

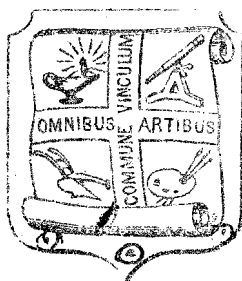
*Registration Office*

# GENERAL CATALOGUE

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OF

## THE UNIVERSITY OF MINNESOTA

VOL. 9, No. 15. November 30, 1906.



BULLETIN

1905--1906

PUBLISHED BY  
UNIVERSITY OF MINNESOTA  
MINNEAPOLIS, MINN.

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The University Catalogues are published by authority of the Board of Regents, as a regular series of bulletins. The number issued each year varies from ten to twelve. Bulletins will be sent gratuitously, postage paid, to all persons who apply for them. In calling for bulletins, please state department of the University concerning which you desire information. The full catalogue will be sent only upon receipt of ten cents to pay postage. Address.

THE REGISTRAR,

The University of Minnesota,  
Minneapolis, Minnesota.

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THE UNIVERSITY OF MINNESOTA

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CATALOGUE

FOR THE YEAR

1905-1906

AND

ANNOUNCEMENTS

FOR THE YEAR

1906-1907

Entered as second-class matter in the post-office at Minneapolis.

PUBLISHED BY THE UNIVERSITY  
MINNEAPOLIS

1906

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I  
GENERAL  
UNIVERSITY INFORMATION

# CALENDAR FOR 1906-1907

1906

1907

## JULY

S.	M.	T.	W.	T.	F.	S.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
..	..	..	..	..	..	..

## AUGUST

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

## SEPTEMBER

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

## OCTOBER

..	1	2	3	4	5	6
7	8	9	10	11	12	13
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21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

## NOVEMBER

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4	5	6	7	8	9	10
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18	19	20	21	22	23	24
25	26	27	28	29	30	..
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## DECEMBER

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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

## JANUARY

S.	M.	T.	W.	T.	F.	S.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
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## FEBRUARY

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3	4	5	6	7	8	9
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17	18	19	20	21	22	23
24	25	26	27	28	..	..
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## MARCH

..	..	..	..	..	1	2
3	4	5	6	7	8	9
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17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

## APRIL

..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..
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## MAY

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

## JUNE

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

# University Calendar, 1906-1907

## THE UNIVERSITY YEAR

The University year covers a period of thirty-eight weeks beginning on the second Tuesday in September. Commencement day is always the second Thursday in June.

### FIRST SEMESTER

SEPTEMBER	10 M	Entrance examinations and registration	
	11 T	Entrance examinations and registration	
	12 W	Entrance examinations and registration	
	13 Th	Entrance examinations and registration	
	14 F	Entrance examinations and registration	
	15 S	Examinations end and registration completed....	1 w
	18 T	Classes called for regular work (First College classes organized, 1869)	
	22 S	.....	2 w
	29 S	.....	3 w
OCTOBER	6 S	.....	4 w
	13 S	.....	5 w
	20 S	.....	6 w
	27 S	.....	7 w
NOVEMBER	3 S	.....	8 w
	10 S	.....	9 w
	17 S	.....	10 w
	24 S	.....	11 w
	29 T	Thanksgiving Day Recess three days	
DECEMBER	1 S	.....	12 w
	8 S	.....	13 w
	15 S	.....	14 w
	22 S	Holiday recess begins (no classes).....	15 w
	25 T	Christmas Day	
JANUARY	1 T	New Year's Day	
	8 T	Work resumed in all departments	
	12 S	.....	16 w
	19 S	.....	17 w
	28 M	Semester Examinations VII and VIII hour classes.....	18 w
	26 S	Semester Examinations I hour classes	
	29 T	Semester Examinations II hour classes	
	30 W	Semester Examinations III hour classes	
	31 Th	Semester Examinations IV hour classes	
FEBRUARY	1 F	Semester Examinations V hour classes	
	2 S	Semester Examinations VI hour classes	



**SECOND SEMESTER**

FEBRUARY	5 T	Second semester begins—Classes called for regular work	
	9 S	.....	1 w
	12 T	Lincoln's birthday—Holiday	
	16 S	.....	2 w
	18 M	University Charter, 1868. General Sibley died 1891.	
	22 F	Washington's birthday—Holiday	
	23 S	.....	3 w
MARCH	2 S	.....	4 w
	9 S	.....	5 w
	16 S	.....	6 w
	23 S	.....	7 w
	30 S	.....	8 w
APRIL	6 S	.....	9 w
	13 S	.....	10 w
	20 S	.....	12 w
	27 S	.....	13 w
MAY	4 S	.....	11 w
	11 S	.....	14 w
	18 S	.....	15 w
	25 S	.....	16 w
	27 M	Senior examinations begin	
JUNE	1 S	.....	17 w
	3 M	Semester examinations. I hour classes	
	4 T	Semester examinations. II hour classes	
	5 W	Semester examinations. III hour classes	
	6 Th	Semester examinations. IV hour classes	
	7 F	Semester examinations. V hour classes	
	8 S	Semester examinations. VI hour classes	18 w

**COMMENCEMENT WEEK 1907**

SUNDAY	June 9	Baccalaureate Service
MONDAY	June 10	Senior Class Exercises
TUESDAY	June 11	Sigma Xi Address. Senior Promenade
WEDNESDAY	June 12	Alumni Day
THURSDAY	June 13	Commencement Day—The Thirty-fifth Annual Commencement
FRIDAY	June 14	Summer Vacation Begins

## PROGRAM OF ENTRANCE EXAMINATIONS, SEPTEMBER, 1906.

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS  
 THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS  
 THE SCHOOL OF MINES  
 THE COLLEGE OF LAW  
 THE COLLEGE OF DENTISTRY  
 THE SCHOOL OF CHEMISTRY

The numbers placed after the subjects, when given, indicate the rooms in which the examinations will be held.

—DAY—	—HOUR—	—SUBJECTS FOR ADMISSION TO THE— FRESHMAN CLASS
Monday, September 10,	8:00—10:30	<sup>1</sup> Elementary Algebra.
	10:45— 1:15	<sup>1</sup> Higher Algebra
	2:30— 5:00	<sup>1</sup> Plane Geometry
Tuesday, September 11,	8:00—10:30	<sup>1</sup> Solid Geometry
	10:45— 1:15	<sup>2</sup> All History Subjects.....17
	2:30— 5:00	<sup>2</sup> American Government.....16
Wednesday, September 12,	9 a. m.	<sup>2</sup> English.
	2:00— 5:00	<sup>3</sup> Geology .....18
		<sup>3</sup> Physiography .....18
Thursday, September 13,	8:00—10:30	<sup>2</sup> Commercial Geography .....16
		<sup>6</sup> Drawing .....24
		<sup>6</sup> Shop Work .....24
	10:45— 1:15	<sup>2</sup> Political Economy.....16
	2:30— 5:00	<sup>1</sup> German
Friday, September 14,	8:00—10:30	<sup>1</sup> French
		<sup>1</sup> Latin Grammar
		<sup>1</sup> Greek
	10:45— 1:15	<sup>1</sup> Cæsar
		<sup>1</sup> Cicero
	2:30— 5:00	<sup>1</sup> Virgil
		<sup>4</sup> Chemistry
	<sup>5</sup> Physics	
	<sup>5</sup> Botany ..... B	
	<sup>3</sup> Zoology .....29	
	<sup>1</sup> Astronomy .....35	

<sup>1</sup> Place to be announced; <sup>2</sup> Library Building; <sup>3</sup> Pillsbury Hall; <sup>4</sup> Chemical Laboratory; <sup>5</sup> Physics Building; <sup>6</sup> The Shops.

# Historical

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AN ACT to re-organize and provide for the government and regulation of the University of Minnesota, and to establish an Agricultural College therein.

As amended by Chapter X of the General Laws of 1872 :

AN ACT to amend Chapter I of the Session Laws of 1868, relating to the University of Minnesota.

Section 1. The object of the University of Minnesota, established by the Constitution at or near the Falls of St. Anthony, shall be to provide the means of acquiring a thorough knowledge of the various branches of literature, science and the arts, and such branches of learning as are related to agriculture and the mechanic arts, including military tactics and other scientific and classical studies.

Sec. 2. There shall be established in the University of Minnesota five or more colleges or departments, that is to say, a College of Science, Literature, and the Arts, a College of Agriculture, including "military tactics," a College of Mechanic Arts, a college or Department of Law, and also a College or Department of Medicine. The Department of Elementary Instruction may be dispensed with at such a rate and in such wise as may seem just and proper to the Board of Regents.

Sec. 3. The government of the University shall be vested in a board of ten Regents of which the Governor of the State, the State Superintendent of Public Instruction, and the President of the University, shall be members ex-officio and the remaining seven members thereof shall be appointed by the Governor, by and with the advice and consent of the Senate. Whenever a vacancy occurs therein, for any cause, the same shall be filled for the unexpired term in the same manner. Of the Regents thus appointed, two shall be commissioned and hold their offices for one year, and two for two years, and three for three years. Their successors shall be appointed in a like manner, and shall hold their offices for the full term of three years from the first Wednesday of March succeeding their appointment and until their successors are appointed and qualified. The President of the University shall have the same rights, powers and privileges as other members, \*except the right of voting, and shall be, ex-officio, the Corresponding Secretary of the Board of Regents.

Sec. 4. The Regents of the University shall constitute a body corporate, under the name and style of "The University of Minnesota," and by that name may sue and be sued, contract and be contracted with, make and use a common seal and alter the same at pleasure; a majority of the voting members shall constitute a quorum for the transaction of business, and a less number may adjourn from time to time.

Sec. 5. The Board of Regents shall elect from the members of the

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\*By the later act the President has been given a vote.

Board, a President of the Board; (a) Recording Secretary and (a) Treasurer, who shall hold their respective offices during the pleasure of the Board. And the President and Treasurer each before entering upon the duties of his office, shall execute a bond in the penal sum of fifty thousand dollars, with at least two sufficient sureties, to the State of Minnesota, to be approved by the Governor, conditioned for the faithful and honest performance of the duties of his office according to law, which bonds, when so approved, shall be filed at the office of the Secretary of State.

Sec. 6. The Board of Regents shall have the power, and it shall be their duty, to enact by-laws for the government of the University of Minnesota in all its departments; to elect a President of the University, and in their discretion a Vice-President, and the requisite number of professors, instructors, officers and employes, and to fix their salaries, (and) also the term of office of each, and to determine the moral and educational qualifications of applicants for admission, and in the appointment of professors, instructors and other officers, and assistants of the University, and in prescribing the studies and exercise thereof; and in all the management and government thereof, no partiality or preference shall be shown to one sect or religious denomination over another; nor shall anything sectarian be taught therein. And the Board of Regents shall have the power to regulate the course of instruction, and (to) prescribe the books and authorities to be used, and also to confer such degrees and grant such diplomas as is usual, in their discretion. It shall be the duty of the Recording Secretary to record all the proceedings of the Board, and carefully preserve all its books and papers; and before entering upon the duties of his office he shall take and subscribe an oath to perform his duties honestly and faithfully as such officer. It shall be the duty of the Treasurer to keep an exact and faithful account of all moneys, bills receivable and evidence of indebtedness, and all securities of property received or paid out by him, and before entering upon his duties shall take and subscribe an oath that he will well and faithfully perform the duties of Treasurer thereof. It shall be the duty of the President to preside at the meetings of the Board; and, in case of his inability to preside, the Board may appoint a President pro tempore.

Sec. 7. In addition to all the rights, immunities, franchises and endowments heretofore granted or conferred upon the University of Minnesota, for the endowment, support and maintenance thereof, there shall be and is hereby inviolably appropriated and placed at the disposal of the Board of Regents thereof, to be drawn from the State treasury upon the order of the President, drawn upon the State Auditor, countersigned by the Secretary of the Board, and payable to the order of the Treasurer of the Board, all the interest and income of the fund to be derived from the sale of all lands granted and to be granted to the State of Minnesota by virtue of an act of Congress, entitled "An act donating lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," approved July 2d, 1867, and also all such gifts, grants and contributions to the endowment thereof as may be derived from any and all such sources.

Sec. 8. And in order to effect a settlement of all remaining indebtedness of the University, all the powers and authorities given by Chapter 18 of the laws of 1864, entitled "An act relating to the University of Minnesota," and Chapter 11 of the laws of 1866, entitled "An act to amend an act

relating to the University of Minnesota, approved March 4, 1864," to the Regents therein mentioned, are hereby given to and conferred upon the Board of Regents of the University of Minnesota aforesaid, and the said acts are hereby continued and shall be in force until such outstanding indebtedness is fully liquidated.

Sec. 9. The first meeting of the first Board of Regents under the provisions of this act, shall be holden at the University building on the first Wednesday in March, 1868, at which meeting the officers of the Board shall be elected, and the annual meetings of the Board shall be holden on the second Tuesday in December in each and every year thereafter.

Sec. 10. Any person or persons contributing a sum of not less than fifteen thousand dollars shall have the privilege of endowing a professorship in the University, the name and object of which shall be designated by the Board of Regents.

Sec. 11. The said Board of Regents shall succeed to and have control of the books, records, buildings, and all other property of the University; and the present Board of Regents shall be dissolved immediately upon the organization of the Board herein provided for. Provided, that all contracts made at that time, binding upon the Board then dissolved, shall be assumed and discharged by their successors in office.

Sec. 12. It shall be the duty of the Board of Regents herein provided for, to make arrangements for securing suitable lands, pursuant to the act of Congress, above mentioned, in the vicinity of the University, for an experimental farm, and as soon thereafter as may be to make such improvements thereon as will render the same available for experimental purposes in connection with the course in the agricultural college; and for such purposes, the Board of Regents is hereby authorized to expend a sum not exceeding the amount specified by the act of Congress aforesaid.

Sec. 13. On or before the second Tuesday in December in each and every year, the Board of Regents, through their President, shall make a report to the Governor, showing in detail the progress and condition of the University during the previous University year, the wants of the institution in all its various departments—the nature, costs and results of all improvements, experiments and investigations, the number of professors and students—the amount of money received and disbursed—and such other matters, including industrial and economic statistics, as they deem important or useful. One copy of said report shall be transmitted to each of the other colleges endowed under the provisions of the said act of Congress, and one copy to the Secretary of the Interior.

Sec. 14. The President of the University shall be the President of the General Faculty, and of the special faculties of the several departments or colleges, and the executive head of the institution in all its departments. As such officer, he shall have authority, subject to the Board of Regents, to give general direction to the practical affairs and scientific investigations of the University, and in the recess of the Board of Regents to remove any employe or subordinate officer not a member of the Faculty and supply for the time being any vacancies thus created. He shall perform the customary duties of a corresponding secretary, and may be charged with the duties of one of the professorships. He shall make to the Superintendent of Public Instruction, on or before the second Tuesday in December in each and every year, a report showing in detail the progress and condition of the Uni-

versity during the previous University year—the number of professors and students in the several departments—and such other matters relating to the proper educational work of the institution as he shall deem useful. It shall be the duty of the President of the University to make to the Board of Regents, on or before the second Tuesday in December in each and every year, a report showing in detail the progress and condition of the University during the previous University year—the nature and results of all important experiments and investigations and such other matters, including economic and industrial facts and statistics, as he shall deem useful.

Sec. 15. Chapter eighty of the laws of eighteen hundred and sixty, chapter eighty-seven of the laws of eighteen hundred and sixty-two, and so much and such parts of any and all acts and laws, whether general or special, as are inconsistent with the provisions of this act, are hereby repealed.

Sec. 16. This act shall take effect and be in force from and after its passage.

Approved February 18, 1868. Act to amend approved February 29 1872.

# The University

The University of Minnesota comprises the following named colleges, schools, and departments:

THE GRADUATE SCHOOL

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE SCHOOL OF MINES

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF EDUCATION

THE DEPARTMENT OF AGRICULTURE

The College of Agriculture

The School of Agriculture

Short Course for Farmers

The Dairy School

The Crookston School of Agriculture

THE COLLEGE OF LAW

THE COLLEGE OF MEDICINE AND SURGERY

THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY

THE COLLEGE OF DENTISTRY

THE COLLEGE OF PHARMACY

The Regents of the University have also entrusted to their charge

THE EXPERIMENT STATIONS.

The Main Station at St. Anthony Park

The Sub-Station at Crookston

The Sub-Station at Grand Rapids

THE GEOLOGICAL AND NATURAL HISTORY SURVEY

In the COLLEGE OF SCIENCE, LITERATURE AND THE ARTS, there is a four-year course of study leading to the degree, Bachelor of Arts. The work of the first year is elective within certain limitations as to the range of subjects from which the electives may be chosen. The remaining work of the course is entirely elective, with the provision that a certain number of long courses be selected. The course is so elastic that it permits the student to make the general scope of his course classic, scientific or literary, to suit his individual purpose.

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS offers courses of study, of four years each, in civil, mechanical, electrical and municipal engineering, leading to the degrees of Civil, Mechanical, Electrical and Municipal Engineer. This college offers a four-year course of study in science and technology, leading to the degree of Bachelor of Science, with an additional year leading to the engineer's degree in any one of the various lines

offered in the college. This college also offers graduate work leading to the degree Master of Science.

THE SCHOOL OF MINES offers four-year courses of study in mining and metallurgy upon completion of which the degrees, engineer of mines and metallurgical engineer, are conferred.

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY, leading to the degrees Analytical Chemist and Chemical Technologist, offers two courses of study of four years each in analytical and applied chemistry.

THE COLLEGE OF EDUCATION receives students who have completed two years of college work, and offers them a three-year course leading to the master's degree. At the end of the second year students may receive the bachelor's degree and the University teacher's certificate. Graduates of other colleges, who have pursued an equivalent course in education, may enter for the master's degree.

THE GRADUATE SCHOOL gathers into a single organization and unites for the purposes of administration all the activities of the University in all its schools and colleges in so far as they relate to advanced instruction offered for the second or higher degrees, viz.: Master of Arts and Doctor of Philosophy conferred for advanced, non-technical study; Master of Science and Doctor of Science for technical study; Master of Laws and Doctor of Civil Law for advanced legal studies. The privileges of this school are in general open to all Bachelors of Arts, of Science, pure and applied, and of Laws, from reputable colleges and universities having courses substantially equivalent to those at this university.

THE UNIVERSITY SUMMER SCHOOL is organized for a six weeks session in June and July under the direction of the State Department of Public Instruction. In the elementary section courses are given for teachers in all the common school branches and in preparation for the state teachers' certificates. In the college section courses are given for high school teachers and in preparation for the state professional certificate. Students who desire University entrance credits and credits toward the bachelor's degree may secure these by pursuing not more than two full courses at each session.

SPECIAL COURSES. In each of the Colleges, students of mature age and adequate preparation are permitted to pursue, under the direction of the faculty, one or two distinct lines of study.

EXTENSION LECTURES. Professors in the University are prepared to give a limited number of extension lectures from time to time. For subjects, speakers, terms and dates, application should be made to the Chairman of the Committee on University Extension.

THE COLLEGE OF AGRICULTURE offers a four-year course in agriculture. The degree of Bachelor of Science, in Agriculture, is conferred on completion of the course. Students in this College may specialize along the line of forestry or of home economics and secure the degree Bachelor of Science (in Forestry, or in Home Economics).

THE SCHOOL OF AGRICULTURE offers a three-years course of study and is a training school for practical farm life and in domestic economy. The College of Agriculture is open to graduates of this School who have completed the fourth year of work required for admission to the college.

*The Dairy School* offers practical instruction in dairying, specially de-



signed for those who are actually engaged in the manufacture of butter and cheese.

*The Short Course for Farmers* is designed to be of the greatest help possible to those actually engaged in farming.

*The Crookston State School of Agriculture* offers a course of study quite similar to that given in the School of Agriculture.

THE COLLEGE OF LAW offers a three-years course of instruction leading to the degree of Bachelor of Laws. Graduate work leading to the degrees, Master of Laws, and Doctor of Civil Laws is offered. An evening class is provided in this college.

THE COLLEGE OF MEDICINE AND SURGERY AND THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY offer four-year courses of study, of nine months each. Upon completion of either of the prescribed courses the degree, Doctor of Medicine is conferred.

In the Colleges of Science, Literature and the Arts, of Medicine and Surgery, and of Homeopathic Medicine and Surgery, there has been established a combined course of six years, leading to the degrees, Bachelor of Science, and Doctor of Medicine.

THE COLLEGE OF DENTISTRY offers a three-years course of study, of nine months each. Upon completion of the prescribed course the degree of Doctor of Dental Surgery is conferred.

THE COLLEGE OF PHARMACY offers a two- or three-years course of study leading to the degree of Pharmaceutical Chemist. This college also offers graduate work leading to the degrees, Master of Pharmacy and Doctor of Pharmacy.

II  
OFFICERS of the UNIVERSITY

# The Board of Regents

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CYRUS NORTHRGP, LL. D., MINNEAPOLIS . . . .	<i>Ex-Officio</i>
The President of the University	
The HON. JAMES T. WYMAN, MINNEAPOLIS . . . .	1907
The President of the Board	
The HON. JOHN A. JOHNSON, ST. PETER . . . .	<i>Ex-Officio</i>
The Governor of the State	
The HON. JOHN W. OLSEN, ALBERT LEA . . . .	<i>Ex-Officio</i>
The State Superintendent of Public Instruction	
The HON. STEPHEN MAHONEY, MINNEAPOLIS . . . .	1907
The HON O. C. STRICKLER, NEW ULM . . . . .	1907
The HON. S. G. COMSTOCK, MOORHEAD . . . . .	1909
The HON. THOMAS WILSON, ST. PAUL . . . . .	1909
The HON. B. F. NELSON, MINNEAPOLIS . . . . .	1909
The HON. A. E. RICE, WILLMAR . . . . .	1909
The HON. EUGENE W. RANDALL, MORRIS . . . . .	1910
The HON. DANIEL R. NOYES, ST. PAUL . . . . .	1910

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C. D. DECKER, AUSTIN  
Secretary of the Board

# Executive Officers

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## THE UNIVERSITY

CYRUS NORTHROP, LL.D., *President*

ERNEST B. PIERCE, B.A., *Registrar*

C. D. DECKER, *Purchasing Agent and Secretary of the Board of Regents*

## THE COLLEGES

JOHN F. DOWNEY, M.A., C.E., *Dean of the College of Science, Literature and the Arts*

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GEORGE F. JAMES, Ph.D., *Dean of the College of Education*

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HENRY F. NACHTRIEB, B.A., *Curator of the Zoölogical Museum*

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ALLEN W. GUILD, *Superintendent of Buildings*

EDWIN A. CUZNER, *Superintendent of Grounds*

# The University Council

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At the regular meeting of the Board of Regents of the University May 31st, 1905, a University Council was established according to the following plan:

I. The name of the body shall be the University Council. It shall consist of the President of the University, the Deans of the various colleges and schools, one elected representative from each college or school for each four hundred students or major fraction thereof, and one representative of the general alumni association.

II. The elected members shall serve for a period of one year. They shall be chosen by the various faculties at the time of the selection of standing committees. The representative of the general alumni association shall be chosen by that body at its annual meeting from among the alumni who are not members of the University.

III. The Council shall be authorized to—

a) Appoint the following committees or the faculty representation thereon:

The University auditing committee

The University press committee

The committee on athletics

The committee on University relations to other institutions of higher learning

The committee on health and sanitation

The committee on commencement and other University functions

The committee on catalogue, programs and courses of study

The committee on student entertainments and social affairs

and such other such committees as the general University interests may require.

b) Receive reports from such committees and to make such recommendations as may be required.

c) Consider and act upon any matter of general University interest beyond the province of a single faculty which may be referred to it by the President of the University or any faculty.

IV. The Council shall hold stated meetings upon the first Monday of October, December, April and June, and such other meetings as the President of the University may call.

## Representatives to the Council

### *The College of Science, Literature and Arts*

DEAN JOHN F. DOWNEY  
PROFESSOR F. L. MCVEY  
PROFESSOR WILLIS M. WEST  
PROFESSOR H. F. NACHTRIEB

### *The College of Engineering*

DEAN F. S. JONES  
PROFESSOR GEORGE D. SHEPARDSON

### *The School of Mines*

DEAN WM. R. APPLEBY

### *The School of Chemistry*

DEAN GEO. B. FRANKFORTER

### *The College of Education*

DEAN GEO. F. JAMES

### *The Graduate School*

DEAN H. T. EDDY

### *The College and the School of Agriculture.*

DEAN WM. M. LIGGETT  
PROFESSOR HARRY SNYLER

### *The College of Law*

DEAN WM. S. PATTEE  
JUDGE A. C. HICKMAN

### *The College of Medicine and Surgery*

DEAN F. F. WESBROOK  
PROFESSOR THOMAS G. LEE

### *The College of Homeopathic Medicine and Surgery*

DEAN EUGENE L. MANN

### *The College of Dentistry*

DEAN ALFRED OWRE

### *The College of Pharmacy*

DEAN FREDERICK JOHN WULLING

### *General Alumni Association*

DAVID P. JONES

# University Council Committees

*The University Auditing Committee*

Professors Anderson, Sigerfocs, Springer, Fletcher, Owre.

*The Committee on Athletics*

Professors Westbrook, Palge, Brooke, West, Harding.

*The Committee on Grounds and Sanitation*

Professors Westbrook, Reynolds, Bass, Flatber, Sideaer.

*The Committee on Catalogue, Programs and Courses of Study*

Professors Frankforter, McVey, Pattee, Jones, Snyder, Appleby, Lee

*The Press Committee*

Professors Schaper, Erdmann, Constant, Snyder, James.

*The Committee on Commencement and other University Functions*

Professors Nachtrieb, Pattee, Eddy, Lee, Owre, Washburn, Schlenker.

*The Committee on Student Entertainments and Social Affairs*

Professors Frankforter, Pike, White (S. M.), Bass, Willis.

*The Committee on University Relations to other Institutions of Higher Learning*

Professors Downey, Folwell, Green, Lee, MacMillan.

*The Committee on University Extension and University Lectures*

Professors James, MacMillan, Mann, Hecker, McVey.

*The Committee on the Library*

Professors Eddy, Downey, Jones (D. P.), West, Lee, Jones (F. S.), Fletcher.

