	Day	Room	Instructor
100W-101S	Physiologic Chemistry . . . . . (3 cred. per qr.; prereq., Chem. 37)	IV	MWF	129MH	Mr. McClendon
100X-101X	Physiologic Chemistry Laboratory.. (3 cred. per qr.)				
	Sec. a	I-III	TTh	310MH	Mr. McClendon. Miss Medes
	b	I-III	FS	310MH	Mr. Pettibone and assistants

PREVENTIVE MEDICINE AND PUBLIC HEALTH

No.	Title	Hour	Day	Room	Instructor
12S	Hygiene . . . . . (No cred.; no prereq.)				
	Sec. 1	VI	T	305E	Dr. Cady
	2	IX	F	305E	
50f,w,su	Public and Personal Health . . . . . (3 cred.; prereq., An. Biol. 1, 2, and Psy. 1, 2)	V	MWF	112MH	Dr. O'Brien

**Bulletin of the University of  
Minnesota  
SUPPLEMENT  
School of Chemistry Announcement of Courses  
Changes for 1925-26**

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**June 5, 1925**

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**The Five-Year Course in Arts and Chemistry** described on pages 19 and 20 of this bulletin has been discontinued and beginning students will not be registered for this course.

**Page 15.** Students who had two years of German in high school will take elective courses instead of German during the regular sophomore year.

**Page 21.** Course 17s, Glassblowing, will be given. One credit. Open to upperclassmen and graduates. No prerequisite. Mr. Stephens.

**Page 22.** Course 21 may be taken before Course 20. Course 13 is prerequisite to either.

In all cases where Course 21 is a prerequisite, Course 20 will also be a prerequisite.

Course 27f,w will be given also in the spring quarter.

Course 28f,w,s will not be given in the spring quarter.

**The following courses will not be offered in 1925-26:**

149s. Principles of Colloidal Chemistry.

151s. Radiochemistry.

152f,w,s. Laboratory Course in Radiochemistry.

156w. Application of Physical Chemistry to Organic Chemistry.

246f-247w-248s. Kinetic Theory and Atomistics.

183f. Chemistry of Explosives.