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- ANNA M. BUTNER 1915 Portland Ave.  
Instructor in Physical Culture.
- FREDERICK K. BUTTERS, M. S. 815 Seventh St. S.  
Instructor in Botany and Practical Pharmacognosy, College of Pharmacy.
- LEROY CADY St. Anthony Park  
Assistant in Horticulture, School of Agriculture.
- THOS. CAHILL 1050 Thirteenth Ave. S. E.  
Instructor in Rhetoric.
- FREDERIC D. CALHOUN 1762 Hennepin  
Instructor in Rhetoric.
- R. A. CAMPBELL, M. D. 322 Century Bldg., St. Paul  
Clinical Instructor in Rhinology, and Laryngology, College of Medicine and Surgery.
- E. G. CHENEY, A. B. St. Anthony Park  
Assistant Instructor in Forestry, School of Agriculture.
- HENRIETTA CLOPATH 701 Delaware  
Instructor in Drawing.
- A. E. CARR, D. D. S. 824 Andrus Bldg.  
Instructor in Medical Chemistry.
- S. G. COBE, M. D. 366 N. Prior, St. Paul  
Assistant in Clinical Medicine, and Physical Diagnosis and Surgery, College of Homeopathic Medicine and Surgery.
- LILLIAN COHEN, M. A. 415 Fourteenth St. E.  
Instructor in Chemistry.]

- A. R. COLVIN, M. D. Lowry Arcade  
Clinical Instructor in Surgery, College of Medicine and Surgery.
- WM. H. CONDIT, B. S., M. D. Andrus Bld.  
Instructor in Materia Medica and Surgery, College of Medicine  
and Surgery.
- M. ESTELLE COOK St. Anthony Park  
Instructor in English, School of Agriculture.
- GEORGE M. COON, M. D. Lowry Arcade, St. Paul  
Clinical Instructor in Genito-Urinary Diseases, College of Medi-  
cine and Surgery.
- NORMAN J. COX, B. S., D. M. D. Masonic Temple  
Instructor in Operative Dentistry, College of Dentistry.
- GEO. CRAIG St. Anthony Park  
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- II. J. CREDICOTT St. Anthony Park  
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- HENRY W. DAHLBERG 400 Oak St. S. E.  
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- HANS H. DALAKER, B. A. 405 Oak St. S. E.  
Instructor in Mathematics.
- LESLIE O. DART, M. D. Hotel Summers  
Clinical Assistant in Diseases of Children, College of Medicine and  
Surgery.
- HERBERT W. DAVIS, M. D. Lowry Arcade, St. Paul  
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- AGNES L. DEAN Minneapolis  
Student Assistant in Chemistry.
- WARREN A. DENNIS, B. S., M. D. Lowry Arcade, St. Paul  
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- JAMES DORAN 329 Sixteenth Ave. S. E.  
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- II. K. DOUGAN 2400 Park Ave.  
Assistant in Civil Engineering.
- HAL DOWNEY, B. A., M. A. 1206 Seventh St. S. E.  
Instructor in Animal Biology.
- J. M. DREW St. Anthony Park  
Instructor in Blacksmithing, and Poultry, Registrar of the School  
of Agriculture.

- A. W. DUNNING, M. D. Endicott Arcade, St. Paul  
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Medicine and Surgery.
- I. O. DYBVICK St. Anthony Park  
Instructor in Pasteurizing, School of Agriculture.
- CARL O. ESTREM 502 Beacon St. S. E.  
Student Assistant in Pathology and Bacteriology.
- A. L. EWING, M. S. St. Anthony Park  
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- R. E. FARR, M. D. Syndicate Bld.  
Clinical Assistant in Surgery.
- OSCAR W. FIRKINS, M. A. 1528 Fourth St. S. E.  
Instructor in English.
- JAS. A. FISK St. Anthony Park  
Instructor in Dairy Laboratory, School of Agriculture.
- HENRY R. FOSHAGER 215 Pleasant St. S. E.  
Student Assistant in Histology and Embryology.
- FRANCIS C. FRARY 3108 Garfield Ave.  
Instructor in Chemistry.
- JULIUS T. FRELIN 124 State St. S. E.  
Instructor in French.
- D. A. GAUMNITZ, M. Agr. St. Anthony Park  
Assistant in Animal Husbandry, College of Agriculture.
- EMIL S. GEIST, M. D. 1030 Andrus Bldg.  
Clinical Assistant in Orthopaedia.
- JAMES T. GILFILLAN, M. D. 388 Prior Ave., St. Paul  
Clinical Assistant in Medicine, College of Medicine and Surgery.
- JUDD GOODRICH, M. D. Lowry Arcade, St. Paul  
Clinical Instructor in Surgery, College of Medicine and Surgery.
- E. K. GREEN, A. B., M. D. 1015 Fourteenth Ave. N.  
Clinical Assistant in Medicine.
- HELEN GRIFFITH 1307 Fourth Ave. S.  
Assistant in Rhetoric.
- GEORGE D. HAGGARD, M. D. Pillsbury Building  
Instructor in Physiology, College of Medicine and Surgery.
- ALEXANDER R. HALL, M. D. Moore Bld., St. Paul  
Clinical Assistant in Medicine, College of Medicine and Surgery.
- ARTHUR S. HAMILTON, B. S., M. D. 600 Washington Ave. S. E.  
Instructor in Pathology, of the Nervous System, College of Medi-  
cine and Surgery.
- EARLE R. HARE, M. D. 327 Fourteenth Ave. S. E.  
Preceptor in Anatomy, Department of Medicine.
- MARY V. HARTZELL, D. M. D. Andrus Bld.  
Instructor in Comparative Dental Anatomy, College of Dentistry.
- C. H. HILL Minneapolis  
Student Assistant in Chemistry.

- FRED E. HOBBS, B. L., LL. B. 255 Temple Court, Minneapolis  
Instructor in Justice and Moot Court Practice, College of Law.
- P. A. HOFF, M. D. 150 Lowry Arcade, St. Paul  
Clinical Instructor in Medicine, College of Medicine.
- CHAS. M. HOLT, B. A. Waverly Hotel  
Instructor in Education.
- DAISY HONE, B. A. 1034 Fifteenth Ave. S. E.  
Assistant in Botany.
- ← D. B. HOWELL  
Instructor in Mathematics, School of Agriculture.
- PERCY HUGHES, Ph. D. 321 Church St. S. E.  
Instructor in Philosophy.
- ← JOHN A. HUMMELL, B. Agr. St. Anthony Park  
Assistant Chemist, Experiment Station and Assistant in Chemistry,  
College of Agriculture.
- ANNAH H. HURD, Phm. D., M. D. Pillsbury Bld.  
Lecturer on Diseases of the Blood and Ductless Glands, College  
of Homeopathic Medicine and Surgery.
- JOHN E. HYNES, M. D. 3404 University Ave. S. E.  
Clinical Assistant in Medicine.
- ETHEL S. HURD, M. D. Pillsbury Bld.  
Lecturer on Electro-Therapeutics, College of Homeopathic Medi-  
cine and Surgery.
- ALICE JACKSON St. Anthony Park  
Assistant Instructor in English, School of Agriculture.
- ADOLPH W. JOHNSON  
Lecturer on Pharmacy, College of Homeopathic Medicine and Sur-  
gery.
- EDWARD JOHNSON 1811 Quincy  
Instructor in Foundry Practice, College of Engineering and Me-  
chanic Arts.
- EDW. C. JOHNSON, B. A. 520 Thirteenth Ave. S. E.  
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Clinical Instructor in Nervous and Mental Diseases.
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- HANS JUERGENSEN 1612 Eleventh Ave. S.  
Instructor in German.
- EARL W. KELLEY 412 Sixteenth Ave. S. E.  
Student Assistant in Drawing.
- A. W. KENNEDY  
Assistant in Chemistry.
- ← FLOY KESSON St. Anthony Park  
Instructor in Music, School of Agriculture.
- MARGARET KOCH, M. D. Masonic Temple  
Assistant in Pedology, College of Homeopathic Medicine and Sur-  
gery.

- ALOIS F. KOVARIK, B. A. 1523 Seventh St. S. E.  
Instructor in Physics.
- R. H. LABBITT 3024 Fifth Ave S.  
Student Assistant in Pathology and Bacteriology.
- ARTHUR A. LAW, M. D. Pillsbury Bld.  
Instructor in Operative Surgery, College of Medicine and Surgery.
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- GUSTAVUS LOEVINGER 408 Washington Ave. S. E.  
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Superintendent of the Sub-station at Grand Rapids.
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Clinical Assistant in Obstetrics, College of Medicine and Surgery.
- KARL E. MACHETANZ, B. A. St. Anthony Park  
Director of the Gymnasium, and Instructor in History, School of Agriculture.
- WM. ALLISON McMANIGAL, B. A. 479 Oakland Ave., St. Paul  
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- J. S. MACNIE, M. D. 304 Pillsbury Bld.  
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Instructor in Rhetoric.
- JAMES E. MANCHESTER, Sc. D. 405 Oak St. S. E.  
Instructor in Mathematics.
- ARTHUR T. MANN, B. S., M. D. 704 Pillsbury Bld.  
Clinical Instructor in Surgery, College of Medicine and Surgery.
- THOMAS R. MARTIN, B. A. Swedish Hospital  
Student Assistant in Pathology and Bacteriology.
- JESSIE A. MATSON 1922 St. Anthony Ave., St. Paul  
Assistant in Physical Culture.

- CARL M. MELOM, M. A. 606 Fifteenth Ave. S. E.  
Instructor in French and Spanish.
- H. V. MERCER, LL. D. 327 Sixth Ave. S. E.  
Lecturer on Jurisprudence, College of Dentistry.
- WILLIAM H. MERRIMAN 608 Seventh St. S. E.  
Instructor in Machine Work.
- WM. E. METHLEY  
Lecturer Assistant in Chemistry.
- CLAUDE G. MINER, B. A. 1328 Sixth St. S. E.  
Student Assistant in Geology.
- ED. MOREN 311 Beacon St. S. E.  
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- M. P. MORTENSON St. Anthony Park  
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- JOHN NEKOLA 56 Clarence Ave. S. E.  
Student Assistant in Drawing.
- H. M. NEWTON 1300 S. Seventh St.  
Student Assistant in Chemistry.
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- W. L. OSWALD St. Anthony Park  
Instructor in Agricultural Botany, School of Agriculture.
- TILDA OTTERSON Minneapolis  
Assistant in Chemistry.
- MARTIN OYEN 1226 Fifth St. S. E.  
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- E. C. PARKER, B. Agr. St. Anthony Park  
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- A. W. PARKIN St. Anthony Park  
Instructor in Cheese Making, St. Anthony Park.
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Instructor in Mineralogy.
- EUNICE PEABODY, B. A. 272 Prescott St., St. Paul  
Assistant in Psychology.
- LEVI PEASE, M. S. *Minnesota Park R. T. S.* Rose Township  
Instructor in Assaying, School of Mines.
- MARY G. PECK, M. A. 2412 Harriet Ave.  
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- WM. A. PETERSON  
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- JOHN H. QUENSE, C. E., M. E.  
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- WALTER RAMSEY, M. D.  
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- H. K. READ, M. D.  
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- SOREN P. REES, B. S., M. D.  
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Medicine and Surgery. 1037 Andrus Bld.
- H. M. REID, D. D. S.  
Instructor in Prosthetic Dentistry, College of Dentistry. 2014 Queen Ave. S.
- DON DU VELLO RIDER, D. M. D.  
Instructor in Prosthetic Technics. 71 Syndicate Bld.
- ARTHUR C. RINGSRED  
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- HARRY P. RITCHIE, Ph. B., M. D.  
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and Surgery. Lowry Arcade, St. Paul
- PARKS RITCHIE, M. D.  
Professor of Obstetrics, College of Medicine and Surgery. Lowry Arcade, St. Paul
- WILLIAM A. ROBERTSON, R. S.  
Superintendent of Sub-Station at Crookston. Crookston
- IRVING D. ROBINSON  
Student Assistant in Chemistry. 441 Selby Ave., St. Paul
- VICTOR ROEHRICH  
Student Assistant in Chemistry. 1892 Feronia Ave., St. Paul
- BERT ROSE  
Instructor of Cadet Band. 41 S. Sixth St.
- A. G. RUGGLES, M. A.  
Assistant Entomologist, Experiment Station and Assistant Instruk-  
tor in Entomology, School of Agriculture. St. Anthony Park
- H. L. RUSSELL, Ph. D.  
Instructor in Dairy Bacteria, Dairy School. St. Anthony Park
- J. FRANCIS SCHUECK, B. S., Ph. G., M. D., C. M.  
Instructor in Materia Medica, College of Dentistry. 501 Masonic Temple
- JOHN P. SCHNEIDER  
Student Assistant in Pathology and Bacteriology. 1314 Fourth St. S. E.
- JESSIE SCHULTEN  
Assistant in Rhetoric. 608 Seventh St. S. E.
- ELEANOR SHELDON, B. A.  
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- W. D. SHELDON, M. D. Andrus Bldg.  
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- JUANITA SHEPPERD, M. A. St. Anthony Park  
Instructor in Cooking, Laundering and Home Economics, College  
of Agriculture.
- ROYAL R. SHUMWAY, B. A. 602 Essex St. S. E.  
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- FRED SMITH Minneapolis  
Student Assistant in Anatomy.
- NORMAN M. SMITH 3000 Hennepin Ave.  
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- EDITH J. SNELL, B. L. 403 Dewey Ave., St. Paul  
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- EDW. D. SOLENBERGER, Ph. B. 1920 Columbus Ave.  
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- M. SONDEGAARD St. Anthony Park  
Instructor in Creamery Work, Dairy School.
- LAWRENCE A. STENGER 1613 Fourth St. S. E.  
Student Assistant in Electrical Engineering.
- H. W. STEVENS, A. B., LL. B. 408 Washington Ave. S. E.  
Librarian, College of Law.
- THOMAS W. STUMM, M. D. 394 Selby Ave., St. Paul  
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- MATHIAS SUNDT 1507 Fifth St. S. E.  
Student Assistant in Histology and Embryology.
- CHARLES S. SUTTON 1507 Fifth St. S. E.  
Student Assistant in Histology and Embryology.
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Clinical Assistant in Dermatology and Genito-Urinary Diseases.
- DAVID F. SWENSON, B. S. 3101 Sixteenth Ave. S.  
Instructor in Philosophy.
- EDWARD F. SWENSON 806 Fourth St. S. E.  
Student Assistant in Political Economy.
- JAMES M. TATE 124 State St. S. E.  
Instructor in Carpentry and Pattern Making, College of Engineer-  
ing and Mechanic Arts.
- JAMES E. TETHILL, M. A. 1207 Fifth St. S. E.  
Instructor in History.
- C. C. TYRELL 1306 Seventh St. S. E.  
Student Assistant in Anatomy.
- HENRY ULRICH, M. D. 519 First Ave. S.  
Assistant in Clinical Microscopy, College of Medicine and Surgery.
- HENRY ULRICH, M. D. Minneapolis  
Assistant in Carpentry.



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Student Assistant in Pathology and Bacteriology.
- EDITH VON KUSTER 527 Thirteenth Ave. S. E.  
Student Assistant in Chemistry.
- J. A. VYE St. Anthony Park  
Instructor in Penmanship, Accounts and Business Methods, School  
of Agriculture, and Secretary of the Experiment Station.
- HANS WALCHLI 1415 University Ave. S. E.  
Assistant in Education.
- JAMES M. WALLS, D. M. D. Germania Life Bld., St. Paul  
Instructor in Operative Technics and Demonstrator of Operative  
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- JAMES T. WATTS 1110 Fourteenth Ave. S. E.  
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- RODNEY WEST 1314 Sixth St. S. E.  
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- GRACE L. WHITTRIDGE St. Anthony Park  
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- VAN H. WILCOX, M. D. 812 Pillsbury Bld.  
Instructor in Operative Surgery, College of Medicine and Surgery.
- M. RUSSELL WILCOX, M. D. 812 Pillsbury Bld.  
Demonstrator of Physiology, Department of Medicine.
- A. D. WILHOIT, M. S. Minneapolis  
Assistant in Chemistry.
- CHAS. WILLIAMS, M. A. 312 Union  
Instructor in German.
- HUGH E. WILLIS, LL. M. 1319 Fifth St. S. E.  
Instructor in Personal Property, Bailments and Carriers, College  
of Law.
- ARCHIE D. WILSON St. Anthony Park  
Assistant Instructor in Agriculture, College of Agriculture.
- FRANK R. WRIGHT, D. D. S., M. D. 713 Pillsbury Bldg.  
Clinical Instructor in Dermatology and Genito-Urinary Diseases,  
College of Medicine and Surgery.
- F. R. WRIGHT, M. D. 713 Pillsbury Bld.  
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lege of Dentistry.
- FRED S. YEAGER, D. D. S.  
Instructor in Crown and Bridge Work, College of Dentistry.
- RODNEY WEST 1314 Sixth St. S. E.  
Student Assistant in Chemistry.
- J. P. WEYRENS, B. S. 1611 Sixth St. S. E.  
Student Assistant in Pathology and Bacteriology.

III.  
EQUIPMENT

# Equipment

## GROUNDS AND BUILDINGS

The University campus comprises about forty-five acres lying between University avenue and the river and between Eleventh and Nineteenth avenues Southeast. The campus is well wooded with a fine growth of native oaks and commands a beautiful view of St. Anthony Falls and the city, but is sufficiently removed from the business center of the city to insure desirable quiet and retirement. The buildings upon the campus number twenty, and are valued at over \$800,000. A special clinical building for the use of the department of medicine is located in the southern part of the city, where there is an abundance of clinical material, and within easy reach of the University. The campus is valued at about \$450,000 and the equipment of the buildings at about \$300,000.

The State Experimental Farm, upon which are located the buildings of the experiment station and the department of agriculture, consists of over two hundred and fifty acres of very valuable land, half way between the twin cities and within a thirty-minutes' ride of either city. The farm is valued at \$400,000, and the sub-stations located at Crookston and Grand Rapids, at \$30,000 more. The buildings and equipment of the department of agriculture are valued at over \$400,000.

## NEW BUILDINGS.

The Legislature of 1905 appropriated \$350,000 for the erection of a "Main Building," of which \$200,000 is available in 1906, and \$150,000 will be available in 1907: this amount will be supplemented by \$60,000 received from insurance on the Old Main Building, destroyed by fire in September, 1905. This will give a total for building and equipment of \$410,000.

The building is now in process of construction. It will be 322 feet in length and three stories in height above the basement, with rooms

arranged on both sides of straight halls extending through the length of the building. It will provide class and seminar rooms, and offices for the departments of Astronomy, Mathematics, Greek, Latin, German, French and Spanish, Scandinavian, Comparative Philology, Rhetoric and Oratory, Philosophy and Psychology, and Education. It will also contain the Scandinavian Museum, German Museum, Psychological Laboratory, Dean's Office, Faculty Parlor, Postoffice, Hall for Literary Societies, Men's Study Hall, Women's Study Hall, Minnesota Daily, Minnesota Magazine, Gopher, Cloak Rooms, Janitors' Rooms, Toilet Rooms, Work Shop, and Store Rooms.

The material is brick with cut stone trimmings.

The Legislature of 1903 appropriated the sum of \$100,000 for the erection of a building for pathology, bacteriology and hygiene. The building, which is known as the Institute of Public Health and Pathology, has been erected with the general group of medical buildings and will be ready for occupancy for the year 1906-07. It is 213 feet long by 100 feet deep in the central portion and consists of the central main portion, 60x100 feet, with north and south wings each 56x75 feet.

Space is provided on three floors for a museum and library. A Pasteur Institute is housed in this building for the treatment of and research in hydrophobia. The two large laboratories for teaching pathology, bacteriology and public health and numerous offices, private and research laboratories and a large amphitheatre are arranged with special attention to efficiency and convenience. The State Board of Health Laboratories are housed here in the end of the building adjacent to the special laboratory built by that Board some years ago. Photographic laboratories, workshops, cold storage and autopsy rooms are provided.

#### GIFTS MADE TO THE UNIVERSITY.

The will of the late Mrs. A. F. Elliott, formerly of Minneapolis, but more recently of California, left a bequest to the University, from which the Regents expect to realize at least \$125,000.00. The heirs have requested that this fund be used to erect a Hospital in connection with the Medical Department of the University.

The Hon. Thomas H. Shevlin has donated to the University \$60,000 for a "Woman's Building," to be known as the "Alice Shevlin Hall." The gift has been accepted by the Regents, and the building is now being erected on the site of the "Old Main" between the Library and Law buildings. It will be a two-story and basement structure, the material used being pressed brick with stone trimmings. It will have a frontage of 114 feet on Pillsbury Avenue and a depth of 55 feet. The purpose of this

building is to furnish suitable rest and study rooms for the women attending the University. The building will contain several Society Rooms, a large Lunch Room, and a general Reception Hall, all of which are greatly needed. It is expected that the building will be ready for occupancy at the commencement of the next college year, September 1st.

#### THE FINANCIAL MANAGEMENT OF THE UNIVERSITY.

The financial management of the University is in the hands of the "Board of Regents," except in the erection of new buildings, the purchasing of fuel, and the placing of insurance on buildings and contents, which are in the hands of the State Board of Control.

#### UNIVERSITY REVENUES.

The sources of the University income for Current Expense are three, viz: 1st, the United States Government; 2nd, the State, and 3rd, the University.

The U. S. Government gave to each of the States certain lands for educational purposes. The proceeds of these lands, as fast as sold, are invested in state bonds. These bonds are known as the University permanent fund, and at present amount to \$1,400,000. The annual interest on these bonds is at present about \$53,000. In addition to the interest on bonds, the University receives from the government the Hatch Bill appropriation of \$15,000.00, an appropriation for the benefit of the Experiment Station, and the Morrill Bill appropriation of \$25,000.00, an appropriation for the encouragement of the Departments of Agriculture, Mechanic Arts, and Military Science.

#### RECAPITULATION.

Interest on Bonds and land contracts.....	\$53,000.00	
U. S. Government, Hatch Bill appropriation.....	15,000.00	
U. S. Government, Morrill Bill appropriation.....	25,000.00	
		\$ 93,000.00
Total from the Government .....		
The University receives from the State an appropriation of 23-100 of one mill per dollar on a valuation of \$846,000,000, which will give about .....	\$194,000.00	
A flat appropriation called a deficiency appro. of..	60,000.00	
An appropriation for support of School of Mines..	5,000.00	
An appropriation for salaries of Mines and Elec. Eng. ....	4,500.00	
		\$263,500.00
Total from the State .....		

Amount received from Student's fees.....	\$126,000.00
Dental Infirmary receipts .....	12,000.00
Station & School, sales and fees .....	14,000.00
Miscellaneous Receipts, University .....	2,000.00
	<hr/>
Total from University .....	\$154,000.00
Total estimated current expense receipts for	
1906 .....	\$510,000.00

## LIBRARIES

The following libraries are easily accessible to the University students: Minneapolis—The University Libraries, 110,000 volumes; the Public Library, 135,000 volumes; the Minneapolis Bar Association, the Guaranty Loan Law, and the New York Life Insurance Law Libraries, numbering a total of about 30,000 volumes, are open under certain restriction to law students; the Minnesota Academy of Natural Sciences, 12,000 titles.

St. Paul—The State Historical Library, 78,000 volumes; the State Library, 35,000 volumes; Public Library, 55,000 volumes.

The University Library consists of:

1. *The General Library.*
2. *College Libraries*, including those in Law, Medicine, Engineering, Agriculture.
3. *Departmental Libraries*, including those in Art, Astronomy, Animal Biology, Botany, Chemistry, French, Geology, German, Greek and Latin, Histology and Embryology, History, Mathematics, Military Science, Pathology and Bacteriology, Pedagogy, Physics, Physiology, Rhetoric, Scandinavian.

The private collections of professors are available when necessary for research.

The whole number of bound volumes owned by the University is about 15,000. Unbound books and pamphlets, about 30,000. About 500 current periodicals are received in the general and other libraries.

The departmental libraries consist mainly of books of reference and current periodicals relating to technical subjects.

The general library is open to students and the public from 8:00 a.m. to 9:30 p.m., every day of the University year, except Sundays and legal holidays.

The Law Library contains nearly all the English Reports, including those of Canada, from the earliest decisions down to the year 1900; nearly all the reports of the different states of the Union; all the reports of the United States Supreme court, and all the Federal Court reports. It contains also the digests of these reports and an excellent selection of standard text-books and law dictionaries.

## Equipment

The Nelson Law Library is a rare collection of fifteen hundred volumes, donated to the University by the Honorable R. R. Nelson, of St. Paul, upon retirement from the Federal bench. It contains many old English reports, in addition to those already mentioned, and many ancient treatises upon common law.

A rare and unique addition to the Law Library has been secured by the donation of Judge Collins and former Attorney-General Childs to the University of all the Briefs and Paper-Books in the cases argued in the Supreme Court of Minnesota since 1888, making a fine collection of over five hundred bound volumes.

The Medical Library contains a large and well assorted collection of books, sets of journals, bound and unbound pamphlets, relating to all branches of medicine. All of the leading medical journals are on file in the reading room. The various laboratories have also reference libraries devoted to their special lines of work.

The library was greatly enriched by the bequest of the late Dean, Perry H. Millard, M. D., who bequeathed his entire private medical library to the department. This collection consists of several hundred volumes and pamphlets, including many rare and old medical works, sets of journals especially rich in surgical works.

To all these library facilities may be added the Minneapolis Public Library, which is within easy reach of the University and is opened freely to the students of the University. This library contains over one hundred twenty-five thousand bound volumes and over fourteen hundred of the leading newspapers, magazines and periodicals of the world.

## MUSEUMS.

The museums of the University contain material obtained from various sources, arranged with special reference to its use for illustration. Among the more notable collections are the following:

(a) *In Geology and Mineralogy.* The Kunz collection of minerals, purchased of George F. Kunz; several suites of crystalline rocks secured from various sources; The Ward collection of casts contributed in part by citizens of Minneapolis; collections of the rocks, fossils, minerals and economic products of Minnesota; upwards of 9,000 entries gathered by the geological survey of the State; the Sardeson collection of paleozoic fossils of Minnesota, Wisconsin, Iowa and neighboring states, comprising 30,000 specimens; a series of 3,000 thin sections of typical rocks and minerals largely representing Minnesota localities; purchased material comprising a fine collection of crystals; 5,000 minerals and 3,000 specimens of economic minerals and crystalline rocks, and a collection of over 4,000 photographs and lantern slides.

*The University of Minnesota.*

(b) *In Zoölogy*: All the material collected by the State Zoölogist; a collection of mounted Minnesota birds representing about one-third of the species found in the State; a number of the mammals of the State and a few from the more western states; a collection of fishes, molluscan shells, corals and other foreign material.

The ornithological room contains the excellent Thomas S. Roberts and Franklin Benner collection of skins, nests and eggs of Minnesota birds. Other groups of animals are more or less numerously represented, and are receiving annual additions from the Zoölogical Survey.

(c) *In Botany*: The general herbarium numbering about 25,000 specimens and comprising the series of plants collected by the State Botanist; an alcoholic collection of material for dissection; a collection of woods of Minnesota; a limited series of carboniferous and cretaceous fossil plants, including the Lesquereaux collection from the Minnesota River localities.

(d) *In Technology*: A cabinet of specimens illustrating the products and processes of applied chemistry is being collected by the Professor of Chemistry, as opportunity offers. The collection embraces fuel, ores, furnace products, textile materials, both raw and manufactured, dyewoods and other materials used in dyeing; specimens illustrating the bleaching and printing of cotton, linen and woolen goods, earthenware, pottery, etc.

(e) *In Classics*: Some material illustrating classical geography, topography, chronology, mythology, archaeology, and art has been collected, consisting mainly of plans and charts, casts, pictorial illustrations, facsimiles of manuscripts and inscriptions.

(f) *In English*: A few fac-similes of manuscripts, plates that may serve for the purpose of archaeological instruction, publication of texts, reprints of blackletter books and of original editions, photographs and portraits have been gathered.

(g) *In Civil Engineering*: The department is collecting samples of road material typical of the various localities of the State, and leading materials used in street paving, such as granite, trap rock, brick and asphaltum. A set of standard sections of steel and wrought iron is provided for illustration in the study of structural design.

(h) *In Mechanical Engineering*: The collection consists of models of mechanical motions especially relating to the work in kinematics; sectioned apparatus, such as injectors, water meters and steam separators; various collections of drop forging in iron, steel and copper; miscellaneous samples of commercial work representing the product of special machines; groups of standard nuts, bolts and screws; samples of belting, ropes, steel and iron cables, rawhide gears, and other material especially useful for illustrative purposes.



(i) *In Electrical Engineering Museum*: This museum contains a growing collection of samples furnished by various manufacturers and dealers for demonstrating the merits of different products and for illustrating modern practice; an excellent collection showing the development of electrical instruments, lightning arresters, switches, primary and secondary batteries, early forms of dynamos and motors, lighting apparatus and various industrial applications of electricity; also a collection of samples from repair shops and elsewhere, illustrating the effects of wear, accidents and abuse.

(j) *In Engineering Mathematics*: This department has recently added to its apparatus used for illustration in teaching, several types of slide rules, including those of Thatcher, Faber, Keuffel and Esser, Schureman's Computer, Boucher's Calculator; also Amsler's Polar Planimeter.

*In Mathematics*: The Schroeder wooden and the Schilling gypsum, string and paper models for Solid Analytical Geometry, many of the Schilling models for illustrating the Theory of Surfaces, several of the Schilling mechanical devices for describing various loci, the Keuffel and Esser models for Solid Geometry, and large slated globes, suitably mounted, for use in Spherical Geometry and Spherical Trigonometry.

#### ASTRONOMICAL OBSERVATORY.

The students' astronomical observatory contains a ten and one-half inch combined, visual, photographic and spectroscopic refracting telescope, constructed by Warner Swasey and Brashear; a photographic clock.

#### GYMNASIUM.

The Gymnasium is located in the Armory, and is well equipped with a variety of gymnastic appliances. The object of the Gymnasium is to provide all of the students of the University opportunity for exercise to build up their general health. It also provides special training to correct physical defects and functional derangements. The gymnasium is in charge of a professional Medical Director and Assistant and the training is under their direct supervision. A thorough physical examination is offered each student immediately before and after the gymnasium course, and a record is made of the same. The examination of these records shows a marked improvement in the standard of health of the average student during his college course. The Gymnasium is open at all times to all young men in the University who are free to use the apparatus and to pursue a course of physical training under the direct supervision of the Director and his assistant. In some of the Colleges of the University, this work is required of all men.

IV.  
ORGANIZATIONS  
AND PUBLICATIONS

# Organizations and Publications

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## RELIGIOUS.

*The Students Christian Association* was organized in 1869, its object being to promote growth in Christian character, and to engage in such religious work as may be deemed expedient and necessary.

The Association owns a commodious building, which serves as the headquarters for student religious activity. All persons in sympathy with the object of the association are eligible to membership.

*The Young Men's Christian Association* has as its object the promotion of "growth in grace and Christian fellowship among its members and aggressive Christian work, by and for students." This association leases the Students' Christian Association building and keeps it constantly open, with a General Secretary in charge. All men in sympathy with the object of the association are eligible to membership. This building is maintained as the social and religious headquarters of all young men in the University.

This Association also provides an employment bureau whose services are free to students in all departments of the institution, as well as a committee to help students to find comfortable rooms and boarding places. The Association also maintains an educational department in which students may make up their entrance conditions at a nominal charge for instruction.

The General Secretary will be pleased to correspond with any young man intending to come to the University. Any inquiry about board, room, employment, or general information will gladly be answered, and a handbook will be sent to anyone wishing it. Address the General Secretary of the Young Men's Christian Association, University of Minnesota, Minneapolis, Minnesota.

*The Young Women's Christian Association* is the center of Christian life among the young women of the University. Its object is "to deepen spiritual thought in the University woman, to environ her with a semblance of home, to bring to her friendship, assistance and sociability by stimulating student fellowship, to give her personal help when necessary; thus developing in her the Christ ideal of culture in womanhood."

To this end frequent socials and informal teas are given throughout the year; twice each week twenty minute prayer meetings are held, a dozen circles meet one hour a week for devotional Bible study; and from time to time missionary meetings are held. The General Secretary

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devotes all of her time to the Association and will be pleased to correspond with any young woman who wishes information regarding the University.

All young women are invited to visit the Young Women's Christian Association room before registering. Women from the upper classes will be there during the opening days to give advice and assistance.

Any inquiry about board, room, employment, or general information will gladly be answered by Miss Agnes Crouse, '07, 3840 Richfield Ave., Minneapolis.

*The University Catholic Association* was organized by the Catholic students in the spring of 1900. The purpose of the Association is the study of the Bible and of the doctrines and history of the Catholic Church. Membership is open to any one connected with the University. Regular meetings are held every Sunday afternoon in the rooms of either the Young Men's or the Young Women's Christian Association, through the courtesy of those organizations. The Association is planning to erect a building on or near the campus at an early date.

Aside from the religious objects, the Association tends to promote good fellowship among its members. Early in each University year a reception is tendered to new students and during the year two or more socials are held.

Further information may be obtained by addressing the Secretary of the Association at the University.

### DEBATE AND ORATORY.

*Literary Societies.*—The literary societies are mainly debating clubs. Every student is welcome to attend the literary sessions, but the business sessions are usually held behind closed doors. Students desiring to join should make early application to some member of the society he prefers, as the membership is limited.

*The Minnesota Literary Union*—Is a federation of the members of the following societies: *Shakopean*, *Forum*, *Castalian*, *Minerva* and *Arena*. Four meetings are held each year.

Membership Limit: *Shakopean*, 35, men; *Forum*, 30, men; *Minerva*, 30, women; *Law Literary*, unlimited, law students; *Castalian*, 35, men; *Theta Epsilon*, 30, women; *Thalian*, 25, women.

*The Debating Board* has charge of home and inter-collegiate oratorical contests.

*The Northern Oratorical League* is composed of the oratorical associations of the University of Michigan, Northwestern University, the University of Wisconsin, Oberlin College, the State University of Iowa, the University of Chicago, and the University of Minnesota. Its purpose is to foster an interest in public speaking and to elevate the stand-

ard of oratory by holding annual contests. The contests are open only to undergraduates.

*The Iowa-Minnesota League* is composed of the two universities and holds an annual contest in debate.

*The Central Debating League* is composed of the debating associations of the University of Michigan, the University of Minnesota, Northwestern University, and the University of Chicago. Its purpose is to discuss in public leading questions of the day and in this way to develop ready and forceful speakers.

The four universities are arranged in two groups for the semi-final debates, which are held the second Tuesday in January. On the first Friday in April in each year, the winners from the groups meet in a final debate in the city of Chicago.

The University competes annually for the *Hamilton Club* prize. Michigan, Minnesota, Wisconsin, Iowa, Ohio, Indiana, Northwestern and Chicago Universities and Knox College constitute the league. Each of the colleges named submits one oration upon Alexander Hamilton or some character or event connected with his time. From the orations submitted four are chosen to be delivered before the Hamilton Club.

#### MUSICAL, SOCIAL AND OTHER ORGANIZATIONS.

*The Women's League* is an organization of the women of the University for mutual helpfulness and sociability.

*The Dramatic Club* is organized for the study and practice of dramatic art. One or more plays are put on the stage each year.

*The Glee and Mandolin Clubs* give a public concert each year at the University and make a tour of the state during the holidays.

*The University Band* is organized as a part of the military system of the University and is composed of about sixty musicians. It is under the efficient leadership of an Instructor in Music, and furnishes music for military and many other University affairs.

#### LITERARY AND SCIENTIFIC ORGANIZATIONS.

*Phi Beta Kappa*.—A chapter of the honorary society of *Phi Beta Kappa* was established at the University in 1892. A small proportion of the graduates of the College of Science, Literature and the Arts are elected to membership each year. Election is based upon high scholarship and character.

*The Philological Society*.—The object of the Philological Society is to promote philological investigation and study.

*Greek Club* is a society composed of professors, students and alumni

of the Department of Greek for the study of Greek life, language and customs.

*Societas Latina* is a society in the Department of Latin, having for its special aim the securing of greater proficiency in reading and writing Latin.

*The Scandinavian Literary Club* is an organization whose purpose is to promote interest in the study of Scandinavian literatures.

*The Philosophical Club* meets bi-weekly in the evening during the winter months to read and discuss contemporary philosophy. The membership consists of the professors, instructors, and qualified students of the department.

*The Economic Club* meets twice a month for debate in economic and political subjects.

*The Graduate Club* is a club organized for the purpose of fostering a greater interest in graduate work, for mutual help, and for the discussion of topics under investigation.

*The University Liberal Association* is an organization of students and faculty members formed for the discussion of topics of broad and current interest. It meets twice a month, usually on Saturday evening.

*Sigma Xi*.—A chapter of the honorary scientific society of *Sigma Xi* was established at the University in 1896. A small proportion of the graduates of the scientific, and technical department are elected to membership each year. Election is based upon high scholarship and character.

*American Chemical Society*.—A local section of the American Chemical Society has been organized in Minnesota with headquarters at the University.

*The Camera Club* is an organization of instructors and students interested in photography and photographic chemistry.

*The Geological Club* is an organization of instructors and students interested in geology, for the discussion of geological problems.

*The Botanical Students' Journal Club* is an organization of juniors, seniors and graduate students, of the Department of Botany, for the review of current botanical literature.

*The Zoölogical Journal Club* for instructors and advanced students who meet for the discussion of current zoölogical literature.

*The Zoölogical Reading Club* meets evenings at the homes of the professors and is for instructors and graduate students. Its purpose is the reading and discussion of philosophical works on Zoölogy.

*The Physical Colloquium* is composed of instructors and graduate students and meets for the discussion of recent investigations in physical science.

*The Society of Engineers* meets once in two weeks to listen to addresses by prominent engineers and for the discussion of various

engineering topics. The Year Book of this society is published annually. It is devoted to the publication of articles upon engineering subjects by professors and students in the College of Engineering and the Mechanic Arts.

*The Mining Society* is an organization of mining engineering students who meet for the purpose of hearing lectures and discussing mining engineering problems.

*The Mathematical Society* is composed of professors, assistant professors and instructors whose work is in Pure or Applied Mathematics, and meets the third Wednesday of each month for the discussion of mathematical subjects.

#### PUBLICATIONS.

*The University Bulletins* are published by authority of the board of Regents twelve times a year—every four weeks during the University year. Bulletins will be sent gratuitously, postage paid, to all persons who apply for them.

*The Minnesota Alumni Weekly* is published every Monday during the University year. The Weekly is published entirely in the interest of the alumni and is devoted to alumni news and such University news as may be of special interest to the alumni.

*The Minnesota Daily* is published five times each week during the University year by an organization of University students.

*The Yearbook of the Society of Engineers* is published annually by the engineering students.

*The Junior Annual*, called the "Gopher," is a book published annually by the junior class of the University.

*The Minnesota Magazine* is a monthly magazine devoted to the cultivation of literary taste and effort among the students of the University. It is managed by a board of editors chosen from the senior class.

#### ATHLETICS.

*The Athletic Association* is an organization having for its object the general physical well-being of the students and the encouragement of a proper spirit in favor of hearty, manly sports.

*Control of Athletics.* The athletic sports of the University are under the supervision of a Board of Control made up of eleven members; two are members of the faculty, two are alumni and seven are students. This board has general supervision of all matters connected with athletic contests and arranges the schedule of games. It is the purpose of the board to foster a spirit in favor of fairness and honesty in all athletic contests.

*Northrop Field* is an enclosed athletic field containing about six acres, immediately adjoining the armory. It is surrounded by a high brick wall, the gift of A. F. Pillsbury, and is one of the finest athletic fields in the country.

V-

SCHOLARSHIPS AND PRIZES



# Scholarships and Prizes

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## UNIVERSITY SCHOLARSHIPS

It is the policy of the University to establish scholarships in the different departments, where extra help is needed for instruction, under regulations somewhat as follows:

1. The appointments are made by the Executive Committee of the Board of Regents, upon the recommendation of the department in which the appointment is desired, after approval by the General Faculty.

2. Recipients of scholarships may be either graduate or undergraduate students.

3. The scholarships are not intended as gifts or benefactions from the state to the recipients, but as provisions under which services may be rendered the University.

4. It is understood that these services are of a nature which shall assist the holder of a scholarship to attain the mastery of some line of work in the department to which he is appointed.

## ENDOWED SCHOLARSHIPS

### THE MOSES MARSTON SCHOLARSHIP IN ENGLISH.

Friends and pupils of the late Professor Marston, Ph. D., have given and pledged one thousand dollars as a memorial fund. The annual income of the fund is to be used to help some student in the long English course. The award of the income is made on the basis of pecuniary need and of deserving scholarship.

### THE ALBERT HOWARD SCHOLARSHIP FUND.

Under the last will and testament of Mr. James T. Howard, of the town of St. Johnsbury, Vermont, \$4,166.81 was left to the University to establish a scholarship to be known as the "Albert Howard Scholarship." This scholarship is assigned by the Executive Committee upon the recommendation of the General Faculty.

## STUDENT LOAN FUNDS.

## THE ELLIOT SCHOLARSHIP LOAN FUND.

To fulfill the wish of the late Dr. A. F. Elliot to aid young men who find their efforts to obtain a practical education embarrassed through lack of means, the income of \$5,000, amounting to \$250 per year, is placed in the hands of the Board of Regents to be used as a scholarship loan fund for assisting young men in the school of mines.

The conditions of granting the scholarship loans are: The financial needs of the applicant, his scholarship, moral character, enthusiasm shown in his work and promise of usefulness in his profession. When money is available it may be loaned to pay expenses of worthy students during sickness. The loans are to be repaid, without interest, at the earliest convenience of the recipients.

## THE GILFILLAN TRUST FUND.

The Honorable John B. Gilfillan has given to the University the sum of fifty thousand dollars, yielding an annual income of two thousand dollars, to be used by the Board of Regents to assist worthy students, needing such aid, to secure an education. The Regents are empowered to give this aid in the way of loans or gifts, according to the circumstances of the case. As a rule the fund is used as a loan fund, and a small rate of interest is charged. The details of the regulations which have been adopted by the Regents for the administration of the fund may be learned by addressing the President of the University.

## PRIZES.

## THE PILLSBURY PRIZE.

Three prizes of \$100, \$50 and \$25, offered by the heirs of the Hon. John S. Pillsbury, are awarded for the best work in the Department of Rhetoric, as evidenced finally by an oration in public.

## THE '89 MEMORIAL PRIZE IN HISTORY.

The class of 1889, at graduation, established a prize of \$25 each year, to be known as the '89 Memorial Prize, and to be given for the best thesis in history. The award is made by a Professor of History in some other institution.

## THE DUNWOODY PRIZE.

Mr. William H. Dunwoody, president of the St. Anthony and Dakota Elevator Company, has provided a cash prize of \$75 for the members of

the team winning the inter-sophomore debate, and another prize of \$25 for the student in the sophomore class writing and delivering the best oration.

#### THE PEAVEY PRIZE.

Mrs. Heffelfinger continues the prize of \$100, established by her father, the late Frank H. Peavey. This prize consists of \$75 for the members of the team winning the freshman-sophomore debate, and another prize of \$25 to the student in the freshman or sophomore class writing and delivering the best oration.

#### THE WYMAN PRIZE.

A prize of fifty dollars is offered by the Honorable James T. Wyman, of Minneapolis, through the department of political science, for the best essay of three to five thousand words by an undergraduate student, on the subject of "The Influence of Immigration upon the Development of the Northwest."

#### THE WILLIAM JENNINGS BRYAN PRIZE.

The Hon. William Jennings Bryan has given the University the sum of \$200.00 for the encouragement of studies in political science. The annual income will be given as a prize to the writer of the best essay upon a topic to be announced each year. The competition is open to all students of the College of Science, Literature and the Arts.

#### THE BRIGGS PRIZE IN FOUNDRY PRACTICE.

For the encouragement of studies in foundry practice, Mr. O. P. Briggs, Commissioner of the National Foundrymen's Association, Detroit, Mich., offers \$75 annually, in two prizes, which are to be accompanied by gold medals. The competition is open to sophomores in the College of Engineering, and the prize will be awarded for the best essay relative to the above subject. No prize will be awarded if less than five essays are submitted in competition. Essays should contain about 3,000 words, and must be submitted to the Professor of Rhetoric on or before May 1st.

#### THE LOWDEN PRIZE.

Mr. Frank O. Lowden, of Chicago, offers as a prize to be competed for by the Northern Oratorical League, an endowment of \$3,000, which will yield an annual income of about \$175. A prize of \$100 will be given

to the winner of the first place, \$50 to the orator who gets second place, and the remainder will be set aside each year for an interest fund to accumulate, and, in time, produce another endowment.

#### MINNEAPOLIS LIFE UNDERWRITERS ASSOCIATION'S PRIZE.

A prize of fifty dollars is offered by the Minneapolis Life Underwriters Association for the best essay on life insurance written by a senior of the class of 1906. Essays should contain at least 3,000 words and be presented to the Professor of Political Economy on or before May 21, 1906.

#### THE ROLLIN E. CUTTS PRIZE IN SURGERY.

Dr. Mary E. Smith Cutts, '91 Medical, has given the University, as a memorial of her husband, Dr. Rollin E. Cutts, '91 Medical, the sum of \$500.00, the income from which is to be awarded in the form of a gold medal to that member of the senior class of the College of Medicine and Surgery who presents the best thesis showing original work upon a surgical subject.

VI.  
MISCELLANEOUS

# General Information

## THE ONE-MILE LIQUOR LAW.

A state law provides that "it shall be unlawful for any person to sell or dispose of any spirituous, vinous, or malt liquors within the distance of one mile of the Main Building of the University of Minnesota, as now located in the city of Minneapolis; provided, that the provisions of this section shall not apply to that part of the city of Minneapolis lying on the west side of the Mississippi River."

## MILITARY DRILL.

The act of Congress of 1862, providing for the establishment of "Land Grant Colleges," requires that instruction be given in Military Science and Tactics at all institutions that are its beneficiaries. The Armory is located on the University campus and has all the facilities usually provided in a modern Armory. The United States Government supplies the University with the necessary arms, equipment and ammunition for instruction in infantry and artillery drill, and details a commissioned officer of the regular army to take charge of the department.

## EXPENSES OF STUDENTS.

Several years ago a number of young men and women, at the request of University officials kept careful account of their expenses for the University year. The result was that the expenses of the young men ranged from \$217.00 to \$397.00. The same students earning sums varying from \$237.00 to \$272.00. The young women reported expenses varying from \$150.00 to \$355.00. These figures do not include fees, and, as the cost of living has increased decidedly, probably 25 per cent should be added to these figures to make them safe.

The students upon whose statements these figures are based were representative students; they were not extravagant nor did they deny themselves unduly to get along. While students can live within the figures given above, they would not, owing to the increased cost of living, be able to live as comfortably nor to have as many privileges as these students had.

Board can be had at prices ranging from \$2.10 to as high as the student can afford to pay. In private families board ranges from \$3.00 to \$5.00.

Furnished rooms vary in price from \$8 to \$20 per month. Two students rooming together would of course reduce this expense. It is sometimes possible for a student, rooming alone to secure a good room at an expense but little higher than when two room together; but such chances are the exception and not the rule. New students will find that they will be more likely to secure comfortable rooms and suitable board if they will consult the general secretary of either the young men's or young women's Christian association immediately upon arrival at the University, or if they will correspond with these officers before coming to the University.

The student who learns some trade before coming to the University has a great advantage over the student who has to earn his money by ordinary manual labor. Students have earned their whole expenses while attending the University, and have made good records at the same time. Other students have done so much work that they have not been able to keep up their studies, and have thus missed the one thing for which they were attending the University.

If it is possible for the student to have a part of his expenses paid, he should not attempt to earn his way entirely by his own exertions. It is a comparatively easy thing for a young man to earn half his living while attending the University and yet do good work in his classes. Students who want work seldom fail to find it. In coming to the University, the student should bring enough money with him so that he can live comfortably for a few weeks until he can find something to do.

A pamphlet has been published containing five papers (one by a young woman), relating actual experience of students who have made their way through the University.

Students who contemplate making their own way through college will find here stated the stern and unpleasant side, as well as the brighter side of such a life. A copy will be sent free to any address upon application.

VII.

DEPARTMENTS OF INSTRUCTION

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THE GRADUATE SCHOOL



# THE GRADUATE SCHOOL

## FACULTY

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- CYRUS NORTHROP, LL. D., *President*, 519 Tenth Avenue S. E.  
HENRY T. EDDY, C. E., Ph. D., 916 Sixth Street S. E.  
*Dean of the Graduate School, and Professor of Engineering and Mechanics.*
- FRANK MALOY ANDERSON, M. A., 1629 University Avenue S. E.  
*Professor of History.*
- GEORGE N. BAUER, Ph. D., Minneapolis.  
*Assistant Professor of Mathematics.*
- CHARLES W. BENTON, M. A., Litt. D., 516 Ninth Avenue S. E.  
*Professor of the French Language and Literature.*
- JABEZ BROOKS, D. D., 1708 Laurel Avenue.  
*Senior Professor of the Greek Language and Literature.*
- JOHN S. CARLSON, Ph. D., 827 Seventh Street S. E.  
*Professor of the Scandinavian Languages and Literatures.*
- JOHN S. CLARK, B. A., 729 Tenth Avenue S. E.  
*Professor of the Latin Language and Literature.*
- FRANK H. CONSTANT, C. E., 1803 University Avenue S. E.  
*Professor of Structural Engineering.*
- SAMUEL N. DEINARD, M. A., Minneapolis.  
*Assistant Professor of the Semitic Languages and Literatures.*
- JOHN F. DOWNEY, M. A., C. E., 825 Fifth Street S. E.  
*Dean of the College of Science, Literature and the Arts, and Professor of Mathematics.*
- HENRY A. ERICKSON, B. E. E., Minneapolis  
*Assistant Professor of Physics.*
- JOHN J. FLATHER, Ph. B., M. M. E., 1103 Fourth Street S. E.  
*Professor of Mechanical Engineering.*
- WILLIAM W. FOLWELL, LL. D., 1020 Fifth Street S. E.  
*Professor of Public Finance, and Lecturer on International Law.*
- GEORGE B. FRANKFORTER, M. A., Ph. D., Flat 1, 602 Fourth Avenue S.  
*Dean of the School of Chemistry, and Professor of Chemistry.*
- EDWARD M. FREEMAN, M. S., St. Paul.  
*Assistant Professor of Botany.*
- JOHN E. GRANRUD, Ph. D., 605 Delaware Street S. E.  
*Assistant Professor of Latin.*
- SAMUEL B. GREEN, B. S., St. Anthony Park.  
*Professor of Horticulture and Forestry, and Horticulturist of the Experiment Station.*

- CHRISTOPHER W. HALL, M. A., 803 University Avenue S. E.  
*Professor of Geology and Mineralogy; Assistant Curator  
of the Museum.*
- ARTHUR EDWIN HAYNES, M. S., M. Ph., Sc. D., 703 River Parkway.  
*Professor of Engineering Mathematics.*
- JOHN C. HUTCHINSON, B. A., 3806 Blaisdell Avenue.  
*Professor of the Greek Language and Literature.*
- GEORGE FRANCIS JAMES, Ph. D., 308 Eighteenth Avenue S. E.  
*Dean of the College of Education, and Professor of Education.*
- ALBERT ERNEST JENKS, Ph. D.,  
*Assistant Professor of Sociology.*
- FREDERICK S. JONES, M. A., 712 Tenth Avenue S. E.  
*Dean of the College of Engineering and the Mechanic Arts and  
Professor of Physics*
- WILLIAM H. KAVANAUGH, M. E., 503 Fifteenth Ave. S. E.  
*Assistant Professor of Mechanical Engineering.*
- WILLIAM H. KIRCHNER, B. S., 618 Tenth Avenue S. E.  
*Assistant Professor of Drawing.*
- FREDERICK KLAEBER, Ph. D., 616 Ninth Avenue S. E.  
*Professor of Comparative and English Philology.*
- FRANCIS P. LEAVENWORTH, M. A., 1628 Fourth Street S. E.  
*Professor of Astronomy and Director of the Observatory.*
- WILLIAM M. LIGGETT, St. Anthony Park.  
*Dean of the College of Agriculture, and Director of the Ex-  
periment Station.*
- HAROLD LYON, Ph. D., Minneapolis.  
*Assistant Professor of Botany.*
- CONWAY MACMILLAN, M. A., 1004 Seventh Street S. E.  
*Professor of Botany, and Botanist of the Geological and Natural  
History Survey.*
- FRANK L. MCVEY, Ph. D., 621 Fifteenth Avenue S. E.  
*Professor of Political Economy.*
- JOHN G. MOORE, B. A., 2810 University Avenue S. E.  
*Professor of the German Language and Literature.*
- HENRY F. NACHTRIEB, B. S., 905 Sixth Street S. E.  
*Professor of Animal Biology; Zoologist of the Geological  
and Natural History Survey; Curator of the Zoological  
Museum.*
- WILLIAM S. PATTEE, LL. D., 1319 Fifth Street S. E.  
*Dean of the College of Law, and Professor of Equity and In-  
ternational Law.*
- JAMES O. PIERCE, 507 Eighth Street S.  
*Lecturer on Constitutional Jurisprudence and History.*
- JOSEPH BROWN PIKE, M. A., 525 Tenth Avenue S. E.  
*Professor of Latin.*
- M. H. REYNOLDS, M. D., V. M., St. Anthony Park.  
*Professor of Veterinary Medicine and Surgery  
Veterinarian of the Experiment Station*

- FREDERICK W. SARDESON, Ph. D., Minneapolis.  
*Assistant Professor of Palaeontology.*
- WILLIAM A. SCHAFER, Ph. D., 1009 University Avenue S. E.  
*Professor of Political Science.*
- ALBERT W. RANKIN, A. B., 916 Fifth Street S. E.  
*Associate Professor of Education.*
- CARL SCHLENKER, B. A., 312 Union Street S. E.  
*Professor of German.*
- GEORGE D. SHEPARDSON, A. M., M. E., Minneapolis.  
*Professor of Electrical Engineering.*
- CHARLES F. SIDENER, B. S., 1320 Fifth Street S. E.  
*Professor of Chemistry.*
- CHARLES P. SIGERFOOS, Ph. D., 1206 Fifth Street S. E.  
*Professor of Zoology.*
- SAMUEL G. SMITH, Ph. D., LL. D., St. Paul.  
*Professor of Sociology.*
- HARRY SNYDER, B. S., St. Anthony Park.  
*Professor of Agricultural Chemistry, and Chemist of the Experiment Station.*
- FRANK W. SPRINGER, E. E., 1100 Fifth Street S. E.  
*Assistant Professor of Electrical Engineering.*
- JOSEPHINE E. TILDEN, M. S., 800 Fourth Street S. E.  
*Assistant Professor of Botany.*
- FREDERICK L. WASHBURN, M. A., St. Anthony Park.  
*Professor of Entomology, and Entomologist of the Experiment Station.*
- WILLIS M. WEST, M. A., 1314 Sixth Street S. E.  
*Professor of History.*
- ALBERT B. WHITE, Ph. D., 515 Fifth Avenue S. E.  
*Assistant Professor of History.*
- NORMAN WILDE, Ph. D., 901 Sixth Street S. E.  
*Professor of Philosophy and Psychology.*
- ANTHONY ZELENY, M. S., 321 Church St. S. E.  
*Assistant Professor of Physics.*
- JOHN ZELENY, Ph. D., Minneapolis.  
*Associate Professor of Physics.*

## THE GRADUATE SCHOOL

This school has been established by the Board of Regents to include in a single organization the graduate work of all colleges and schools of the University, which offer courses of instruction leading to the higher degrees. The administration of the school is entrusted to the Dean, who is charged with its supervision and regulation, under the general direction of the President.

The faculty of the school consists of all those professors in the University who give courses of instruction accepted for such higher degrees as are offered by the school. Each college of the University has its graduate committee.

The Dean is chairman of the faculty and of the graduate committees of the various colleges, *ex officio*.

The aim of the school is to offer instruction and opportunity for study combined with facilities for investigation and research to graduate students who desire to pursue some one or more branches of knowledge beyond the ordinary undergraduate courses.

### FEES.

All students taking full work in this school are required to pay a fee of ten dollars a semester, or a proportionate fee for less work. Members of the staff of instruction in the University may register for graduate work without payment of tuition fees. Laboratory fees are charged in addition to those just mentioned.

### ADMISSION.

Any graduate from a four years' course of study in any reputable college or university will be admitted to the graduate school without examination, but will not be thereby admitted to candidacy for either of the higher degrees until his case has been duly considered and approved, as is explained later, in connection with the several degrees.

Each applicant for admission to the school should present himself in person to the registrar with his credentials, (preferably his diploma of graduation), in order to register and pay his fees.

In case of doubt respecting the sufficiency of credentials, consult the dean.

Registration at the beginning of each semester is obligatory upon graduate students and undergraduates alike.

Each student will receive at registration for entrance to the school, as well as at the beginning of each semester thereafter, a blank on which to inscribe the courses he desires to pursue. When the professors in charge of those courses shall have put their signatures upon the blank, certifying that the student is prepared to begin such of these courses as they have charge of, the registrar will issue cards authorizing the student to attend the courses thus certified to.

At the end of each semester regular reports shall be made to the registrar by the professors in charge of the various courses of the graduate students as to the amount and grade of work completed by each student during the semester, as is done in case of undergraduates.

#### DEGREES.

The degree of Master of Arts is, in general, conferred for advanced non-technical study; the degree of Master of Science for advanced technical study, such as agriculture, industrial chemistry, engineering, etc.; and Master of Laws for advanced legal studies.

*The Master's Degree.* Three degrees of this grade are conferred, viz: Master of Arts (M. A.), Master of Science (M. S.), and Master of Laws (LL. M.).

*Candidacy for the Master's Degree.* Any bachelor, a graduate of this university or of any other university or college with an equivalent baccalaureate course, will be enrolled by the Dean as a candidate for the corresponding master's degree on the basis of an approved course of study conforming to requirements detailed below, provided the heads of the departments in which the studies selected lie, signify their approval of the student's preparation to enter upon the work selected.

In case of inadequate preparation for the work selected, such preliminary study as the case may require will be stated by the professor in charge and will be insisted on before the applicant is admitted to candidacy.

#### REGULATIONS.

The master's degree will be conferred on any candidate duly enrolled for that degree, who not sooner than one year after graduation if in residence at the university, and not sooner than two years after graduation if not in residence, shall pass satisfactory final examinations on the course which was approved when he was admitted to candidacy, and shall in addition present an acceptable thesis in accordance with the following provisions:

The professor with whom the candidate pursues his major subject shall be chairman of a committee of three, having in charge the work of the candidate from the time of his enrollment as such, the other members of

the committee being those professors under whom the candidate's minors fall. This committee shall arrange for and have charge of the final examinations of the candidate; it shall approve the subject of the thesis, and pass upon the thesis itself. The candidate must secure their approval of his subject at least three months before graduation and must complete the thesis and all examinations at least two weeks before graduation. It shall be the duty of this committee to canvass the examinations of the candidate's whole course together with the thesis, and in case they regard him entitled to a degree, to report the fact to the Dean, at least one week before commencement. The chairman of the committee shall also make a final report upon the candidate to the registrar one week before commencement.

Any candidate for master's degree at commencement must, as a preliminary, make application to the Dean in writing, by the first of the preceding May, and state the courses in which he has passed and is to pass examination, the title of his thesis, and the names of the committee in charge of his work.

The amount of work required for the master's degree shall be equivalent to that done by the senior class, viz.: An average of sixteen hours per week for two semesters. Proficiency shall be determined by examination upon the subject matter of the courses taken and of the thesis.

For convenience in selecting among the various departments and subjects of study they are arranged in groups, as follows:

1. Education, History, Philosophy, Psychology.
2. Economics, Law, Political Science, Sociology.
3. Greek, Latin, Sanscrit and Semitic languages and literatures.
4. Comparative Philology, English, Germanic, Romance and Scandinavian languages and literatures.
5. Anatomy, Animal Biology, Bacteriology, Embryology, Histology, Botany, Paleontology, Physiology.
6. Agriculture, Chemistry, Geology, Mineralogy.
7. Astronomy, Engineering, Mathematics, Mechanics, Physics.

Candidates desiring a master's degree in some special line of study, for the purpose of teaching or research, or as a basis for studies leading to the doctor's degree, must select three subjects of study, a major to occupy at least eight of the sixteen hours required, a first minor to occupy at least four hours which shall be germane to the major subject by being selected from the same group or a closely related group, and a second minor to occupy at least two hours, which last shall be in some reasonable connection with the other subjects selected. In special cases the candidate may be allowed to fill the required time with a major and one minor only. The thesis in this case must embody the results of study and investigation along the line of the major subject. In attaining this specialized master's degree, the thesis is regarded of much importance, and to it

the candidate should devote much time and effort. To render this possible, the professor in charge of the major subject may count work assigned in its preparation as part of the time required in that subject.

Candidates desiring a master's degree with a view to general culture will select subjects from three distinct groups, of which the work in no one group shall be less than four hours a week, for the year. The work in one of these groups shall be designated as the candidate's major and to it the subject of his thesis shall stand in close relation. The courses pursued in the major shall be in advance of any regularly pursued by undergraduates.

The other two subjects selected shall be designated as minors.

A minor in any subject will require as a prerequisite that the student selecting it shall have pursued that subject at least one year before entering upon the course or courses of which the minor consists.

A candidate for the degree of Master of Laws must not only be Bachelor of Laws from a reputable law college having a course equivalent in length to that at the University of Minnesota, but he must in addition have been admitted to the bar in Minnesota. Any person who possesses the requisite legal learning may on registration pursue any or all of the studies offered for this degree, but he thereby acquires no standing as candidate for this degree.

The major selected for this degree will in all cases be Law, and the minors Political Science and Constitutional History.

*The Doctor's Degree.* Three degrees of this grade are conferred, viz.: Doctor of Philosophy (Ph. D.), Doctor of Science (Sc. D.), and Doctor of Civil Law (D. C. L.), for still more advanced study than that leading to the corresponding bachelor's and master's degrees, and such special attainments therein as show power of original investigation and independent research, together with a fair degree of literary skill as evinced by the preparation of a thesis which shall be a contribution to knowledge.

*Candidacy for the Degree of Doctor.* Any student in the Graduate School who applies to be enrolled as candidate for a doctor's degree must, in order to be enrolled as such, possess a reading knowledge of French and German, certified to by the professors respectively in charge of those languages, and in case of an applicant applying to be enrolled as candidate for the degree of Doctor of Civil Law, proficiency in Latin and Roman History are also required. Knowledge of Latin will also be required in certain other cases such as for a major in Medieval History, or Philosophy, as the professor in charge may prescribe.

The applicant must also have made before enrollment such noteworthy advancement in his graduate work as to secure the approval of his candidacy by his instructors. And in particular, he must obtain the written consent of the professor under whom his major subject falls to take

charge of his instruction in that subject. His minors must also be acceptable to this professor, who must recommend him to the dean as a suitable candidate for the degree sought.

In order for the application to be successful, this professor should also state that through the work thus far accomplished by the applicant, he has become convinced of his capacity and of his probable ability to carry an investigation in his special field to a successful conclusion and embody it in a valuable thesis.

The Dean shall, after full consideration and consultation with the professors concerned, pass upon his application and have power to enroll the applicant as candidate or refuse to do so.

It will frequently not be practicable to enroll an applicant as candidate for the doctor's degree before the completion of one year's study in the Graduate School. Graduates desiring to become candidates for this degree will find it advisable, under ordinary circumstances, to spend the first year of graduate study in attaining to the specialized master's degree, as part of the work leading to the doctor's degree.

That procedure is likely to furnish such a decisive test of capacity for advanced study, as well as experience in preparation of a thesis, as to definitely settle the question of candidacy for the doctor's degree.

Candidates for the degree of Doctor of Civil Law are required to secure the degree of Master of Laws as a preliminary.

#### REGULATIONS.

Candidates for the degree of doctor must devote at least three years of graduate study to the subjects approved for candidacy. One of these three years, viz., that in which the final examinations are held, must be spent in residence at the University of Minnesota. In lieu of the other years the candidate may offer an equivalent term of graduate study at some other university, but study pursued and work done *in absentia* without proper facilities of libraries and laboratories will not be accepted.

The same general regulations govern the candidate for this degree as hold in case of the specialized master's degree, both as regards the amount of study per year, the selection and relative amount of major and minors and as regards the chairman of the committee in charge of the work of the candidate, as well as regards the thesis required, which for this degree must give evidence of original and independent research and must be a contribution to knowledge.

In particular, considerable portions of the work on the major and on the thesis may be carried on under general direction of the professor in charge, in which case the candidate will be held responsible for large attainments in the directions indicated, in the form of written reports, reviews and criticism.



The candidate must pass satisfactory examinations upon his major and minor subjects. The committee shall indicate beforehand its requirements for final examination on the minors as to extent and proficiency. The final examinations upon the minors may occur at any time not more than a year prior to the final examination on the major.

The final examination upon the major must show an exhaustive knowledge of the special subject selected, and a large acquaintance with the general field in which the subject lies, but the candidate shall not be admitted to the final examination upon his major until his thesis has been considered by the committee in charge and found satisfactory.

The order of procedure to be followed is this: The candidate for a doctor's degree shall submit the title and outline of his proposed thesis to the professor in charge of his major for final approval at least as early as the first of October preceding the commencement at which the degree is to be conferred. In case the proposed subject and the outline are acceptable, the candidate shall make a statement in writing to the Dean, as early as the first of the following February, of his intention to present himself for a doctor's degree at the next commencement, giving at the same time the names of the committee in charge of his work, the subjects of his major and minors, and the title of his thesis.

The thesis itself shall be completed and delivered to the professor in charge at least one month before commencement. In case the thesis is adjudged satisfactory, the candidate will be admitted by the committee to final examinations upon his major, upon the subject matter of his thesis and upon such of his minors as are still incomplete.

This examination shall be arranged for by the professor in charge of the major, on a date at least two weeks before commencement. It shall be held by a committee of examination of which the professor in charge of the major shall be chairman, consisting of the professors in charge of the minors and, in addition, of such other members of the teaching force as the Dean may appoint as members of this examining committee. In order to do this, the dean shall be duly informed of the date of the examination by the chairman.

The examining committee shall decide from all the facts within its knowledge, whether the candidate is, in its estimation, entitled to receive the doctor's degree sought, and the chairman shall, without delay, report its findings, in writing, to the Dean and to the registrar.

Immediately after the final examination, the thesis shall be placed by the chairman in the president's office for general examination.

In case the report of the committee is favorable, the candidate shall be presented to the faculty of the graduate school, at a meeting called for the purpose, by the professor in charge of his major subject, who shall then make a written statement of the academic life of the candidate, of

the character and scope of his examinations, and the scope and value of his thesis.

Any member of the faculty shall then be at liberty to propound any questions he will to the instructors of the candidate, respecting his work, or to the candidate himself, respecting the subject matter of his thesis. Upon evidence before it, the faculty shall then decide by vote whether the candidate shall be recommended for the degree.

## COURSES OF INSTRUCTION

The Roman numerals by which the courses are here designated are those under which they appear in the bulletins of the separate colleges.

The courses which are offered to both undergraduates and graduates may not be selected by graduates as major subjects, but as minors only. The courses offered primarily for graduates include the subjects offered to them as majors.

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### ANIMAL BIOLOGY.

The details of the work of a graduate student in this department will naturally depend upon and be determined by the previous training of the student and the end in view.

#### FOR UNDERGRADUATES AND GRADUATES.

- II. Zoology.* *Professor Sigerfoos.*  
First and second hours on Tuesday, Thursday, Saturday. I and II prerequisite, course I.
- III. Histology.* *Professor Nachtrieb and Instructor Downey.*  
Third and fourth hours on Monday, Tuesday, Wednesday, Thursday, Friday. I. and II prerequisite, course I.
- IV. Embryology of Vertebrates.* *Professor Nachtrieb.*  
Fifth and sixth hours on Monday, Tuesday, Wednesday, Thursday, Friday. I and II prerequisites, courses I. and III.
- V. Embryology of invertebrates.* *Professor Sigerfoos.*  
Hours and days arranged with the professor. I and II prerequisites, courses I and III.
- VI. Comparative Anatomy of Vertebrates.* *Instructor Brown.*  
Fifth and sixth hours on Tuesday, Thursday, Saturday. I. and II prerequisite, course I.
- VIII. Taxonomy.* *Instructor Brown.*  
Entomology, third and fourth hours on Monday, Wednesday, Friday. I. and II. *Assistant Professor Oestlund.*  
Ichthyology. Hours and days arranged with Professor Nachtrieb. I. Ornithology. Sixth hour on Tuesday, Thursday, Saturday. II. Prerequisite, course I.
- VIII. Physiology.* *Professor Sigerfoos.*  
Fourth hour on Monday, Wednesday, Friday. I. alternates with course IX and will not be offered in 1907-8.
- IX. Nature Study.* *Professor Sigerfoos.*  
Fourth hour on Monday, Wednesday, Friday. II. alternates with course VIII. It will be offered in 1907-8.
- XI. Neurology.* *Professor Nachtrieb and Instructor Downey.*  
Third and fourth hours on Monday, Tuesday, Wednesday, Thursday, Friday. I. and II. or only I.
- XII. Mental Evolution in Animals.* *Professor Nachtrieb.*  
Fourth hour on Saturday. I. This is a course of lectures that may be taken in connection with course III. or IV.

- XIII. Economic Zoology.** *Professor Nachtrieb.*  
Fourth hour on Saturday. This course of lectures is, like course XII, open to all and may be taken in connection with course III, or IV. It is alternated with course XIV and will be given in the even-numbered years; accordingly not in 1907.
- XIV. Parasitology.** *Professor Nachtrieb.*  
Fourth hour on Saturday. This is a course of lectures on disease producing animals that is open to all and may be taken in connection with course III, or IV. It is alternated with course XIII and is given in the odd-numbered years.

FOR GRADUATES.

- XV. Philosophical Zoology.** *Professor Nachtrieb.*  
Occasional lectures to advanced students. Problems or special advanced work. Research along such line or lines as previous training, available material and end in view may suggest. Graduate students are expected to take an active part in both the Journal Club and the Reading Club. Open to those who have completed course III. Open also as a major or minor to candidates for the degree of master of science.

## ASTRONOMY.

FOR UNDERGRADUATES AND GRADUATES.

- I. General astronomy.** I, II. *Professor Leavenworth.*  
A study of the general principles of astronomy, illustrated by observational work. Open to those who have completed trigonometry.
- II. Practical astronomy.** [3 or 6] I, II. *Professor Leavenworth.*  
The theory of instruments, the use of the ephemeris and nautical almanac; the various methods of determining time, latitude and longitude, parallax, the position of the celestial bodies, and the method of least squares; observatory practice including photography, and spectrum-analysis. Open to those who have completed analytical geometry, calculus and general astronomy.
- III. Extended course in practical astronomy.** *Professor Leavenworth.*
- IV. Orbit work.** *Professor Leavenworth.*  
Computation of orbits; the determination of the orbits of planets and comets; perturbations.
- V. Astrophotography.** *Professor Leavenworth.*  
The making and measuring of astronomical photographs; the determination of right ascension, declination, parallax, etc.

## BOTANY.

FOR UNDERGRADUATES AND GRADUATES.

- V. Cytology.** Junior or senior I, II. *Professor McMillan and Dr. Lyon.*  
Laboratory work and collateral reading. The course includes a survey of cell structure and the various phenomena of division, fusion and metamorphosis, together with a review of the history of cytologic investigation from the time of Malpighi and Grew to the present. Assignments from the work of Strasburger, Henneey, Hertwig, Wilson, Guignard, Beneden and Driesch will be made and methods of cytological research indicated in the laboratory. Open to those who have completed course III or IV. Open also as a major or minor to candidates for the degree of master of science.
- VI. Algology.** Junior or senior. I, II. *Assistant Professor Tilden.*  
Lectures, laboratory and reference work. Instruction is also given in the preservation of material. The work of the first semester includes a detailed comparative morphological and taxonomic study of the freshwater algae, Cyanophyceae and Chlorophyceae, (with a systematic examination of the forms found in the Minneapolis water supply) and of the second semester a similar course in the seaweeds, Phaeophyceae and Rhodophyceae. Either

- IX. Plant ecology.** Junior or senior 11. *Professor MacMillan.*  
Lectures, collateral reading and field observations. The course is designed to cover generally the domain of adaptational adjustments in plant embryology, anatomy, physiology and distribution. Particular attention is devoted to the problems of ecological distribution. Open to those who have completed course I or III. Open also as a minor to candidates for the degree of master of science.
- X. Wood technology.** Junior or senior I. *Assistant Professor Freeman.*  
This course will include a histological study of the most important woods of commerce and the special taxonomy of the trees and shrubs of Minnesota. Field trips, lectures and laboratory. Open to those who have completed course I or III.  
FOR GRADUATES.
- XI. Morphology and taxonomy.** *Professor MacMillan.*  
Important literature and necessary apparatus will be provided for whatever research is entered upon under the direction of the department, and the results of the investigation will be required to be prepared for publication. The course is an elastic one and will be adapted to the special training and requirements of those pursuing it. Open as a major or minor to candidates for an advanced degree.
- XII. Problems in plant pathology and mycology.** *Assistant Professor Freeman.*  
Morphological, physiological and cultural problems in the diseases of plants. Methods of infection and culture in the study of disease in plants will be given. Open as a major or minor to candidates for an advanced degree.
- XIII. Problems in algology.** *Assistant Professor Tilden.*  
Research work may be done on special groups or along any of the following lines: the freshwater algae of Minnesota; the algae of the Minneapolis and St. Paul water supplies; the algae of hot springs; lime-secreting algae; arctic marine algae (material from Vancouver Island); tropical marine algae (material from the Hawaiian Islands). Special facilities for study are offered by the Minnesota Seaside Station on Vancouver Island which is open during the summer vacation. Open as a major or minor to candidates for an advanced degree.
- XIV. Problems in cytology and embryology.** *Dr. Lyon.*  
Special problems in cell morphology, life histories, embryology and histogenesis. The student will be provided with the necessary reagents, apparatus and plant-house facilities. Those so desiring may also select a subject for research from a large number of important problems, material on which has already been carefully selected and preserved for cytological and embryological study. Open as a major to candidates for an advanced degree.
- XV. Paleobotany.** *Dr. Sardeson.*  
Lectures and laboratory work with collateral reading designed to cover the historical literature. Schenck's Handbuch will be used as a guide in the laboratory. Open as a partial minor to candidates for the degree of master of arts or of science.

## CHEMISTRY.

FOR UNDERGRADUATES AND GRADUATES.

- IV. Quantitative analysis.** *Professor Sidener.*  
Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis.
- V. Volumetric analysis.** *Professor Sidener.*  
Lectures and laboratory work. The course includes an introduction to volumetric analysis with a discussion of standard solutions and the necessary stoichiometric calculations.
- VI. Organic chemistry.** *Professor Frankforter.*  
Lectures and laboratory work. This course includes the aliphatic series with a preparation of the more important compounds supplemented by Levy's Anleitung zur Darstellung Organischer Präparate.

- VII. *Organic chemistry.* *Professor Frankforter.*  
Lectures and laboratory work. This course includes the aromatic series with a preparation of some of the more important compounds supplemented by Fischer's *Organischer Präparate*.
- VII. *Theoretical chemistry.* *Assistant Professor Harding.*  
Lectures and readings. The course includes a study of Lothar Meyer's *Modernen Theorien der Chemie*, Oswald's *Grundriss der Allgemeinen Chemie* and Remsen's *Theoretical Chemistry*.
- IX. *History of chemistry.* *Professor Frankforter.*  
Lectures and reading. This course includes a full historical discussion of alchemy and chemistry.
- X. *Water analysis.* *Professor Frankforter.*  
Lectures and laboratory work. The course includes an exhaustive discussion of the chemical and sanitary properties of water.
- XI. *Gas analysis.* *Assistant Professor Harding.*  
Lectures and laboratory work. The work includes an exhaustive chemical examination of the common gases, with a determination of light and heat efficiency of combustible gases.
- XII. *The chemistry of carbohydrates.* *Assistant Professor Nicholson.*  
Lectures and laboratory work. The course includes a discussion of the carbohydrate group with the important methods of analysis.
- XIII. *Industrial chemistry.* *Professor Sidener.*  
Laboratory work and reading. The course includes the analysis of various commercial products.
- XIV. *Wine and beer analysis.* *Assistant Professor Harding.*  
Lectures and laboratory work. The course includes the determination of alcohol and other constituents in wine and beer, with a special study of fermentation.
- XV. *Special problems.* *Professor Sidener.*  
Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems.
- XVI. *Photographic chemistry.* *Professor Frankforter.*  
Lectures and laboratory work. The course includes a study of the compounds affected by the chemical rays of light, and a discussion of developers and fixers, photo-engraving, photo-reliefs and color photography.
- XVII. *Electro-chemistry.* *Professor Frankforter.*  
Lectures and laboratory work. The course includes the qualitative and quantitative separations of the metals by electrolysis.
- XVIII. *Micro-chemical analysis.* *Assistant Professor Harding.*  
Lectures and laboratory work. The course includes the methods for the determination of minute quantities of substance by means of the microscope.
- XIX. *Food adulterations.* *Assistant Professor Harding.*  
An examination of common food products for adulterants.
- XX. *Iron and steel analysis.* *Professor Sidener.*  
Lectures and laboratory work. The course includes the rapid determination of iron by the various methods, as well as the determination of the associated elements, sulphur, phosphorus, silicon, manganese and carbon.
- XXI. *Mineral analysis.* *Professor Sidener.*  
The course includes the analysis of building stones and some of the most important minerals.
- XXII. *Inorganic preparations.* *Assistant Professor Harding.*  
The preparation of inorganic salts, supplemented by Bender's *Anorganische Preparatkunde*.
- XXIII. *Colloquium.* *Professor Sidener.*  
A thorough quiz in general inorganic chemistry.
- XXIV. *Colloquium.* *Professor Frankforter.*  
A thorough quiz in general organic chemistry.
- XXV. *Special problems.* *Professor Sidener.*  
This course includes work on ores of base metals, limestones, slags, etc.

XXVI. *Physical chemistry.*

Professor Frankforter.

Lectures and laboratory work. The laboratory work will include that laid down by Jones and Walker with such references as **Nernst and Ostwald.**

This work must be taken in regular class. For details, see program of the School of Chemistry.

## FOR GRADUATES.

Courses offered by Professor Frankforter.

For the major work in chemistry leading to the higher degree, no specific courses are offered. On the contrary, the candidate will be given some chemical problem which will require original investigation to solve. The laboratories are specially prepared to offer topics for investigation along the following lines:

1. *General Inorganic Chemistry.*
2. *Analytical Chemistry.*
3. *Technological Chemistry.*
4. *Electro-chemistry.*
5. *Organic Chemistry with the following special topics:*
  - (a) The Alkaloids. (b) The Terpens. (c) The Resins.
6. *Physical Chemistry.*

## COMPARATIVE PHILOLOGY.

This department, besides offering courses in (1) the general principles of linguistic science, affords an opportunity for elementary studies in (2) comparative Indo-European philology, and more particularly the investigation of (3) old Germanic dialects. Related courses in (4) English philology will be found under 'English Language and Literature.'

Courses offered by Professor Klaeber.

## FOR UNDERGRADUATES AND GRADUATES.

- I. *General Introduction to the Science of Language.* (The life and growth of language.)
- II. *Studies in Semasiology.*
- III. *Introduction to Germanic Philology.*
- IV. *Comparative Phonology of English and German.*

## FOR GRADUATES.

- I. *Comparative Grammar of the Greek, Latin, and Germanic Languages;* with a general survey of the field of Indo-European Philology.
- II. *Urgermanische Grammatik.*
- III. *Gothic:* Grammar and Reading of the Gospels. The relation of Gothic to the other Teutonic dialects will be especially emphasized.
- IV. *Old Saxon:* Grammar and Interpretation of the Heliand.
- V. *Old High German.*

Courses II, III and IV, V, will be given in alternate years.

## ECONOMICS, PUBLIC FINANCE AND INTERNATIONAL LAW.

## FOR UNDERGRADUATES AND GRADUATES.

The particular lines and subjects of study are selected by individuals or groups after consultation with the professors of the department.

When insufficiently grounded in elementary subjects, graduates are permitted to join undergraduate sections, but are expected to do more work than is required of undergraduates.

III. *Money and Banking.*

II. Professor McVey.

A course in the principles of money and banking, dealing with fundamental principles illustrated by existing monetary systems and legislation. Text books, lectures, papers and discussions.

- IV. *Modern Industrial Legislation.* II. Professor McVey.  
A course based upon McVey's *Modern Industrialism*. This course deals with the problems and legislation arising from industrial conditions such as labor questions, trusts, monopolies, etc. Assigned topics, lectures, and collateral reading.
- V. *Corporation Finance.* I. Professor McVey.  
A study of the methods of financing modern corporations, their position in the law and the analysis of their accounts and statements. Text-books, Green, *Corporation, Finance*; Ripley, *Trusts, Pools and Corporations*; Wyman's *Cases*; Robinson's *Investment Securities*; Woodlock, *Anatomy of a Railroad Report*; Lectures, collateral reading and problems.
- VI. *Public Finance Part I.* I. Professor Folwell.  
Public expenditures national, state and local, from the standpoint of public wants; budget framing; treasury administration and accounting; public debts in peace and war. Illustrations chiefly from American practice. Lectures and exercises.
- VII. *Public Finance Part II.* II. Professor Folwell.  
The public revenue, national, state and local—from taxation and other sources. In particular, the principles and practice of taxation in the United States.
- VIII. *Advanced Economics.* I. Professor McVey.  
In this course further consideration is given to selected topics from the course in elementary economics. Carver *Distribution of Wealth* is used as a text, supplemented by readings and problems. Lectures, papers and discussions.
- IX. *Transportation.* II. Professor Folwell.  
The evolution of transportation in the United States, and of railroads in particular. Economic aspects, public policy and finance of railroading. Open to senior engineers.
- X. *Monetary History of the United States.* [1] I, II. Professor McVey.  
In this course the problems arising from the changes and alterations in the money of the United States from 1770-1900 are discussed. The work consists of lectures and assigned topics based upon Hepburn's *Contest for Sound Money* and Noyes' *Thirty Years of American Finance*. Students registering for this course are required to have the element of economics, course I, and money and banking course v. The section meets one hour each week throughout the year. The hour of meeting will be determined by the convenience of students and instructor.
- XII. *Methods of Investigation.* [1] II. Professor McVey.  
A course in methods of using libraries, collecting and organizing material, followed by the actual investigation of important questions.
- \*XIV. *Economic Schools and Movements.* d. h. I, II. Professor Folwell.
- \*XV. *Statistics and Economics.* d. h. I, II. Professor Folwell.  
\*These courses are given in alternate years.
- XVI. *International Law.* I. Professor Folwell.  
An elementary treatment by lectures with required exercises; illustrations chiefly from American history.
- XVII. *Political Schools and Movements.* d. h. I, II. Professor Folwell  
This course is given in a seminar for graduates and seniors especially interested and qualified. It alternates with courses XIV and XV above.

## EDUCATION.

### FOR GRADUATES.

Preliminary Requirements: Students who desire to undertake graduate work in education must have a general knowledge of psychology and of the history of education, and some acquaintance with the theory of education. For a minor in education the candidate may pursue studies either in the theory and practice of elementary teaching, the organization and methods of secondary education, or in advanced educational theory and administration. Students who undertake a major in education are expected to do work in at least two of these fields. Selection will be made by the candidate on the approval of the head of the department from the following courses:



- |   |                       |
|---|-----------------------|
| IV. Secondary Education.                | I. Professor James.   |
| V. Practice of Elementary Teaching.     | I. Professor Rankin.  |
| VI. Practice of Secondary Teaching.     | II. Professor Rankin. |
| IX. School Supervision.                 | II. Professor Rankin. |
| X. Comparative Study of School Systems. | I. Professor James.   |
| XI. Modern Educational Theories.        | II. Professor James.  |
| XII. Problems in Elementary Education.  | I. Professor Rankin.  |
| XIII. Problems in Secondary Education   | II. Professor James.  |

## ELECTRICAL ENGINEERING.

The courses offered by the department of electrical engineering are open to graduate students having the required preliminary training. Thorough courses in physics and mathematics are essential prerequisites. The laboratory, shop and library of the department provide facilities for a moderate amount of research work in addition to the regular courses of study.

The laboratory equipment includes about forty dynamo electric machines of various types and sizes for direct and alternating currents, such as constant current and constant potential direct current generators and motors, single phase and polyphase alternators, commutating, induction and synchronous motors and rotary converters, each furnished with suitable regulating devices. A number of these machines have been equipped with special devices for experimental purposes. Lamps, rheostats, batteries, fans and brakes afford convenient and ample means for taking up the energy of dynamos and motors. To facilitate testing, there are a number of pairs of similar machines. A three-ton traveling crane facilitates handling the machines. Power is obtainable from a main shaft driven by the engines of the lighting plant, or by motors connected with the University power circuits, with a storage battery or with the circuits of The Minneapolis General Electric Company, which supplies direct current at 500 volts and alternating current at 2,250 volts. The laboratory has equipment for obtaining low voltage direct or alternating current up to 2,000 amperes, for continuous EMF up to 2,000 volts and for alternating EMF up to 40,000 volts. An excellent assortment of instruments of well-known American and foreign makers is available for laboratory use. A well equipped standardizing laboratory furnished with certified standards of current, electromotive force and resistance, allows the frequent checking of instruments, so that students may work to any desired degree of refinement. The meter and lamp testing laboratories are furnished with a wide variety of arc and incandescent lamps and meters with all necessary standards and other accessories. The electro-chemical laboratory provides facilities for the construction and testing of various cells, for electro-plating and other electrolytic processes and for the formation and study of electric furnace products. Alternators, rotary converters, transformers, lamps, motors, condensers, special apparatus and suitable instruments afford facilities for the experimental study of alternating currents. Telephone transmitters, receivers and accessories provide for practice in assembling and testing the ordinary telephonic apparatus and circuits and for investigation.

The department library contains an excellent collection of electrical and allied works, including a full set of United States Patent Office Gazettes. New books and trade publications are being added continually. Files of twenty-two journals are nearly complete and others are being collected and bound. These, with the files in the general and other departmental libraries of the University, offer excellent facilities for research work. The reading room receives regularly the leading American and foreign periodicals devoted to electrical engineering and allied interests.

## FOR UNDERGRADUATES AND GRADUATES.

- I. *Applied electricity.* [2] Junior I. 36 hours. *Professor Shepardson.*  
Outline of industrial uses of electricity; units; application of Ohm's law; methods and calculation of wiring; electrical instruments and measurements. Text book: Shepardson, Electrical Catechism. Preparation required: physics, course I.
- II. *Dynamos and motors.* [2] Junior II. 72 hours. *Assistant Prof. Springer.*  
Theory of electro-magnet and direct current dynamo and motor; methods of regulation, construction and operation of dynamos and motors; methods of testing. Preparation required: electrical engineering, course I; physics, courses I and II (a); differential and integral calculus.
- III. *Alternating currents.* [3]. Senior I, II. 108 hours. *Professors Eddy and Shepardson.*  
Phenomena, measurement and use of alternating currents; theory of line, transformer, generator and motor; types of apparatus. Text-book: Steinmetz, Alternating Current Phenomena. Preparation required: electrical engineering, courses I and II.

- IV. *Electrical engineering practice. Electric railway.* [2] Senior I. 18 hours. One-half semester. *Assistant Professor Springer.*  
History and development; different systems of distribution, location and calculation of feeders; line and track construction; choice of motors, trucks, generators and engines; operation and repairs. Text-book: Gotshall, *Electric Railway Economics*. Preparation required: electrical engineering, course II.
- V. *Electrical engineering practice. Batteries.* [2] Senior I. 18 hours. One-half semester. *Assistant Professor Springer.*  
General theory of primary and secondary cells; types and methods of construction; commercial applications; operation of battery plants; construction and test of cells by students; test of a commercial plant. Text-book: Lyndon, *Storage Battery Engineering*. Preparation required: electrical engineering, course II.
- VI. *Electrical engineering practice. Electric lighting.* [2] Senior I. 18 hours. One-half semester. *Professor Shepardson.*  
Comparison of different sources of light; photometry, physics of the arc; history, design and regulation of arc lamps; adaptation to constant currents, constant potential and A. C. circuits; carbons; history, manufacture and economy of incandescent lamps; distribution of light. Text-book: Bell, *Art of Illumination*. Preparation required: electrical engineering, course II.
- VII. *Electrical engineering practice. Electrical transmission.* [2] Senior II. 18 hours. One-half semester. *Professor Shepardson.*  
Utilization of natural forces; various methods of transmission; theory of electric motor; power distribution with constant current, constant potential and alternating systems; design of line; study of particular plants. Preparation required: electrical engineering, courses I, II and VI.
- VIII. *Electrical engineering practice. Central stations.* [2] Senior II. 18 or 36 hours. One-half or one semester. *Professor Shepardson.*  
Preliminary surveys; choice of electrical systems; load diagrams; best units of power; comparison of steam, gas and water power; location, design and erection of station buildings; boilers, engines, dynamos, storage batteries, switch board and lines; operation and regulation; maintenance of plant; emergencies; examination of stations in Minneapolis and St. Paul. Preparation required: electrical engineering, courses II, and VI.
- IX. *Electrical engineering practice. telegraph and telephone.* [2] Senior II. 18 or 36 hours. One-half or one semester. *Professor Shepardson.*  
Various systems and instruments used in local and long distance telegraphy and telephony, design and construction of switch-boards and lines; protection from inductive and other disturbances; police, fire alarm and district messenger systems. Preparation required: electrical engineering, courses I and VI.
- X. *Electrochemistry.* [2.] Senior II. 36 or 72 hours. *Professor Shepardson.*  
Theoretical and experimental study of electrolysis, electrodeposition and electric furnaces.
- XI. *Electrical design.* [2.] Junior II. 72 hours. *Assistant Professor Springer.*  
Problems in designing circuits, electro-magnets and dynamos; complete working drawings and specifications to accompany each design. Text-book: Wiener, *Dynamo Electric Machines*. Preparation required: physics, courses I and II; electrical engineering, courses I and II; machine design, course XI.
- XII. *Electrical design.* [2.] Senior I. 72 hours. *Professor Shepardson.*  
Design of a dynamo or other problem as assigned. Preparation required: electrical engineering, courses II and IV.
- XIII. *Electrical design.* [3.] Senior II. 108 hours. *Professor Shepardson.*  
Designs, specifications and estimates for an electric light or power plant, or other approved problem. Preparation required: electrical engineering, courses IV and VI.
- XIV. *Electrical laboratory.* [3.] Junior II. 108 hours. *Assistant Professor Springer.*  
Tracing circuits and locating faults; measurements of conductivity and insulation; calibration and use of instruments; operation and characteristic curves of dynamos and motors. Preparation required: physics, courses I and II, electrical engineering, courses I and II.

- XV. *Electrical laboratory.* [2, or 4,] First semester [3,] Second semester. Senior I. 72 or 144 hours; II. 108 hours. *Professor Shepardson.* Photometric and electrical tests of incandescent and arc lamps and regulating devices. Experimental study of alternating currents; regulation and efficiency tests of alternators, transformers, rotaries and motors.
- XVI. *Electrical laboratory.* [1, or 2,] Senior I or II. 36, 72 hours. *Professors Shepardson and Springer.* Efficiency tests and special problems.
- XVII. *Electrical measurements of precision.* [2,] Senior I, or II. 72 hours. *Assistant Professor Springer.* Lectures and laboratory work. Measurements of resistance, voltage, current, self-induction and capacity; standardization of measuring instruments. Open to a limited number.
- XVIII. *Plant operation.* Senior I, II. *Professor Shepardson and Mr. Dixon.* Practice in operation and care of boiler, engines, motors, dynamos and circuits of the University lighting plant. Nine runs of four hours each.
- XIX. *Journal reading.* [1,] Senior I. 36 hours; II. 36 hours *Professor Shepardson*
- XX. *Electric power.* Senior I. 54 or 72 hours. *Assistant Professor Springer.* For Civil, Mechanical and Mining Engineers. Elements of theory and practice of electrical measurements, wiring, dynamos, motors and electric lighting. Thirty-six lectures and recitations and forty-eight hours laboratory. Text-book: Shepardson, *Electrical Catechism.* Preparation required: physics, course I.
- XXI. *Dental electricity.* [2] Senior I. Dentists. 27 hours. *Assistant Professor Springer.* Electrical and magnetic units; electrical instruments and measurements; electro-dental apparatus. Recitations and experimental lectures. Text-books: Shepardson, *Electrical Catechism,* and Custer, *Dental Electricity.* For seniors in dentistry.
- XXII. *Electrical measurements of precision.* *Assistant Professor Springer.* Lectures and laboratory work. Precise measurements of resistance voltage, current, self-induction and capacity; standardization of measuring instruments.
- XXIII. *Illumination engineering.* *Professor Shepardson.* Lectures and laboratory work. Investigation of performance of electric and gas lamps, reflectors and diffusers; luminous efficiency, distribution, color characteristics, physiological phenomena. Methods of determining location, kind and quantity of lights for obtaining desired illumination.
- XXIV. *Telephone engineering.* *Professors Shepardson, and Eddy.* Lectures and laboratory work. Theoretical and experimental study of telephonic apparatus; lines and line phenomena, including induction, transpositions, loading coils, etc.
- XXV. *Alternating current phenomena.* *Professor Shepardson.* Lectures and laboratory work. Study of wave-forms, transient phenomena; oscillographic investigations; tests of apparatus.

## ENGINEERING AND MECHANICS.

FOR UNDERGRADUATES AND GRADUATES.

- I. *Applied mechanics.* [90] Junior I. *Professor Eddy.* Statics and dynamics including the laws of equilibrium, motion, work and energy as applied to rigid bodies, and a study of the strength and elastic properties of materials of construction required in the design of beams, posts, masonry arches and the equilibrium polygon. Open to students who have completed the work of the first two years in mathematics and physics.
- II. *Hydraulics and pumping machinery.* [90] Junior II. *Professor Eddy.* The laws of the equilibrium pressure and flow of liquids and gases; the theory of the action of pumps and air compressors. Open to those who have completed course I in applied mechanics.

- III. *Thermodynamics of steam and other engines.* [54] Senior I. *Professor Eddy.*  
The mechanical theory of heat as applied to steam, gas and oil engines, by analytical and graphical methods. Open to those who have completed courses I and II, in applied mechanics and hydraulics.
- IV. *Water turbines.* [36] Senior I. *Professor Eddy.*  
The general mathematical theory of hydraulic turbines, especially with reference to the design of the various types of reaction turbines as affecting their efficiency; turbine governors. Open to those who have completed course II in hydraulics.
- V. *Steam turbines.* [36] Senior II. *Professor Eddy.*  
The thermodynamics of the various types of steam, turbines, and theory of their design and construction. Open only to those who have completed courses II and IV on the steam engine, etc., and water turbines.
- VI. *Refrigerating machinery.* [18] Senior II. *Professor Eddy.*  
The thermodynamics of ammonia machines of the compression and absorption types, etc. Open to those who have completed course III in the steam engine.

## FOR GRADUATES.

Selections from the following list of courses in theoretical mechanics and mathematical physics will be offered each year to graduates (or possibly to undergraduates) of sufficient preparation in mathematics and physics according to the needs of the students applying and the amount of time at the disposal of the professor, with whom arrangements should be made at as early a date as possible.

- VIII. *Theory of elasticity.*  
IX. *Hydrodynamics and fluid motion.*  
X. *Kinetic theory of gases.*  
XI. *Potential function and electrical theory.*  
XII. *Fourier's Series, spherical harmonics, etc.*  
XIII. *Electro-magnetic theory of light.*  
XIV. *Theory of function of the complex variable.*  
XV. *Directional calculus and vector analysis.*

## ENGLISH LANGUAGE AND LITERATURE.

## FOR GRADUATES.

Courses in English Philology offered by Professor Klaeber.

- I. *Old English (Anglo-Saxon):* Grammar and Reading of Selections.  
II. *Critical study of the Beowulf.*  
III. *Introduction to the Middle English Language and Literature.*  
Related courses will be found under "Comparative Philology."

## FRENCH.

(Italian and Spanish.)

## FOR UNDERGRADUATES AND GRADUATES.

- V. *Lectures and conversations concerning the writers of the classical period and readings of works produced during this period, including La Fontaine, Corneille, Racine, Moliere; some modern authors will be read for the purpose of comparison.* *Mr. Frelin.*  
Open to those who have completed courses I and II or course III.
- VI. *Advanced French Conversation.* *Professor Benton and Mr. Frelin.*
- VII. *Lectures, in French, on the literature of the sixteenth century.* I, II  
*Professor Benton.*

The works of many of the writers of this century will be read and reports given in class, including Chateaubriand, Victor Hugo, Balzac, Renan, Taine, Bourget, Francois. Advanced French Composition.

- X. *Spanish, advanced.* I. II. *Mr. Melom.*  
Advanced grammar, Cervantes, Calderon, Lope de Vega.

## FOR GRADUATES.

- XI. *Romance philology. Old French.* *Professor Benton.*  
French and other Romantic languages from popular Latin. Reading old *sis des Auteurs Francais du Moyen Age*, par L. Cledat. Some of the oldest monuments of the French language interpreted and translated into modern French, such as *Serments de Strasbourg*; *La Vie de Saint Alexis*; *La Cantilene d'Eulalie*; the chronicles of *Villehardouin*, *La Chanson de Roland*, *Froissart*. Phonetic changes studied and their laws examined. Special attention is given to those forms which have entered into the English language. This course is especially valuable to students in English philology.
- XII. *History of the drama.* *Professor Benton.*
- XIII. *Italian. Dante's Divine Comedy.* *Professor Benton.*
- XIV. *Old Spanish.* *Professor Benton.*  
Development of Castilian dialect. *El Poema del Cid.*

## GEOLOGY.

## FOR UNDERGRADUATES AND GRADUATES.

- III. *Industrial geology.* Junior or senior II. *Professor Hall and Mr. Ball.*  
(a) The relations of the natural development of North America to its physical structure.  
(b) The geography of Minnesota in its relations to the industrial resources and development of the state.  
Open to those who have taken course I or II.
- IV. *Geology of Minnesota.* Junior or senior II. *Professor Hall.*  
(a) An historical survey of the facts and principles of pre-Cambrian geology as exemplified in the geological features of the Lake Superior region and of Northern and Eastern Minnesota.  
(b) A discussion of the geology and mineral resources of the state, particularly with reference to its deposits of clay, building stones and ores.  
Open to all who have taken course I.
- VII. *Paleontology. Senior I, II.* *Assistant Professor Sardeson.*  
The chief types of organisms as represented by fossils will be studied successively. The leading fossils and their phylogenetic history will be treated with considerable detail. Lectures and demonstrations. Open to students of geology and biology.
- VIII. *Paleontologic practice.* Senior I, II. *Assistant Professor Sardeson.*  
The course may be taken by advanced students in geology and biology in conjunction with course VII. Exercise in the preparation and study of materials; examination of collections, and reading will be carried on with a view to more complete knowledge of the groups of fossil organisms as presented in course VII. Laboratory, and field work.
- X. *Petrography.* Junior or senior II. *Mr. Parsons.*  
An investigation of the megascopic and microscopic characters of crystalline rocks; a discussion of their habit, mineral composition and genetic relations. The course discusses the historical succession and broader stratigraphic relations of rocks; it also extends into an examination of some Minnesota groups of crystallines. Practically a continuation of course IX. Laboratory, with lectures and reference reading.
- XII. *Ore deposits.* Junior or senior I. *Professor Hall.*  
History of mineral discovery and development in the Americas; a discussion of the origin and distribution of ore deposits, embracing the chemical processes involved in their formation and subsequent alterations; a description of the geology and mineralogy of ore bodies, particularly those yielding gold, silver, copper, iron, lead and zinc.
- XIV. *Special problems.* Senior II. *Professor Hall.*  
The investigation by individual students of particular problems, involving the field work of an investigation of some particular for-

mation and with the laboratory investigation and reading incident to the study of the material collected. The methods of systematically recording and interpreting geological and mineralogical data as observed in the field, the keeping of note-books and the preparation of geological maps, profiles and sections will be taught.

## FOR GRADUATES.

- XVI. *Petrographical problems.* Professor Hall and Mr. Parsons.  
A study of rocks as geological bodies; the genesis of rocks and their chemical and dynamical alterations. Illustrated in the gneisses and gabbro schists of the Minnesota river valley or the granites and basic eruptives of central Minnesota.
- XVII. *The Keweenaw eruptives.* [1] Professor Hall and Mr. Parsons.  
Of eastern and northeastern Minnesota, their stratigraphic relations, textural and structural characters; or other problem to be selected on consultation.
- XVIII. *Glacial geology.* I. Professor Hall.  
The local features of glacial phenomena. Field work will form the special feature of this course, embracing the formations at Minneapolis or some area accessible from it, as a survey of the glacial lakes in the vicinity, the gorge of the Falls of St. Anthony, the Dalles of the Saint Croix and other problems. The special field to be selected on consultation.
- XIX. *Palaeontologic geology.* Assistant Professor Sardeson.  
A study of the Ordovician fauna with special illustrations from the Ordovician of Minnesota and neighboring states.
- XX. *Palaeontology.* Assistant Professor Sardeson.  
The study of a selected group of fossils; a practical acquaintance with the forms and literature of the group is sought. The course is to be supplemented by a thesis.

## MINERALOGY.

## FOR UNDERGRADUATES AND GRADUATES.

- IV. *Optical mineralogy.* Junior or senior I. Mr. Parsons.  
A study of the microscopic structure of crystals and crystal grains. An application of methods used in determining minerals by their optical properties; goniometric and stauroscopic practice, embracing the elements of lithology. Lectures and laboratory work.
- V. *The morphology of minerals.* Junior or senior II. Mr. Parsons.  
A study of crystallography, embracing projection and the geometric relations of crystal planes. The identification of minerals from crystal measurement and mathematical calculation. Crystal nomenclature.
- VI. *Physico-chemical methods with their applications.* Senior I. Mr. Parsons.  
The method of micro-chemical analysis described and demonstrated; the leading elements found in minerals are determined through the aid of crystalline precipitates of known compounds. Special attention is given to the study and determination of the rock-making minerals.
- VII. *An outline of mineralogy.* [1] Junior or senior. Mr. Parsons.  
A study of methods of identification of minerals, with their applications. Conferences, reading and demonstrations. Throughout the year.
- FOR GRADUATES.
- VIII. Professor Hall and Mr. Parsons.  
Original problems in morphological and physical mineralogy. Investigations in mathematical crystallography and its application to crystal development and structure. Further applications than are made in course IV of the optical characters of minerals in identification of mineral species.
- IX. Mr. Parsons.  
Special investigations in physical and chemical mineralogy. Special attention is here given to tenacity and electrical properties and their relation to crystal form, cleavage and fracture. Dimorphous compounds are investigated and the conditions governing their formation studied. The physical properties of artificial mineral compounds are compared with those of natural minerals.

- X. *Professor Hall and Mr. Parsons.*  
Description of mineral occurrence and association. Genetic relationships. Field work in connection with the different phases of the particular problem in hand.  
The equipment of the Department of Geology and Mineralogy is sufficient for many lines of graduate work. The department has collected from many localities, both within and without the state, and the Geological Survey made extensive collections during the years of its active field work. The material thus gathered, the published literature on the state and the field within easy access from the University afford suggestions of unsolved problems in a number of different geological lines.

## GERMAN.

## FOR UNDERGRADUATES AND GRADUATES.

- X. *Modern authors. German literature of the Nineteenth century.* Pre-requisite, course IX. I, II. *Professor Moore.*  
First semester.—Romantic school and Junge Deutschland.  
Second semester.—German literature since 1848.
- XI. *History of German literature.* Prerequisite course IX. I and II. *Mr. Juergensen.*  
Lectures in German. Reviews and topical research on the part of the students.
- XII. *Seminar in German drama.* [1] I, II. *Professor Schlenker.*  
This course aims to give in outline the history of German dramatic literature from its beginnings to, and including, the classic drama. Open to graduates; also, by permission of the instructor, to undergraduates, but without credit.
- XIII. *History and literature of the Reformation.* Prerequisite, course X. I, II. *Professor Moore.*  
Readings from Brandt, Luther, Hutten, Sachs, Murner and Fischart. Selections from the histories of Jansen and Egelhaaf.
- XIV. *Middle High German.* I, II. *Professor Schlenker.*  
Study of the language and literature of the period. Paul's Mhd. Grammatik. Selected readings from Der Arme Heinrich, Niebelungen Lied, Gudrun, Walter Von der Vogelweide, etc.

## FOR GRADUATES.

- XV. *The German Volkslied.* *Mr. Williams.*  
Outline of the history and development of the Volkslied. Study of selected numbers in Uhlands Volkslieder with references to other general and special collections. Influence of the folk-song upon lyric and ballad writers.
- XVI. *Lessing and the Age of Enlightenment.* *Professor Moore.*  
Reading of Lessing's critical and controversial writings.

## GREEK.

## FOR GRADUATES.

- XVIII. *Advanced Course in Poetry.*  
Epic and Lyric Poetry *Professor Hutchinson*  
Dramatic Poetry *Professor Brooks*
- XIX. *Advanced course in Oratory* *Assistant Professor Savage.*
- XX. *Later Greek (322 B. C.—200 A. D.)* *Professor Hutchinson.*
- XVII. *Advanced course in Modern Greek.* *Professor Brooks.*  
Inasmuch as the exact nature of the work will differ with the desires and purposes of the applicants who must be dealt with individually, it has not been thought best to attempt a more specific statement than the above. No undergraduate courses in Greek will be accepted as part of the work leading to an advanced degree.

## HISTORY.

## FACILITIES.

The Department of History is equipped with library material for "practice courses" in research in American History, especially the colonial and revolutionary periods, in English and French medieval history, in the French Revolution, and in certain phases of European Nineteenth Century history. Valuable additions to the University resources in some of these lines are to be found in the excellent Library of the State Historical Society, and in the State Library at the Capitol in St. Paul (thirty minutes distant), and in the City and Athenaeum libraries in Minneapolis.

In none even of the lines mentioned, however, is the Department satisfactorily prepared to give more than two years of graduate work, with due regard for economy of the student's time and energy. Therefore, if a student desires to take his doctorate in history here, he must be prepared, until the library facilities are materially improved, to do at least a third of his work in libraries elsewhere, under direction of the Department.

## COURSES OF INSTRUCTION.

The following are "general courses" (lectures and reading, with study of selected documents and some research work). They are open to upper classmen in the undergraduate college who have completed one or two elementary courses there, and they may be taken as minors, or parts of minors, for the master's degree. Any one of them may be taken, also, for part of a major towards the master's degree, provided, (1) that the applicant has made large general preparation in other fields of history, and, (2) that the course chosen be accompanied by sufficient work in more intensive courses in the same field. (Thus if an applicant is well prepared in European history, including English constitutional history, but has had little American history, he might be allowed a major in it followed by two, three, or four courses selected from VII-XIV.)

III. *The Renaissance and Reformation.*I. *Assistant Professor White.*

Open to those who have completed either I or II, and a desirable preparation for IV.

The Renaissance and Reformation will be studied as general European movements, with the emphasis upon the work of individual men and upon ideas rather than upon politics and institutions. The purpose of the course will be to show how the medieval world became the modern world.

IV. *Europe since 1789.*I, II. *Professor Anderson.*

Open to those who have completed course I or II. The entire class meets twice each week for lectures or recitations. The third exercise is devoted to the study of important historical documents, drawn principally from Anderson's Constitutions and other Select Documents illustrative of the History of France, 1789-1901. This work is done in small groups which meet in the European history seminar room.

The history of France occupies the most prominent place in the course, that of other countries being grouped about it, as far as possible. Much attention is given to international affairs, the principal territorial changes being illustrated with a series of wall maps prepared for the course under the direction of the instructor. A special effort is made to put the students into a position to understand the present governments and politics of the leading European states.

V. *Constitutional history of the United States to 1840.* I, II. *Professor West*

Open to those who have completed course II; and required for courses VI-IX, and for XI, XIII, and XIV. The aim is to make this a "practice course;" the work is done partly by co-operative topical reports, and students are expected to consult primary sources to a greater degree than is possible in most undergraduate courses. During part of the year the class will meet once a week in small sections for the study of documents.

VI. *American History, 1841-1885.*II. *Professor Anderson.*

Open to those who have completed, or are pursuing, course V. Special attention is given to the development of the slavery issue in politics, the political history of the Civil War and reconstruction.



**XV. Historical method and bibliography.** [2] **II. Assistant Professor White.**

Open to those who have completed course I or course II. The course is designed especially for those intending to do advanced work in history. It aims to make clear to the students the genesis of the modern historical method and to introduce him in a practical way to the use of the best tools in historical study. The work divides naturally as follows:

1. Exercises in historical criticism and interpretation. One or more important historical sources will be studied intensively by the class.
2. History of historical writing; especially the work of Von Ranke and his followers and the origin of the seminar system. Some account will be taken of present methods and advantages of study in Germany and France.
3. Bibliography. Purpose, to gain a working knowledge of existing helps to historical study, such as standard bibliographers, historical magazines, source material, etc.

While the knowledge of Latin or the modern languages is an advantage, it is not a necessity in this course.

**XX. English history, 1660-1905.** **I. Professor Anderson.**

Open to those who have completed course II. The period from 1660 to 1815 is covered in a rapid survey. From 1815 the work is more intensive, the topics and readings affording an opportunity to become acquainted with the principal British reviews and with two or three of the leading newspapers.

**XXI. Greek history.** **I. Assistant Professor Westermann.**

Especial attention will be given to the period following Alexander's conquests.

The following courses are "intensive" or "advanced" courses. Each one of them requires the completion of the corresponding "general" course in the list above. They may be taken, in proper combinations, for majors for the master's degree, or, by ones or twos, for minors.

**VII. The making of the constitution of the United States.** **I, II. Professor West.**

Open to those who have taken course V with distinction, and to graduates. Each member of the class studies in detail the transition in one of the original colonies to commonwealth government, with the constitution of his chosen state. The work of the Philadelphia convention is then taken up and the accounts of later writers are compared with the sources. "We the people," the "compact" theory, and the province of the supreme court as "final arbiter," are topics especially investigated, with such further aids as the writings of the day and the discussions of the ratifying state conventions afford. Besides the class work each student will present a written report upon the history of some important bill providing for the admission of a state, and some constitutional question in connection with congressional legislation.

**VIII. American history since 1789 as shown in the development of constitutional law.** **Professor West.**

In alternate years, not offered in 1906-07. Open to seniors who have completed course V, to graduates, and to qualified law students. Course VIII is a desirable preparation. This course is not designed to be a systematic treatment of either history or constitutional law. It consists of a careful analysis of cases selected from Thayer's Cases on Constitutional Law, studied in their historical setting and with reference to the course of development.

**IX. Studies in American biography.** **I. Professor Anderson.**

Open to seniors who have completed course V and to graduates. In this course the work will each year center about the political activity of a single important character. In the choice of a subject two points will be especially borne in mind.

1. To select a character not only important *per se* but representative of some great historical movement or idea.
2. To select one who has left an abundance of material, valuable not only for his own part, but throwing light upon the action of others.

It is the aim to give each member of the class an opportunity to work up carefully topical divisions of the field and some acquaintance with the entire body of writings relating to the subject. Not given in 1906-07. When next offered, the subject will be Thomas Jefferson.

- X. *A critical study of historical masterpieces.* II. Professor Anderson.  
Open to undergraduates who have taken two courses in history, and to graduates.  
The object of this course is to develop the habit of reading history critically. Each year a masterpiece of historical literature will be minutely and critically studied. Every student will be required to read critically the entire work studied and in addition, to analyze and report upon assigned portions of it. These reports will be made the basis of the class work, which will consist mainly of discussions carried on by the students under the direction of the instructor. Not given in 1906-07.
- XI. *The history of American diplomacy.* I. Professor Anderson  
Offered to seniors and graduate students who have had two courses in history or one in history and one in international law. History V is the best preparation. The course is designed to afford instruction upon the following matters: (1) The organization and methods of the diplomatic corps. (2) The history of the most important diplomatic negotiations. (3) The effect of the foreign policy upon the internal affairs of the country.
- XII. *The history of European diplomacy since 1789.* II. Professor Anderson.  
Offered to seniors and graduate students who have had two courses in history or one in history and one in international law. History IV is the best preparation.  
Ability to read easy French is required. The course centers about a critical reading of the principal treaties.
- XIII. *Colonial expansion and administration.* II. Professor West.  
Open to those who have completed IV or V. The history of the colonial acquisitions of the great nations will be surveyed rapidly, and colonial institutions and governments will be studied and compared in detail.
- XIV. *A critical study of authorities for early New England history—based upon a reading of Winthrop's New England.* [2] 1, II. Professor West.  
Open to graduates and seniors who have completed course V. This is primarily a course in historical criticism. Each member of the seminar has a group of secondary authorities assigned him which he is to criticize in the light of the original sources. The study involves also a careful comparison of the chief sources with each other, and incidentally it leads to a minute treatment of political, social and economic development in early New England. The number admitted to the course is strictly limited to eight. Given in alternate years.
- XVIII. *The Beginnings of the English Judiciary.* II. Assistant Professor White.
- XIX. *Expansion of America as studied in its highcays of immigration.* I, II. Assistant Professor McDonald.  
Open to students who have completed course V and to qualified graduates. This is a study of roads and methods of pioneer travel in that westward movement of population which extended the inhabited area of the United States from the seaboard to the Mississippi valley.  
Not offered in 1906-7.
- XXII. *An intensive course on some topic in Greek history,—the subject to be varied from year to year.* II. Assistant Professor Westermann.

## LATIN.

FOR UNDERGRADUATES AND GRADUATES.

- I. *Teachers' course in Caesar.* Professor Pike.  
A review and drill upon Books I-IV, of the Gallic war.  
A review of Grammar and elementary Latin composition; a discussion of various problems connected with teaching.
- II. *Teachers' course in Virgil.* Professor Pike.  
A review and drill upon Books I-VI of the Aeneid, a review of Prosody and practice in the quantitative method of pronouncing Latin verse.
- III. *Advanced Latin composition and lectures on Latin style.* Professor Pike.

- IV. *Virgil's Aeneid Books VII- XII.* Professor Pike.  
The instructor will translate and comment. The student will not be required to prepare a translation but will be expected to read the Latin understandingly after the instructor's explanation.
- V. *Roman Elegiac Poetry.* Professor Clark.  
Selections from Catullus Tibullus, Propertius and Ovid will be translated with a study of the rise, development and characteristics of Roman Elegiac poetry.
- VI. *Correspondence of Cicero.* Professor Clark.  
Reading course in the Letters of Cicero with a study of his life and of the history of his times.
- VII. *Roman Satire.* Professor Clark.  
Juvenal, Persius, Horace and the Fragments of early Satire with a study of the rise, development and nature of Roman Satire.  
Of these courses Nos. III, V, VI. and VII are open only as minors to graduate students. Nos. I, II, and IV are open as minors only on permission of professor in charge.

## FOR GRADUATES.

- VIII. *Lucretius.* Professor Clark.  
Translation and interpretation of the VI Books "de rerum natura" with a study of his philosophy in its relation to his sources and to other Roman writers.
- IX. *Outlines of Roman law.* Professor Clark.  
Reading of "Robinson's Selections of Roman Law" and of the first book of "The Institutes of Justinian" with lectures and topical study of Roman private law.
- X. *Graduate seminar.* Professor Pike  
Interpretation of the Epistles of Seneca with a study of Stoic Philosophy at Rome.
- XI. *Orations of Cicero.* Assistant Professor Granrud  
Reading and interpretation of a few representative speeches. Special attention will be devoted to the technique and the language and grammar of the orations.

## LAW.

## FIRST GRADUATE COURSE.

- I. Dean Pattee.  
The first course offered for the degree of Master of Laws is that of the *Philosophic Basis of Jurisprudence*. This course constitutes an inquiry into the nature of law in its most general signification. It considers the truths of reason, the "laws of nature" so-called, and the positive law or Jurisprudence. It considers the nature of International and Municipal law, and illustrates by means of judicial authorities how the primary truths of reason operate in the realm of human law.
- II. Professor Fohwell.  
*Science of the State.*  
This course considers the segregation from the comprehending science of politics, and the co-ordinate sciences of government and jurisprudence. The citizen and subject population; the territory, its extent and content, subdivisions, relation of people to the land, comparison of great and small states; theories of the state; liberty and opportunity as the ends of the state; the state as the organ of power, and guardian of rights; the essential of constitutions.
- III. Judge Pierce.  
*Constitutional history and jurisprudence.*  
This course is devoted to a critical study of the "dual system" of constitutional government of which the American Republic is the conspicuous example. The Federal constitution and the State constitutions are illustrated separately, in both their historical and their legal aspects, as distinct parts of one system, but which are designed to work harmoniously in unison, and are both necessary to the successful operation of the system. The Federal Courts are shown to have so conducted their administration of their high

duties as to have contributed to the proper development of the State side of the system, and to have made the Federal Government the firm bulwark of local self-government in the States.

Those who enter this course as candidates for the degree must have already received the degree of bachelor of laws, from this or some other law college having a three years' course of study. Those who spend the entire year in the work prescribed for this course, and pass a satisfactory examination upon the subjects taken, will be entitled to the degree of master of laws.

But no graduate of another law school, who has not been admitted to the Bar in Minnesota, will be matriculated in this course as a regular student for the degree of LL. M.; but any person who possesses the requisite legal learning may enter the course as a special student and pursue any or all of the studies offered.

## SECOND GRADUATE COURSE.

Students who have received the degree of LL. B., from this or some other law school requiring three years' study of law for said degree, and who have also received the degree of LL. M., from this or some other school after not less than one year of graduate study, and who have taken high rank in all the studies leading to these degrees, may apply to the faculty for the degree of Doctor of Civil Law. A knowledge of French or German, as well as of Latin is required, and special proficiency in Roman history is necessary to entitle a student to candidacy for such degree.

There is no prescribed time within which students are required to do their work in this course, but they must make themselves proficient in the subjects of Roman law, political science, comparative constitutional law, and the philosophy of jurisprudence before any thesis will be accepted from them.

None of the aforementioned degrees will be conferred until a satisfactory thesis is presented to the faculty by the student, and the thesis for the doctor's degree must be one evincing original investigation and special excellence.

Whether a class will be organized in this course during the academic year of 1906 and 1907 will depend upon the number of applicants for admission.

## MATHEMATICS.

### FOR UNDERGRADUATES AND GRADUATES.

- VIII. *Curve tracing.* I. *Professor Downey.*  
By aid of the calculus. Open to those who have completed the first six courses.
- IX. *Differential equations.* [3 and 2] I. *Dr. Manchester.*  
Open to those who have completed the first seven courses.
- X. *Solid analytical geometry.* [3 and 2] I, II. *Assistant Professor Bauer.*  
The plane, the straight line in space, quadric surfaces, applications.  
Open to those who have had the first seven courses.
- XIII. *Method of least squares.* [2] *Professor Leavenworth.*  
A study of the combination and adjustment of observations and the discussion of their precision as applied especially to engineering, physics and astronomy. Open to those who have completed the first seven courses.

### FOR GRADUATES.

- XVI. *Advanced differential and integral calculus.* [2] *Professor Downey.*  
This course goes farther into some of the subjects treated in courses VI. and VII. and takes up some important subjects not included in those courses.
- XVII. *Theory of curves and surfaces.* [2] *Assistant Professor Bauer.*  
This is a course in Differential Geometry. The fundamental equations of the theory of curves and of surfaces will be developed. The work will be based upon Scheffer's *Theorie der Curven* and *Theorie der Flaechen.*
- XVIII. *Theory of functions of a complex variable.* [2] *Dr. Manchester*  
Lectures, readings and problems. The course presupposes a knowledge of Differential and Integral Calculus and Differential Equations.

- XIX. *History of mathematics.* [2] *Professor Haynes.*  
Lectures and reading, under direction, of works in the mathematical library on the ancient and modern development of mathematics.
- XX. *Projective geometry.* [3] *Assistant Professor Kirchner.*  
A study of the theories and methods of Projective geometry. Perspective, homology, duality, cross-ratios, involution, reciprocals, conics, systems of conics, ruled surfaces, and special problems and exercises.
- XXI. *Perspective.* [3] *Assistant Professor Kirchner.*  
The principles and practice of perspective, including shadows, reflections, distortions, corrections, systems, methods, the practical problem, and inverse constructions.

## MECHANICAL ENGINEERING.

FOR UNDERGRADUATES AND GRADUATES.

- VIII. *Shop economics.* Senior II. 36 hours. (Elective.) *Professor Flather.*  
Shop and factory organization and management; cost systems.
- XI. *Machine Design.* Junior I and II. 216 hours. *Professor Flather and Mr. Oliver.*  
Calculation and design of such machine parts as fastenings, bearings, rotating pieces, belt and tooth gearing. Recitations, lectures and drawing-room practice. Open only to students pursuing course I in mechanics.
- XII. *Machine design.* Junior II. 72 hours. (Second half semester.) *Professor Flather and Mr. Oliver.*  
Application of graphical methods to the design of valve gears and link motions; Zeuner diagrams, indicator cards. Lectures and drawing-room practice. Open only to those pursuing course XVIII.
- XIII. *Machine design. Steam engine.* Senior I. 144 hours. *Professor Flather.*  
Calculations and working drawings for a high speed automatic steam engine. Theoretical diagrams and determination of details. Preparation: Courses XII and XVII.  
*Gas engine.* An alternative course in gas engine design is offered those who have completed course XIX.
- XIV. *Machine design.* Senior II. 144 hours. *Professor Flather.*  
Original designing, including machinery for changing size and form. Boiler design, cranes, pumping and transmission machinery and engineering appliances. Lectures, problems and drawing-room practice. Preparation: course XI.
- XV. *Tool design.* Senior I or II. 72 or 144 hours. *Professor Flather.*  
Design of special tools for manufacturing interchangeable parts; jigs and milling fixtures. Preparation: courses V and XI.
- XVI. *Engineering design.* Senior II. 72 or 144 hours. *Professor Flather.*  
Problems, designs and estimates for power plants, central stations and factory equipment. Selection of motive powers, pumps, shafting, piping and accessory plant. Preparation: courses XVII, XVIII, and XIX.

## STEAM ENGINEERING.

- XVII. *Steam boilers.* Junior I. 18 hours. *Professor Flather.*  
Application of theory and practice in the design and construction of steam boilers, chimneys, boiler settings and accessories, smoke prevention, mechanical stokers; methods of operating boilers with safety and economy. Open only to students pursuing course I in mechanics.
- XVIII. *Steam engine.* Junior II. 54 hours. *Professor Flather.*  
Mechanics of the steam engine. Work in the cylinder; effect of reciprocating parts; steam distribution. Mechanism of the steam engine. A study of the details of modern steam engines. Valves and valve gears. A study of the slide valve, link motions and other reversing gear; automatic cut-off gears and the Zeuner diagram. The steam engine indicator. Principles and operation of the instrument, indicator rigging; indicator cards; compounding. Preparation, course I. in applied mechanics.

- XIX. Gas engines and producers.** Junior II 36 hours. *Mr. Oliver.*  
Principles of operation of two cycle and four cycle engines; cylinder construction and arrangement; valve gears and starting mechanisms; system of speed control, ignition and cooling. Application of the indicator and consideration of indicator diagrams.
- A study of the power gas producer including suction and pressure types for various fuels; construction and operation of the generator and accessory apparatus. Application to various industrial purposes. Recitations and lectures. Open only to students pursuing course V in chemistry.
- XXIII. Mechanical engineering.** Senior I. 36 hours. *Professor Flather.*  
**Measurement of power.** A study of the methods employed in measuring power. Dynamometers, Prony brakes; measurement of water power; water meters; weir measurement, flow of water in pipes; measurement of electric power, efficiency of motors; power required to drive machine tools and shafting. Recitations and lectures. Preparation, course II in applied mechanics.
- Air compressors and motors,** and the transmission of power by compressed air. Recitations and lectures. Preparation, course II in applied mechanics.
- XXIV. Mechanical engineering.** Senior I. 36 hours (Elective.) *Mr. Oliver.*  
**Heating and ventilation.** Principles of heating and ventilation. Construction and operation of heating apparatus. Steam, hot water, exhaust, vacuum and fan systems. Lectures, recitations and problems.
- Journal Club*—Open to the seniors and juniors. Once a week.

## MECHANICAL ENGINEERING LABORATORY.

- XXV. Strength of materials.** Junior I. 72 hours. *Assistant Professor Kavanaugh and Mr. Shoop.*  
Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams. Open only to students pursuing course I in mechanics.
- XXVI. Mechanical laboratory.** Junior II. 72 hours. *Assistant Professor Kavanaugh and Mr. Shoop.*  
Continuation of course XXV; also exercises in valve setting, indicator practice, calibration of steam gauges, calorimetry, efficiency of screws and hoists. Preparation: course XXIII.
- XXVII. Hydraulic laboratory.** Junior II. 72 hours. *Assistant Professor Kavanaugh and Mr. Shoop.*  
Hydraulic measurements, calibration of weirs, nozzles, orifices and meters, tests of water meters, rams, pulsometers, pumps and other hydraulic apparatus. Preparation: course XXV.
- XXVIII. Mechanical laboratory.** Senior I. 108 hours. *Assistant Professor Kavanaugh and Mr. Shoop.*  
Calibration of dynamometers and other apparatus. Testing lubricating value of oils; tests of injectors, steam-engines and boilers, and complete power and lighting plants. Preparation: course XXV.
- XXIX. Mechanical laboratory.** Senior I. 108 hours. *Assistant Professor Kavanaugh and Mr. Shoop.*  
Hydraulic measurements, calibration of weirs, nozzles, orifices and meters. Tests of water motors, rams, pulsometers, steam pumps and other hydraulic apparatus. Calibration of dynamometers and other apparatus. Testing lubricating value of oils; tests of injectors, steam-engines and boilers. Preparation: course XXVI.
- XXX. Mechanical laboratory.** Senior II. 144 hours. *Assistant Professor Kavanaugh and Mr. Shoop.*  
Tests of gas and hot air engines; gas producers; air compressors; automobile and locomotive testing and other special work. Preparation: course V in chemistry, and XXVIII.
- XXXI. Mechanical laboratory.** Senior II. 72 or 144 hours. (Elective.) *Assistant Professor Kavanaugh and Mr. Shoop.*  
Special research work and commercial tests.

- XXXII. *Mechanical laboratory.* Senior II. 72 hours.  
*Assistant Professor Kavanaugh and Mr. Shoop.*  
 Special modification of courses XXIX and XXX, covering work in hydraulic measurements, steam engine and boiler testing for students in mining and metallurgy.

## FOR GRADUATES.

## RAILWAY MECHANICAL ENGINEERING.

The following courses are available to seniors desiring to prepare themselves for special work in railway engineering.

- XXXIII. *Railway technology.* Senior I. 72 hours  
*Assistant Professor Kavanaugh.*  
 The object of this course is to familiarize the student with the principal details of construction of locomotives, and consists of a systematic course of shop visits carried on in the various railroad shops in the vicinity, supplemented by lectures and recitations.
- XXXIV. *Railway design.* Senior II. 144 hours. *Professor Flather.*  
 (a) Of link and valve motions. Continuation of course XII with  
 (c) Of the locomotive boiler.  
 (d) Of assembled parts. Preparation: course XXXIII.
- XXXV. *Locomotive construction.* Senior II. 36 hours. *Professor Flather.*  
 Lectures, reading and recitations on design and construction of locomotives, supplementing course XXXIV. This treats—  
 (a) Of parts not involving the boiler and use of steam; but in special applications of the Stephenson link.  
 (b) Of locomotive and car details, including the carriage, as frames, springs and equalizing arrangements, running gear, brakes, trucks, lubrication.  
 (c) Of locomotive boilers and connected parts. Types, proportions, grates, flues, smoke-box arrangements and stacks. Riveted joints, bracing and staying. Lagging, smoke prevention.  
 (c) Of the locomotive engine. Details, heat insulation, cylinder proportions for various types, weight on drivers, special service; crank effort diagrams with inertia of reciprocating parts, cylinder and receiver ratios for compound engines, starting valves for compounds.
- XXXVI. *Locomotive road testing.* Senior II.  
*Professors Flather and Kavanaugh.*  
 (4) Advanced work will be given to graduate students in  
 (1) Engineering design.  
 (2) Experimental investigations in the Laboratory.  
 (3) Railway Engineering.

In each of these courses the student must satisfy the head of the department that he is able to satisfactorily carry on the work proposed.

This work will be largely a continuation of that laid down in the courses for undergraduate students, and will consist in original designing and experimental research along various engineering lines; studies and investigations relating to the economic administration of manufacturing plants; also special lines of investigation will be followed in connection with railway mechanical engineering. This will be accompanied by a similar line of work in the drawing room in which original problems will be taken up by the student.

## PHILOSOPHY AND PSYCHOLOGY.

## FOR UNDERGRADUATES AND GRADUATES.

- I. *Analytic psychology.* II. *Mr. Swenson.*  
 An advanced course treating in detail the more important problems of psychology.
- II. *Experimental psychology—the senses.* I. *Assistant Professor Miner.*  
 Four hours laboratory work and one hour discussion. Typical experiments on sensation and movement. [Not given 1906-7]
- III. *Experimental psychology—higher mental processes.* II.  
*Assistant Professor Miner.*  
 A continuation of course II. [Not given 1906-7]

- IV. *Psychological interpretations.* I. Assistant Professor Miner.  
Unusual and pathological mental states are studied for the light they throw on normal mental life. The sub-conscious, dreams, telepathy, hypnotism, secondary personalities, are among the topics treated.
- V. *Research in Psychology.* I. and II. Assistant Professor Miner.  
Original work on special topics.
- VII. *Ancient philosophy.* I. Professor Wilde.  
Lectures and reading of Greek philosophy.
- VIII. *Modern philosophy.* II. Professor Wilde.  
Lectures and reading of philosophy since the Renaissance.
- VIII. *The principles of ethics.* I. Professor Wilde.  
Systematic study of the principles of conduct.
- IX. *Philosophy of religion.* II. Professor Wilde.  
A study of the development and significance of religion.
- X. *Logic of science.* I. Mr. Swenson.  
A study of the presuppositions of the sciences.
- XI. *Philosophy of Spencer.* II. Mr. Swenson.  
A critical reading of the *First Principles*.

## FOR GRADUATES.

Courses from the following list will be offered to graduates each year as determined by the needs and qualifications of the students presenting themselves.

- I. *Philosophy of Aristotle.* Mr. Swenson.  
A critical reading of the *Metaphysics* in the Greek.
- II. *Philosophy of Kant.* Mr. Swenson.
- III. *Philosophy of Hume.* Mr. Swenson.
- IV. *Descartes, Spinoza and Leibnitz.* Mr. Swenson.
- V. *History of ethics.* Professor Wilde.
- VI. *Systematic ethics.* Professor Wilde.
- VII. *German idealism.* Professor Wilde.
- VIII. *Metaphysics.* Professor Wilde.
- IX. *Swedish Philosophy.* Professor Carlson.
- X. *Psychological problems.* Assistant Professor Miner.

## PHYSICS.

## FOR UNDERGRADUATES AND GRADUATES.

- I. *Mechanics, properties of matter, heat, sound.* [6] I. Professor Jones.  
Experimental lectures, recitations and laboratory work.  
Open to those who have completed Algebra and Trigonometry of courses III. and IV.
- II. *Light, electricity and magnetism.* [6] II. Professor Jones.  
Experimental lectures, recitations and laboratory work.  
Open to those who have completed course I.
- III. *Electric measurements.* [3] I. Professor A. Zeleny.  
Lectures and laboratory work.  
Open to those who have completed course II.
- IV. *Physical manipulations and laboratory technique.* [3] II. Professor A. Zeleny.  
Open to those who have completed courses I. and II.
- V. *Theoretical mechanics.* [3] II. Professor Jones.  
Open to those who have completed Calculus and course I.
- VI. *Advanced laboratory work.* [3] I. Prof. J. Zeleny.  
Open to those who have completed course II.



- VII. *Advanced laboratory work.* [6] I. Professor J. Zeleny.  
Open to those who have completed course II.
- VIII. *Advanced laboratory work.* [3] II. Professor J. Zeleny.  
Open to those who have completed course VI.
- IX. *Advanced laboratory work.* [6] II. Professor J. Zeleny.  
Open to those who have completed course VI.

FOR GRADUATES.

- X. *Kinetic theory of gases.* [3] Assistant Professor Erikson.  
Open to those who have completed course II.
- XI. *Radio-activity.* [3] Mr. Kovarik.  
Open to those who have completed course II.  
Advanced laboratory work. Open to those who have completed course VI.
- XII. *Discharge of electricity through gases.* [3] Professor J. Zeleny.  
Open to those who have completed course II.
- XIII. *The theory of light.* [3] Professor Jones.  
Open to those who have completed course II.
- XIV. *The mathematical theory of electricity and magnetism.*  
[3] Assistant Professor A. Zeleny  
Open to those who have completed course III.
- XV. *Laboratory practice* Professor J. Zeleny.  
investigation in some special field being the principal feature of this work.

These courses may not be given simultaneously. Students wishing to pursue one or more of these courses should consult the head of the Department.

POLITICS.

FOR UNDERGRADUATES AND GRADUATES.

- III. *The elements of jurisprudence.* I. Professor Schaper.  
A study of those human relations requiring legal regulation considered from the American point of view; the nature and sources of law, status, rights and wrongs, sovereignty, corporations, etc. The course is intended as a preparation for active citizenship as well as for the study of law. The student will practice looking up cases summarizing principles. The course is based on a text, with lectures and assigned reading.
- II. *Comparative government.* I. Professor Schaper.  
An account of the government as the agent of the state; a comparative study of the organization and workings of the governments of the great European powers of today, including the French, German, British and others. Text with lectures and assigned reading.
- IV. *American constitutional law.* [2] Seniors and graduates I and II.  
Professor Schaper.  
This is an advanced course in the study of the principles of our constitutional law based on important supreme court decisions and standard works.
- IX. *Politics and administration.* [2] I and II. Professor Schaper.  
A course in politics and administration throughout the year. A study of American administration as a branch of public law and as a science, including an examination of the extra-legal institution, the political party; its nature, organization, function, evils and reforms. Such topics as the initiative and referendum, proportioned representation and direct primaries versus the convention plan are taken up.
- VIII. *Theory of the state.* II. Professor Schaper.  
A study in the theory of the state, its origin, nature, purpose and its justification; the state on its physical side, that is, the elements of population and territory. Important theories, like the divine, contract, instinct, the modern socialistic, anarchistic and social welfare, are considered; also the question of state interference and state management of industries. It includes a study of

classification of states and of governments, of sovereignty, the origin, nature and classification of law. This course follows course I. A text book with lectures and topical readings.

- VII. *Municipal administration.* II. *Professor Schaper.*  
A comparative study in modern city charters and methods of administration. The relation of the city to the state, the delimitation of its sphere of activity, its liability for tort, and an investigation into the causes of corruption and merits of proposed reforms.
- FOR GRADUATES.
- XI. *Seminar in Political Science.* I and II. *Professor Schaper.*  
the discussion of current problems in administration, politics and public law.

## SCANDINAVIAN

FOR UNDERGRADUATES AND GRADUATES.

- VI. *Scandinavian literature.* *Professor Carlson.*  
History of the literature and a study of special authors.  
FOR GRADUATES.  
Courses offered by *Professor Carlson.*
- VII. *Icelandic or Old Norse.*  
The history, language and literature of Iceland and Norway from earliest times to 1500 A. D.
- VIII. *Old Swedish.*  
The history, language and literature of Sweden from earliest times to 1500 A. D.
- IX. *Old Danish.*  
The history, language and literature of Denmark from earliest times to 1500 A. D.
- X. *Modern Danish language and literature.*
- XI. *Modern Swedish language and literature.*
- XII. *Modern Norwegian language and literature.*

## SEMITIC LANGUAGES.

FOR UNDERGRADUATES AND GRADUATES.

- I. *Elementary Hebrew.* I, II. *Assistant Professor Deinard.*  
Harper's Elements of Hebrew and reading of easy prose passages of the Old Testament.
- II. *Advanced Hebrew.* I, II. *Assistant Professor Deinard.*  
Critical reading of some Old Testament book, with a review of Hebrew grammar.
- III. *Elementary Arabic.* I, II. *Assistant Professor Deinard.*  
Socin's Arabic Grammar and reading of the prose selections contained in it.
- IV. *Advanced Arabic.* I, II. *Assistant Professor Deinard.*  
Selected Suras of the Koran and a review of Arabic grammar.
- V. *Elementary Aramaic or Syriac.* I, II. *Assistant Professor Deinard.*  
Strack's Grammatik des Biblischen Aramaisch, and Brockelman's Syrische Grammatik.
- VI. *History of the Hebrews to the close of the Persian period.* I, II. *Assistant Professor Deinard.*  
Political, religious and social. The English Bible will be used as a text book, a careful study of the Palestinian and Assyro-Babylonian inscriptions will be made, and the works of some modern writers on Hebrew history will be consulted. No knowledge of any Semitic language is required for this course.

FOR GRADUATES.

Courses offered by *Assistant Professor Deinard*

- I. *Critical study of one of the following Old Testament books:*  
Isalah, The Minor Prophets, The P'salms, or Job.

- II. *Early Arabic poetry.*  
And the relation of the Arabic, grammatically considered, to the Hebrew.
- III. *Reading of the Aramaic portions of the Old Testament.*  
And a review of Aramaic grammar.
- IV. *History, prophecy and the monuments.*  
Studies in the early history of the Semites.

## SOCIOLOGY.

### FOR UNDERGRADUATES AND GRADUATES.

- V. *Social Groups.* I. Professor Smith.  
An examination of the clan and the village in primitive life, a study of demography to discover the effect of environment upon social organization, and a comparison with the nature of and reasons for the modern city.
- VI. *The Study of Institutions.* I. Professor Smith.  
The genesis of custom and the beginnings of law with the geographical and race influences in the growth of states, will be studied, as well as the various forms of the family and their relation to forms of civilization.
- VII. *Elements of Sociology.* I. Assistant Professor Jenks.  
This course is similar to I. but will be more exhaustive. Text books, lectures, assigned readings, and thesis. Open to Juniors and Seniors.
- VIII. *Anthropology.* II. Assistant Professor Jenks.  
An advanced course. A study of the different races of America, Asia, Africa, and Oceania: a description of the types of primitive culture; an investigation of the origin and development of various phases of culture areas of forest, plain, desert, and island; and a presentation of anthropological problems. Text books, lectures, assigned readings and thesis. Open to Juniors and Seniors.
- IX. *The Philippines.* I. Assistant Professor Jenks.  
This course will present the geography, physiography and resources of the Philippine Islands. A careful comparative study of the four large culture groups of people will be made; tropical influence will be noted; the present policy of the Insular Civil Government will be outlined, so far as it tends to modify the natural characteristics and the modern culture of the inhabitants. This course aims to present a model for the investigator of human culture, and to prepare students for government, business or missionary service in the Philippines. Lectures, illustrated lectures, assigned readings and reports.

## STRUCTURAL ENGINEERING.

### Courses offered by Professor Constant.

#### FOR UNDERGRADUATES AND GRADUATES.

- I. *Structural designs.* Prerequisite, courses in stresses and structural details.  
Senior I. 170 hours; II. 170 hours.  
Theory and design of steel structures, including railway and highway bridges, standpipes and towers, and other problems of structural interest. Theory of higher structures. Reference: Johnson's Stresses, Merriman's Part III and IV Bridge Series. Ten hours per week.
- II. *Masonry construction.* Prerequisite, I. Senior I. 136 hours.  
Properties of stones, bricks, cement and concrete, and their use in engineering structures. Foundations, retaining walls, piers and abutments, dams and chimneys. Theory of reinforced concrete. Theory and design of masonry arches. Design of stone and concrete structures. Lectures and textbook work, two hours per week; drawing room work, six hours per week. Reference books: Baker's Masonry, Church's Mechanics, and current periodical engineering literature.

#### FOR GRADUATES.

- III. *Swing and lift bridges.*  
Detailed study of mechanism and power for operating moving

bridges, and complete design, with working drawings for a swing or bascule bridge.

IV. *Higher structures.*

Theory and design of cantilever, suspension and arch bridges. Analysis of indeterminate structures and complex portal bracing. General theory of flexure and application to special problems.

THE COLLEGE *of* SCIENCE,  
LITERATURE *and* THE ARTS

# THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

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JABEZ BROOKS, D. D., *Senior Professor of Greek.*  
JOHN G. MOORE, B. A., *Professor of German.*  
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JOHN S. CLARK, B. A., *Professor of Latin.*  
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JOHN ZELENY, Ph. D., *Associate Professor of Physics.*  
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A. W. RANKIN, B. A., *Associate Professor of Education.*  
RICHARD BURTON, Ph. D., *Professor English Literature.*  
CAPT. EDWARD SIGERFOOS, Ph. B., U. S. A., *Professor of Military Science.*  
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ADA L. COMSTOCK, M. A., *Assistant Professor of Rhetoric.*  
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JOHN E. GRANRUD, Ph. D., *Assistant Professor of Latin.*

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 cution.*  
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 C. O. ROSENDAUL, *Assistant Professor of Botany.*  
 FREDERICK W. SARDESON, Ph. D., *Assistant Professor of Palaeontology.*  
 CHARLES ALBERT SAVAGE, Ph. D., *Assistant Professor of Latin and Greek.*  
 CARLYLE M. SCOTT, *Assistant Professor of Music.*  
 JOSEPHINE E. TILDEN, M. S., *Assistant Professor of Botany.*  
 ALBERT B. WHITE, Ph. D., *Assistant Professor of History.*  
 MATILDA J. WILKIN, M. L., *Assistant Professor of German.*  
 ANTHONY ZELENY, M. S., *Assistant Professor of Physics.*

## INSTRUCTORS.

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 EMMA BERTIN, *French.*  
 JOHN C. BROWN, M. A., *Animal Biology.*  
 OSCAR C. BURKHARD, M. A., *German.*  
 ANNA M. BUTNER, *Physical Culture.*  
 THOMAS CAHILL, *Rhetoric.*  
 FREDERIC D. CALHOUN, *Rhetoric.*  
 HENRIETTA CLOPATH, *Drawing.*  
 LILLIAN COHEN, M. A., *Chemistry.*  
 HANS H. DALAKER, B. A., *Mathematics.*  
 HAL DOWNEY, M. A., *Animal Biology.*  
 OTTO DUNKEL, Ph. D., *Mathematics.*  
 FRANCIS C. FRARY, M. S., *Chemistry.*  
 OSCAR W. FIRKINS, M. A., *English and Rhetoric.*  
 JULES T. FRELIN, B. A., *French.*  
 CHARLES M. HOLT, B. A., *Education.*  
 PERCY C. HUGHES, Ph. D., *Philosophy.*  
 LEULAH J. JUDSON, B. A., *History.*  
 HANS JUERGENSEN, *German.*  
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 LINDA H. MALEY, B. L., *Rhetoric.*  
 JAMES E. MANCHESTER, Sc. D., *Mathematics.*  
 CARL M. MELOM, M. A., *Spanish and French.*  
 LILLIAN NIXON, M. A., *Rhetoric.*  
 ARTHUR L. PARSONS, B. A., *Mineralogy.*  
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 BERT A. ROSE, *Band.*  
 ROYAL R. SHUMWAY, B. A., *Mathematics.*  
 EDWARD D. SOLENBERGER, Ph. B., *Lecturer in Economics.*  
 DAVID F. SWENSON, B. S., *Philosophy.*  
 JAMES E. TUTHILL, M. A., *History.*  
 CHARLES WILLIAMS, M. A., *German.*

SCHOLARS AND ASSISTANTS.

EDWARD ANDERSON, *Chemistry*.  
WALTER BADGER, *Chemistry*,  
FRANK M. BALL, B. A., *Geology*.  
WILLIAM E. BARNABY, *Chemistry*.  
CHARLES R. CRESSY, *Chemistry*.  
AGNES L. DEAN, *Chemistry*.  
JOHN P. DEVANEY, *Rhetoric*.  
JAMES DORAN, *Chemistry*.  
HELEN GRIFFITH, *Rhetoric*.  
C. H. HILL, B. A., *Chemistry*.  
DAISY HONE, *Botany*.  
EDWARD C. JOHNSON, B. A., *Botany*.  
A. W. KENNEDY, *Chemistry*.  
GUSTAVUS LOEVINGER, *Rhetoric*.  
HARRY LOVE, M. A., *Political Science*.  
WM. ALLISON MCMANIGAL, B. A., *Sociology*.  
JESSIE A. MATSON, *Physical Culture*.  
CLAUDE G. MINER, B. A., *Geology*.  
H. M. NEWTON, *Chemistry*.  
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IRVING D. ROBINSON, *Chemistry*.  
JESSIE SCHULTEN, *Rhetoric*.  
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EDWARD F. SWENSON, *Political Economy*.  
EDITH VON KUSTER, *Chemistry*.  
HANS WALCHLI, *Education*.  
JAMES T. WATTS, *English*.  
RODNEY WEST, B. A., *Chemistry*.  
A. D. WILHOIT, M. S., *Chemistry*.

FACULTY COMMITTEES

*Enrollment*: PROFESSORS HUTCHINSON, ANDERSON, BAUER, SAVAGE, LYON.  
*Curriculum*: PROFESSORS MOORE, WEST, SIGERFOOS, MACMILLAN, CLARK.  
*Graduate Studies and Degrees*: PROFESSORS EDDY, BROOKS, FOLWELL, NACHTRIEB, WILDE, KLAEBER, HUTCHINSON (ex-officio).  
*Program*: PROFESSORS SCHLENKER, LEAVENWORTH, TILDEN.  
*Students' Work*: PROFESSORS DOWNNEY, PIKE, NICHOLSON, WHITE, COM-STOCK.  
*Relations of the University to the Public Schools*: PROFESSORS JAMES, SCHAPER, BENTON, HALL, CARLSON.  
*Music, Public Lectures and University Functions*: PROFESSORS FRANK-FORTER, SCHLENKER, POTTER, SIDENER, WILKIN.  
*Debate and Oratory*: PROFESSORS McDERMOTT, SANFORD, WILLIS, SARDE-SON.  
*University Extension*: PROFESSORS McVEY, JAMES, JONES, GRANRUD, OEST-LUND.  
*Catalogue*: PROFESSORS WEST, McVEY, ZELENY, HARDING, THE REGISTRAR.



Regulations Governing Admission to the College of  
Science, Literature and the Arts

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EXAMINATION IN ENGLISH.

Every applicant for admission to this college must take an examination in Writing, Spelling, and English Composition. An examination will be given in two parts, the second of which is optional.

Part I. Elementary. Those who fail to pass this examination satisfactorily are required to take a special three-hour Preparatory Course in Rhetoric through their first year, or longer if necessary. This work will not receive credit toward a degree. Students pursuing it shall not take more than the maximum of seventeen hours of work a week, including this course. These students must take Freshman Rhetoric, but not until the preparatory work has been completed; but at any time during the first half of the first semester the Department of Rhetoric may transfer promising students from the Preparatory Rhetoric class to the regular Freshman Rhetoric.

Part II. Advanced. This is designed as a test of ability to express thought in a clear and orderly manner and of a fair knowledge of Elementary Rhetoric. This test is not obligatory: it may or may not be taken, as the student prefers. Those who do not take it, and those who fail to pass it with a grade of "Good" or "Excellent," shall be registered for Freshman Rhetoric as a required subject. Those who pass this test with a grade of "Good" or "Excellent" are not required to take Freshman Rhetoric.

The entrance examination (both Parts I and II) will be given twice a year at the University in the Chapel in the Library Building, once on the next to the last Saturday in May at 9 a. m., and once on the Wednesday of examination week in September, at the same hour.

This examination will be sent also to the Principals of State High Schools and other accredited schools in the state, to be offered in each case at the option of such Principal, to members of the senior class who expect to enter the University. If, for the convenience of his students, the Principal elect to offer the examination, it must be given on the date assigned and under the rules which govern State High School Board examinations. All papers must be sent, immediately after examination, to the registrar of the University and will be marked by the proper University authority.

Students who enter the Freshman class after the regular September

examination, without having passed either test in English, may be given a special test, if the Department of Rhetoric thinks fit, or shall be registered for Freshman Rhetoric, with the provision that, if found deficient during the first six weeks, they shall be dropped into the Preparatory Rhetoric class. Such students must be prepared to suffer any other change in registration necessitated by the program and the rules of the college.

#### PREPARATION REQUIRED.

Graduates of the following courses, providing they present credits for four years of English and one year each of Elementary Algebra and Plane Geometry, are admitted to the freshman class without condition other than that imposed by the above examination in English:

- (a) Any four-year course of a Minnesota State High School.
- (b) A four-year course of other accredited schools in the state.
- (c) A four-year course of schools in any other state accredited to the State University of that state.
- (d) The advanced English or Latin Course of the Minnesota Normal Schools.

In all cases the character of the work and the time given to the respective subjects should be according to the following schedule:

#### I. REQUIRED OF ALL.

*English*, four years, including

- (a) Classics.
- (b) Principles of Composition.
- (c) Practice in Written Expression.

*Mathematics*.

- (a) Elementary Algebra, one year.
- (b) Plane Geometry, one year.

#### II. ELECTIVE.

*Mathematics*, one year.

- Higher Algebra, one-half year.
- Solid Geometry, one-half year.

*Latin*, two or four years.

- Grammar, one year.
- Caesar, four books, one year.
- Cicero, six orations, one year.
- Virgil, six books, one year.

*Greek*, two years.

- Grammar, one year.
- Anabasis, four books, one year.

*German*, two years.

Grammar, one year.

Literature, one year.

*French*, two years.

Grammar, one year.

Literature, one year.

*Spanish*, two years.

Grammar, one year.

Literature, one year.

*Swedish, Danish-Norwegian, Icelandic*, two years.

Grammar, one year.

Literature, one year.

*History*, three years.

Ancient, to Charlemagne, one year.

Modern, from Charlemagne, one year

England, one-half year.

Senior American, one-half year.

*American Government*, one-half year.

*Political Economy*, one-half year.

*Physics*, one year.

*Chemistry*, one year.

*Botany*, one-half or one year.

*Zoology*, one-half or one year.

*Astronomy*, one-half year.

*Geology*, one half-year.

*Physiography*, one half-year.

*Commercial History and Commercial Law*, one year.

*Freehand Drawing*, one year.

*Mechanical Drawing*, one year.

*Commercial Geography*.

*Senior Arithmetic and Senior English Grammar*, as parts of a High School Normal course.

The following as parts of a Manual Training Course or a Commercial Course:

*Machine or Architectural Drawing*, one or two years.

*Shop Work*, one, two, or three years.

*Stenography and Typewriting*, one or two years.

## SYLLABI

The following statements indicate, in a general way, the ground expected to be covered in the study of the various subjects accepted for admission.

*English (four years).*

In order to secure a definite plan of study and unity of method on the part of preparatory schools, the entrance requirement in English is outlined below somewhat in detail. To satisfy this requirement a four years' course of not less than four hours per week must be pursued. The headings under which instruction will naturally fall are:

- (a) English Classics
- (b) The Principles of Rhetoric
- (c) Practice in Written Expression

(a) English classics should include a critical reading, in class, of English masterpieces. The following are suggested as well adapted for such study: Shakespere's "Macbeth," Milton's "Paradise Lost," books one and two; Burke's "Conciliation with America"; Carlyle's essay on "Burns." In the study of these works the student should come to know the leading facts connected with the author and his time; he should become familiar with the subject-matter of the work and thoroughly at home with the story, and should have a clear idea of the form and structure of the work as a whole.

A less critical knowledge of other standard or classic works, which may perhaps be read by the student at home, with written reports and brief oral discussions in class, is desirable. The following works are noted as indicative of the minimum amount of work expected: at least two of Shakespere's plays, beside the one read in class, one of Irving's works, one of Hawthorne's novels, one of Stevenson's novels, one of Webster's orations.

(b) The work in the Principles of Composition should include the principles and technical terms of ordinary texts upon the subject, whether acquired by the direct study of such texts or mainly by the study of selected English masterpieces. It should not be forgotten that this is not an end in itself, but simply a means of teaching the student the correct use of English.

(c) Not less than one hour each week throughout the four years of the high school course should be devoted to practice in written expression. The instructor may choose such topics as local conditions may require or make most profitable; but whatever line of work is pursued, the student should be taught to use language correctly and forcibly and learn to express himself clearly and logically in writing.

*Elementary Algebra (one year)*

Addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, simple equations (with one, two, and several unknown quantities) followed by problems, theory of exponents, involution (including the binomial theorem for positive integral exponents), evolution, radicals, inequalities, ratio, proportion, progression, and quadratic equations, with problems.

*Higher Algebra, First Part (one-half year)*

While this subject does not include any topics not named under Elementary Algebra, a much fuller treatment of those topics is expected in this work. Principles as well as processes should be learned, theorems and rules should be rigorously demonstrated, the exercises and problems should be more difficult, and students should be drilled in short methods and rapid work. Unless candidates have a good knowledge of the fundamental topics named below, they are not prepared to pursue successfully at the University the second part of Higher Algebra.

The topics are addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, theory of exponents, involution, evolution, surds, imaginaries and simple equations with problems.

*Plane Geometry (one year)*

Any of the standard texts on this subject will furnish the necessary preparation. Isoperimetry, symmetry and minima of figures are not required. The exercises requiring solutions and demonstrations should not be omitted.

**Solid Geometry** (One half year).

Any of the standard texts on this subject will furnish the necessary preparation. The exercises requiring solutions and demonstrations should not be omitted.

**Latin Grammar** (one year).

This will include the subjects of orthography, etymology and syntax. Proficiency is particularly desired in the following subjects: the analysis of the verb forms, the rules of syntax, and the principal parts of the irregular verbs.

**Caesar** (one year).

First four books or selections from the seven books equivalent to four; or three books, with thirty pages of Cornelius Nepos, or two books with sixty pages of Cornelius Nepos. Special attention should be paid to the translation of passages of the text into correct and idiomatic English; grammatical questions connected with the text; more especially on the subjunctive mood, indirect discourse and the sequence of tenses. The pupil should be able to rewrite in oratio recta all the passages of oratio obliqua that occur in the text. The student is expected to be familiar with the life of Caesar and an account of his wars.

**Cicero** (one year).

Six orations, four against Catiline and any two of the following: "Poet Archias," "Ligarius," "Marcellus," "Manilian Law" (to count as two orations), the Fourteenth Philippic. The student should be familiar with the life of Cicero and the history of his times.

**Virgil** (one year).

Six books of Aeneid, or five of Aeneid and one of the Metamorphoses of Ovid, or the Eclogues. The student should be familiar with the life of Virgil and an account of his times and writings. A correct rythmical reading of the text is to be encouraged.

**Greek Grammar** (one year).**Xenophon's Anabasis** (one year)—Four books.**German** (two years).

First year the pupil should acquire:

- (1) A correct pronunciation, training of the ear, eye and organs of speech.
- (2) A vocabulary of a thousand words of every day use; facility in combining these words into simple sentences. As a means to this, 100 to 150 pages of easy narrative prose and poetry should be read, from which questions and answers may be formed. To test the student's memory and knowledge of the word-order he should relate or write out the story anew in his own words.
- (3) From two to three hundred German idioms.
- (4) The essentials of German Grammar, to be taught by means of oral and written exercises based upon the reading lessons.

**Second year—**

- (1) Read 150 to 200 pages of prose and poetry.
- (2) Practice in reading smoothly and with expression.
- (3) Carefully translate selected passages of the text into idiomatic English. To translate easy sentences which the student already understands is a waste of time.
- (4) Translate sentences from English into German, using words and idioms of the text read.
- (5) Study topically German grammar; chief rules of orthography, etymology and syntax; illustrate these by words, phrases and sentences selected or composed by the student.

**French** (two years).

The principles of French grammar, including acquaintance with the verb, regular and irregular; an ability to translate easy English sentences into French and simple French prose into English.

**Spanish** (two years).

First year—Grammar and Reader.

Second year—Grammar reviewed; reading of some modern writer; composition and conversation.

**Ancient History** (one year).

- (a) This study should begin with from five to seven weeks upon the oriental peoples who have most influenced European development, noting the early civilizations in the valleys of the Nile and Euphrates, the spreading and meeting of these civilizations in the intermediate region, with notice of the more important states in that district, and the union of the East under Persia. This survey should aim to give an idea of the reach of recorded history, of the distinguishing features of the successive oriental nations, and of their more important influence upon later European development.
- (b) In the Greek and Roman age emphasis should be put upon the evolution of institutions, and considerable attention should be paid to the later Hellenistic period, after the rise of Macedonia, and to the Roman Empire, with its bearing upon subsequent history. Some of the work should be illustrated by the use of sources, and maps should be used constantly.
- (c) The subject should be carried down to the establishment of Charlemagne's Empire. This will bring together all the chief lines of influence which were afterwards to make our modern world, will show the meaning of the preceding eras as can not be done if the study stops at an earlier date, and will leave the subject at a period of comparative order and simplicity.

**Modern History** (one year).

From Charlemagne to the present. The topics to which special attention are called are the period of disorder after Charlemagne and the consequent rise of feudalism, the Holy Roman Empire and the papacy, the medieval church, the crusades, the free cities, the rise of national monarchies, the intellectual renaissance and the Protestant Reformation, the French Revolution and the subsequent democratic movements in politics and industry.

It is desirable to give at least half of the year to this last period from 1789.

Instead of these two subjects, Ancient and Modern History, the University will, until 1907, continue to accept the following:

History of Greece and Rome (one-half year).

Medieval (one-half year).

Modern History (one-half year).

**English History** (one-half year).

The Saxon period should be passed over rapidly. In the remainder of the work, besides the narrative, constitutional points should receive attention, and easily accessible documents, like Magna Charta, should receive careful study.

**Senior American History** (one-half year).

No attempt should be made to cover the whole field in this time. Either the colonial history or the period from 1783 to 1832 offers quite enough material. In any case considerable use should be made of collections or documents and sources.

**American Government** (one-half year).

This should be a study of our government, national, state and local, as it is organized and actually operated to-day. Students should be made familiar with the purpose and salient features of important instruments of government and other public acts like the Declaration of Independence, Articles of Confederation, Constitution of the United States, Constitution of Minnesota, and a local city or village charter.

In no case, however, should the instruction consist wholly or largely of an analysis of documents. It should rather aim to impart information essential to intelligent, active citizenship, such as the division of the government into departments, their organization and function; the methods of nominating, electing and appointing men to office; of fram-

ing and amending constitutions, city charters and statutes; of drawing grand and petit juries and the duty of the citizen to serve on them; the distinction between common law, state law and constitutional law, between equity, civil and criminal cases.

To make the government seem a real working organization to the student, he should be encouraged to observe public proceedings by attending school meeting, town meeting, sessions of the county Commissioners, city council, state legislature, a trial in court, and party primaries and conventions. He should also be lead to read about and observe public affairs for himself. To that end let him collect statistics and accounts of work done by particular offices and departments from published reports and by personal inquiry.

**Political Economy** (one-half year).

Some good elementary text book should be mastered. It is desirable that students be encouraged to study local and general economic phenomena and conditions. The time should be wholly devoted to the elements of the science of political economy. The beginner should not be confused with problems of applied economics such as tariff, trusts, bimetallism, etc.

**Physics** (one year).

It is suggested that the year's work be confined to four of the seven subjects mentioned below.

(1) **Mechanics of solids**, (2) **liquids and gases**, (3) **sound**, (4) **heat**, (5) **light**, (6) and (7) **electricity and magnetism** (to count as two subjects but not to be divided).

**Chemistry** (one or one-half year).

The full year's work should include a study of both the non-metals and metals with laboratory experiments illustrating the common chemical laws and the commoner chemical reactions.

The half year's work should cover the non-metals only, with laboratory experiments similar to the first half of the full year's work.

After the opening of the year 1906-07, the one-half year credit will not be accepted for admission.

**Botany** (one or one-half year).

Schools which give one-half year of Botany should devote particular attention to plant relations, making the course largely ecologic in bearing. When a whole year is given to the subject, additional work upon plant structures should be offered, and together with fundamental conceptions of ecology a general idea of morphology and taxonomy should be the aim of the course.

**Zoology** (one or one-half year).

The course of Zoology, whether a half year or a year course, should be a natural history rather than a modern morphological course. Collecting and classifying (as a means) should be encouraged as much as possible. Animals should be studied as living units, in their relation to one another and their environment. The general and special structural feature in relation to the habits, the food and manner of obtaining it, the enemies and means of protection against them, hibernation, migration, the differences in habits, form and structure between the old or mature animal and the young, the relation of parents to their offspring, etc.—in short, all about the life of the animal under consideration should be the prominent feature, and as much as possible of this should be made out by direct observation of the animal in its natural home and in confinement.

The course, on the whole, should aim to foster and develop a love for nature, train the power of observation toward accuracy and give a healthful stimulation to the imagination. The pupil should be guarded against the habit of confounding the facts of observation with his interpretation and his judgments.

The animals for direct observation should be selected from as many branches of the animal kingdom as possible, and the changes during the year in the character of the fauna of the locality in general as well as as of some particular region should be noted. In some localities the work will of necessity be largely restricted to land and air animals, but no locality in Minnesota is so poor in animal life that very profitable work cannot be laid out along the line indicated above.

It will be noticed that such a course of necessity includes so-called laboratory work. The amount and extent of the laboratory work will depend upon conditions, but even under the best conditions it is hardly advisable to go into detailed dissections and embryology. Continued, repeated and close observation, aided now and then, by a simple hand lens or a compound microscope, will reveal an abundance of material and opportunity for disciplining the mind.

**Astronomy** (one-half year).

An elementary course in General Astronomy as presented in any good modern text-book.

**Geology** (one-half year).

These subdivisions should receive special attention: physiographic geology, which treats of the building of the land and the evolution of its existing contours; geo-dynamics, the study of the forces, atmosphere, water, terrestrial heat, plants and animals, modifying the earth; and a brief survey of historical geology.

**Physiography** (one-half year).

The following topics should be emphasized: Meteorology, to an orderly arrangement of the leading facts relating to the atmosphere, and its phenomena, including some acquaintance with the work of the U. S. Bureau; Land Sculpture, as it treats of the origin, development and decadence of land forms and the influence of these processes on the physical environment of man.

**Commercial Geography** (one-half or one year).

The work usually provided in high schools will answer this requirement.

An applicant not holding a diploma from one of the courses (a), (b), (c), or (d), indicated above, may be admitted by gaining by examination fifteen year-credits, including four years of English and one year each of Elementary Algebra and Plane Geometry, from the list of subjects given above.

State High School Board certificates will be accepted for the subjects which they represent.



The following High Schools are accredited:

Ada	Eveleth	Iuverne	Rochester
Adrian	Excelsior	Mabel	Royalton
Aitkin	Fairmont	Madelia	Rush City
Akeley	Faribault	Madison	Rushford
Albert Lea	Farmington	Mankato	St. Charles
Alden	Fergus Falls	Mantorville	St. Cloud
Alexandria	Fertile	Mapleton	St. James
Amboy	Fosston	Marshall	St. Louis Park
Annandale	Fulda	Milaca	St. Paul
Anoka	Gaylord	Minneapolis	Central
Appleton	Glencoe	Central	Cleveland
Argyle	Glenwood	East Side	Humboldt
Arlington	Graceville	North Side	Mechanic Arts
Atwater	Grand Meadow	South Side	St. Peter
Austin	Grand Rapids	Minneota	Sandstone
Barnesville	Granite Falls	Montevideo	Sauk Center
Belle Plaine	Hallock	Montgomery	Shakopee
Bemidji	Harmony	Monticello	Sherburne
Benson	Hastings	Moorhead	Slayton
Bird Island	Hawley	Mora	Sleepy Eye
Blooming Prairie	Hector	Morris	Springfield
Blue Earth City	Henderson	Morton	Spring Valley
Brainerd	Herman	New Paynesville	Staples
Breckenridge	Heron Lake	New Prague	Stewartville
Browns Valley	Hibbing	New Richland	Stillwater.
Buffalo	Hopkins	New Ulm	Thief River Falls
Caledonia	Howard Lake	Northfield	Tracy
Canby	Hutchinson	North St. Paul	Two Harbors
Cannon Falls	Jackson	Olivia	Virginia
Cass Lake	Janesville	Ortonville	Wabasha
Chatfield	Jordan	Osakis	Wadena
Cloquet	Kasota	Owatonna	Warren
Cokato	Kasson	Park Rapids	Waseca
Crookston	Kenyon	Pelican Rapids	Waterville
Dawson	Lake Benton	Perham	Wells
Delano	Lake City	Pine City	West Concord
Detroit	Lake Crystal	Pine Island	Wheaton
Dodge Center	Lakefield	Pipestone	White Bear
Duluth	Lamberton	Plainview	Willmar
East Grand Forks	Lanesboro	Preston	Windom
Elbow Lake	Le Roy	Princeton	Winnebago
Elgin	Le Sueur	Red Lake Falls	Winona
Elk River	Litchfield	Red Wing	Winthrop
Elmore	Little Falls	Redwood Falls	Worthington
Ely	Long Prairie	Renville	Zumbrota

The following private schools are also accredited to the University:  
 St. Mary's Hall, Faribault  
 St. Paul Academy  
 Shattuck Military Academy, Faribault  
 Stanley Hall, Minneapolis  
 Windom Institute, Montevideo  
 Concordia College, Moorhead  
 Pillsbury Academy, Owatonna  
 St. Joseph's Academy, St. Paul  
 St. Paul's College, St. Paul Park  
 Holy Angel's Academy, Minneapolis

### ADMISSION TO ADVANCED STANDING.

#### 1. From other colleges.

This college accepts records from all reputable colleges for credit to advanced standing. Such records are accepted as far as they are equivalent to the work done in this college. In bringing records from other institutions, the certificate must be upon the official blank of the institution granting the certificate, and should show:

- (a) The subject studied; if a language, the books read, etc.
- (b) The time spent upon each subject.
- (c) Ground covered in laboratory work in case of laboratory subjects
- (d) The result. It is sufficient to state that the subject was completed creditably.

Records from institutions whose entrance requirements are not as high as those of this college will not be accepted for equivalent rank. The credits to be allowed in such cases will be determined by the Enrollment Committee.

#### 2. From Minnesota Normal Schools.

Graduates of the "advanced graduate course" of a Minnesota State Normal School are admitted with advanced standing equivalent to one year's credit, and receive the degree of Bachelor of Arts upon completing in this college the following courses: freshman mathematics, two years of science from the subjects prescribed for the freshman and sophomore years, two years of language (not including English) from those years, sophomore rhetoric, and sufficient additional work to complete three full years of the college course. Such students will not be permitted to elect courses V and VII in Education, and before registering for the freshman mathematics they will be required to make good any deficiencies in their preparatory mathematics, under the regulations that apply to all other candidates for the bachelor's degree.

Individual graduates of the "advanced Latin course" (five-year) or of the "advanced English course" (five-year) of a Minnesota State Normal School, who, on the basis of maturity and ability, present certificates of special fitness from the president of the Normal School, will be admitted with advanced standing under the same regulation and proviso.

### ADMISSION AS UNCLASSIFIED STUDENTS.

Whenever in the judgment of the Enrollment Committee an applicant presents satisfactory reasons for not taking the regular course, such applicant may be admitted as an unclassified student. He must take the same examinations or present the same credentials as are required of those

who enter the freshman class. Exceptions can be made only upon vote of the Faculty.

Unclassed students must take the same number of hours as regular students, and, unless advanced standing is obtained through credits from other institutions, four-fifths of the work during the first year must be taken from subjects offered to freshmen. A new application must be made each semester to the Enrollment Committee.

#### ADMISSION TO STUDY MUSIC

Students who wish to pursue the courses in Music must take the same examinations or present the same credentials as are required of those who apply for admission to the Freshman class.

#### DAILY ROUTINE

The morning session begins at 8:30 o'clock; a general assembly of the faculty and students is held each day at 10:25 o'clock, at which there are brief and simple religious exercises. Work extends through six days of the week.

#### EXAMINATIONS

At the close of each semester, examinations are held in the studies of that semester.

Students are reported as "excellent," "good," "passed," "incomplete," "conditioned," or "failed."

An "incomplete" must be removed within one month from the opening of the following semester or it becomes a condition.

A "condition" not made up before the subject is offered again becomes a "failure," subject to rules governing failures.

"Failures" must be pursued again in class.

A student who at any time is deficient in more than half a year's work, loses his class rank and is regarded as a member of the next lower class.

Students whose absences in any semester exceed four weeks in the aggregate, are not permitted to take the semester examinations without special permission of the faculty.

#### FAILURE TO KEEP UP WITH THE CLASS.

Any student receiving conditions or failures in 60 per cent of the work the first semester shall be dropped from the rolls, and shall not be allowed to re-enter the University until the opening of the following year.

Any student failing to pass in one-half of the work of any year shall not be allowed to register until reinstated by action of the faculty upon recommendation of the committee on students' work.

### FEEES.

All students in the colleges, who are residents of the state, are charged an incidental fee of ten dollars a semester. Non-residents are charged double the fee required of residents of the state, or twenty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. Save in the case of the first registration, the incidental fee is increased 25 cents for each day's delay in registration, beginning with the day set for recitations to begin. In addition to this fee, students who take work in laboratories are charged a sum sufficient to cover the cost of material and breakage. The following is a statement of fees charged per semester for freshman year; chemistry, \$5; botany, 83; zoology, 83.

### GRADUATION

Students completing the course of study to the satisfaction of the faculty of the college, are entitled to receive the baccalureate degree. Any person may undergo, at suitable times, examination in any subject, and if such person pass in all the studies and excercises of the course, he is entitled to the appropriate degree; *provided*, however, that at least one full year (the one immediately preceding the granting of the degree) must be spent at the University, before such degree shall be granted, and *provided* that examination, in every case, be held before a committee of the faculty appointed for that purpose.

### THE UNIVERSITY STATE TEACHERS' CERTIFICATE.

Graduates of the College of Science, Literature and the Arts may apply for and receive upon vote of the faculty the University State Teachers' Certificate under the following conditions.

First: They must have maintained a good average of scholarship thruout the four years of college study.

Second: They must have the recommendation of at least one department concerned with high school studies.

Third: They must have completed one semester of Psychology and three semesters of Education.

This certificate by state law authorizes students to teach in the public schools of Minnesota for two years from date. After that time, upon satisfactory evidence of success, the certificate may be made permanent by the endorsement of the State Superintendent of Public Instruction and the President of the University.

# Courses of Study

## FOUR-YEAR COURSE IN SCIENCE, LITERATURE AND ARTS

### LEADING TO THE DEGREE OF BACHELOR OF ARTS.

The degree of Bachelor of Arts will be conferred upon any student who completes, from the courses offered in this college, one hundred and twenty-six credits, in addition to the required exercises in Drill, Gymnasium and Physical Culture. A credit is one hour per week through one semester.

Of the courses selected five or more shall be long courses, and at least one long course shall be chosen from each of the following groups:

- (a) English, French, German, Greek, Latin, Rhetoric.
- (b) Animal Biology, Astronomy, Botany, Chemistry, Geology and Mineralogy, Physics.
- (c) History, Philosophy, Economics and Politics, Sociology.

No student shall receive credit for more than two beginning language courses save by special permission.

A long course means an amount of work equivalent to not less than twelve credits in one department.

A double period in laboratory subjects counts as one credit-hour.

The notation [n] indicates the number of exercises per week, and [n2] indicates the number of double periods per week.

### FRESHMAN YEAR.

*Mathematics* [3]—Required of all during freshman year.

- (a) Second Part Higher Algebra and Trigonometry, for those who have entrance credits in First Part Higher Algebra and Solid Geometry.
- (b) Solid Geometry and First Part Higher Algebra for those who lack entrance credits in these subjects.
- (c) Freshmen who have an entrance credit in First Part Higher Algebra, but not in Solid Geometry, will take Second Part Higher Algebra the first semester and Solid Geometry the second semester.
- (d) Freshmen who have an entrance credit in Solid Geometry, but not in the First Part Higher Algebra, will take First Part Higher Algebra the first semester and Trigonometry the second semester.

Note: First Part Higher Algebra and Solid Geometry cannot receive credits both for entrance and for freshman requirements.

*Rhetoric* [3] *Course I*.—Required of all who do not pass with a grade of "good" or "excellent" Part II. of the examination in Entrance English.

Students who have had special preparation in Debate may, by consent of the Head of the Department, substitute Argumentation for Rhetoric.

*Preparatory Rhetoric* [3].—Required of all who do not pass Part I. of the examination in Entrance English. This does not give a University credit.

*Military Drill* [3].—Required of men.

*Gymnasium* [1, in two periods].—Required of men.

*Physical Culture* [3].—Required of women.

In addition students shall choose from the following list a sufficient number of subjects to make in the aggregate not less than fourteen nor more than seventeen credits. The subjects chosen must be continued through the year.

*Animal Biology* [32], *Course I*, General Zoology.

*Animal Biology* [32] *Course II*, Representatives of the phyla of the animal kingdom. May be pursued in connection with course I or independently by those with proper preparation.

*Botany* [32], Course I, Short.

*Botany* [32], Course II, first year of long course.

*Chemistry* [32], Course I, General.

*Elocution* [3], Course VII. To count for two credits.

*English* [3], Course I, and Course II.

*French* [5], Course I, Grammar and translation, composition and conversation.

*French* [3]. Course III, Beginnings of French literature and translations from modern authors.

*French* [5]. Courses III and IV.

*German* [5], Course I, Grammar, translation, pronunciation, conversation and composition.

*German* [3]. Course IV, Advanced, third year's work.

*German* [5], Courses IV and V.

*Greek* [5], Course I, Grammar, Anabasis and composition.

Course II may be pursued at the same time to advantage.

*Greek* [3]. Course II, Anabasis continued.

*Greek* [3]. Course III, History.

*History* [3]. Course I, 31 B. C. to 1500 A. D.—Open to students with less than two years of preparatory history.

*History* [3]. Course II, English Constitutional. Open to students who have completed the equivalent of course I.

*Latin* [3]. Courses I (Livy), II (Cicero), III (Plautus and Terence), IV Selections.

*Scandinavian* [5]. Course I, Grammar and composition; practice, including writing, speaking and translating Swedish.

*Scandinavian* [5]. Course II, Grammar and composition; practice, including writing, speaking and translating Danish—Norwegian.

*Scandinavian* [3]. Course III, History of Scandinavian literature and study of authors.

*Spanish* [5]. Course I, Grammar and composition, conversation and translation.

#### SOPHOMORE YEAR.

*Rhetoric* [3]—Required of all who took Preparatory Rhetoric in the freshman year. It counts for freshman and not sophomore credits.

*Military Drill* [2]—Required of men.

In addition to Military Drill sophomores shall elect not less than fifteen nor more than eighteen credit-hours of work from the subjects open to them. See departmental statements.

#### JUNIOR AND SENIOR YEARS.

The work of these two years is entirely elective, it being provided that no student shall elect less than fifteen nor more than eighteen hours of work in any semester, save by permission of the Committee on Students' Work.

1. Students who carry Military Drill [3] beyond the required two years will be allowed two semester credits for each year; but no credit will be allowed for such Drill for less than one year.

2. Seniors contemplating entering the Medical Department are permitted to elect the courses in Anatomy, Chemistry, Histology and Physiology (it being understood that no repetition of work is allowed) in the Medical Department. The work completed in any or all of these departments will be applied toward the work required for a degree in this department.

3. Members of the senior class of this college are permitted to elect throughout the senior year, work in the College of Law, including the Elements of Contracts, Domestic Relations, Torts, Criminal Law and \*Negotiable Paper. The satisfactory completion of the above named courses will give the student twelve senior credits, and will entitle him to admission to the middle class of the College of Law. No student will be permitted to take more than one lecture each day in the College of Law, without special permission of the faculty of this college. The work must be taken with the night class in the College of Law.

\*If the student prefer, "Negotiable Paper" may be taken in connection with the middle year of the law course.

## SIX-YEAR COURSE IN SCIENCE AND MEDICINE

## LEADING TO THE DEGREES OF BACHELOR OF SCIENCE AND DOCTOR OF MEDICINE.

There has been established a six year course of study arranged especially for students of medicine. This course is conducted in the Colleges of Science, Literature and the Arts and of Medicine and Surgery. It leads to the degree of Bachelor of Science at the end of the first four years and to the degree of Doctor of Medicine at the end of the six-year course. The work of the first two years is adapted especially to the needs of the student of medicine.

The work of the first two years is outlined as follows:

## FIRST YEAR.

1. \**German*. [3 or 5]
2. *Botany*. [3<sup>2</sup>]
3. *Chemistry*. [3<sup>2</sup>]
4. *Zoology*. [3<sup>2</sup>]
5. *Higher Algebra and Trigonometry*, [3], courses III and IV.
6. *Drill*. (3)
7. *Gymnasium*. [1]

## SECOND YEAR.

1. *Rhetoric*. [3]
2. *German or French*. [3 or 5]
3. *Chemistry*. [3<sup>2</sup>]
4. *Comparative Anatomy of Vertebrates*. [3<sup>2</sup>]
5. *Physics*. [6]
6. *Drill*. [3]

\*Note: Students who enter with two years of German may elect French instead in the first or second year.

# Courses of Instruction

Unless otherwise specified all courses are three credit-hour courses.

## ANIMAL BIOLOGY.

### I. *General Zoology.*

I, II. *Professor Sigerfoos, Assistant Professor Oestlund and Assistants.*

Text books, lectures, quizzes and laboratory work.

The course includes the elements of Entomology, a general survey of the phyla of the animal kingdom and the elements of embryology.

### II. *Zoology.* Extension of course I.

I, II. *Professor Sigerfoos and Assistant Professor Oestlund.*

This course may be pursued either in connection with course I, thus completing a "long course" in General Zoology during the first year, or independently by those sufficiently prepared. The object of the course is to acquaint the student with more representatives of the phyla of the animal kingdom and to give him practice in the use of references.

### III. *Histology.* [5 or 6]

I, II. *Professor Nachtrieb and Mr. Downey.*

Prerequisite, course I.

Lectures, quizzes, references and laboratory work.

(a) General Histology. A comparative study of the characters, properties and development of animal tissues.

(b) Vertebrate Organology. The microscopic anatomy of the organs of vertebrates.

So far as possible the student will prepare the material himself and thus acquire not only a collection of personally-made preparations, but also a practical knowledge of histological methods and technique.

The text book and principal references are: Szymonowicz-MacCallum, A Text-Book of Histology and Microscopic Anatomy; Bohm and Davidoff-Huber, Text-book of Histology; Schneider, Lehrbuch der vergleichenden Histologie der Tiere; Opper, Lehrbuch der vergleichenden mikroskopischen Anatomie der Wirbelthiere; Hertwig, Zelle und Gewebe; Wilson, The Cell; and others.

### IV. *Embryology of Vertebrates.* [3 or 5]

I, II. *Professor Nachtrieb.*

Prerequisite, courses I and III or their equivalent.

Lectures, reference and laboratory work.

In the laboratory the student will prepare series of various stages of several vertebrates, and with these personally prepared series and the laboratory collections he will be taught to work out developmental problems as well as to verify the statements of the reference texts.

The text-book and general references of the course are: Hertwig-Mark, Text Book of the Embryology of Man and Mammals; Minot, A Laboratory Text-book of Embryology; Marshall, Vertebrate Embryology; Minot, Human Embryology; Roule, L'Embryologie Comparee, and Hertwig, Handbuch der vergleichenden und experimentellen Entwicklungslehre der Wirbelthiere.

### V. *Embryology of Invertebrates.*

I, II. *Professor Sigerfoos.*

Prerequisite, courses I and III or their equivalent.

Lectures, laboratory and reference work.

Text references: Haddon, An introduction to the Study of Embryology; Korschelt and Heider, Text-book of Embryology of Invertebrates; Roule, L'Embryologie Comparee.



VI. *Comparative Anatomy of Vertebrates.*

I, II. Mr. Brown.

Prerequisite, course I.

Lectures, quizzes, reference and laboratory work.

Reference and laboratory guides: Flower, Osteology of the Mammalia; Parker and Bettany, Morphology of the Skull; Reynolds, The Vertebrate Skeleton; Jayne, Mammalian Anatomy; Huxley, A Manual of The Anatomy of Vertebrate Animals; Owen, Comparative Anatomy and Physiology of Vertebrates; Wiedersheim, Comparative Anatomy of Vertebrates; Gegenbauer, Vergleichende Anatomie der Wirbelthiere.

VII. *Taxonomy.*

Prerequisite, course I. Days and hours are arranged with the instructor.

(a) Systematic Entomology.

I, II. Assistant Professor Oestlund.

The course covers the general classification of insects and special problems in entomology.

(b) Ichthyology.

I. Professor Nachtrieb.

The classification of fishes, with detailed work on the fishes of Minnesota.

(c) Ornithology.

II. Mr. Brown.

The classification of birds, with special reference to the birds of Minnesota.

VIII. *Physiology.*

I. Professor Sigerfoos.

Open to all juniors and seniors. Lectures, text-book and demonstrations.

This course will alternate with course IX. It will be offered during 1906-7 and not during 1907-8.

IX. *Nature Study.*

II. Professor Sigerfoos and Assistants.

Prerequisite, course I. Days and hours are arranged with the instructor.

The course consists of lectures, reference, laboratory and field work. It

is intended for those who contemplate teaching Zoology and is planned to give practical instruction in collecting, indentifying and preparing laboratory and museum material, for general courses of zoology.

This course will alternate with course VIII. It will be offered during 1907-8.

X. *Teachers' Course.*

Professor Nachtrieb

This course consists of one lecture and discussion a week during the first

semester on the ends to be attained through courses in general Zoology and the methods and means by which such ends may be gained.

XI. *Neurology.* [5]

I or I, II. Professor Nachtrieb and Mr. Downey.

Open to juniors and seniors.

Lectures, text-book and laboratory work on the nervous system.

The course is especially designed for those pursuing or intending to pursue courses in psychology.

XII. *Mental Evolution in Animals.* [1]

I. Professor Nachtrieb.

Open to juniors and seniors.

Lectures on habit, instinct and intelligence in animals.

XIII. *Economic Zoology.*

II. Professor Nachtrieb.

Open to juniors and seniors one hour a week.

Lectures on the commercial and economic value of animals—the uses made of animals, parts and products of animals, and the processes of preparing and preserving them.

This course will be given in the even numbered years, alternating with course XIV.

XIV. *Medical Zoology.* [1]

II. Professor Nachtrieb.

Open to juniors and seniors.

Illustrated lectures on the life histories of disease-producing animals.

This course will be given in the odd numbered years, alternating with course XIII.

XV. *Problems or Special Advanced Work.*

I, II. Professor Nachtrieb and Associates.

Open to those qualified to carry on research or special work in any branch of Zoology.

XVI. *Philosophical Zoology.*

Professor Nachtrieb.

Open to those pursuing advanced courses.

Occasional lectures upon special topics. Days and hours determined with the professor.

## FOR GRADUATES.

For graduates of the department and those of equal preparation from other institutions, whether candidates for the Master's or Doctor's degree or not, any line of research or advanced work that can be carried on profitably.

For less advanced students any regular work of the department for which the student is sufficiently prepared.

## JOURNAL CLUB.

This club is composed of the professors, instructors and advanced students of the department. It meets once a week throughout the year. The object is to keep its members informed on the latest investigations carried on in the various branches of Zoology through abstracts, reviews and discussions of the articles in the current periodicals. While the attendance is voluntary, all advanced students are expected to take an active part.

## FRIDAY NIGHT READING CLUB.

This club meets Friday nights during the winter months at the home of one of the professors to read and discuss writings not so technical as those of the Journal Club, such as the biographies and philosophical writings of prominent biologists. Attendance is voluntary.

## ASTRONOMY.

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Professor Leavenworth.

## FOR UNDERGRADUATES.

I. *General Astronomy.*

I, II.

A study of the general principles of Astronomy, illustrated by observatory work. Open to those who have completed Trigonometry.

II. *Practical Astronomy.* [3 or 6.]

I, II.

The theory of instruments, the use of the Ephemeris and Nautical Almanac; the various methods of determining time, latitude and longitude, parallax, the position of the celestial bodies, and the method of least squares; observatory practice including photography, and spectrum-analysis. Open to those who have completed Analytical Geometry, Calculus and General Astronomy.

## FOR GRADUATES.

III. *Extended course in Practical Astronomy.*IV. *Orbit work.*V. *Astrophotography with photographic measurements.*

## BOTANY.

I. *General Botany.*

I, II. Assistant Professor Lyon.

This course comprises a general survey of the plant kingdom with laboratory work on the cell, on algae, lichens, fungi, mosses, ferns, gymnosperms and flowering plants. Lectures and laboratory. Open to all.

II. *General Plant Morphology.* First year. I, II. Assistant Professor Tilden.

This course comprises a thorough laboratory discipline in bacteria, algae, fungi and lichens, and also includes a brief survey of economic plants. It is the prerequisite for course III. Lectures, laboratory and collateral reading throughout the year. Open to all.

III. *General Plant Morphology.*

Second year. I, II.

Professor MacMillan and Assistant Professor Rosendahl.

A view of mossworts, ferns and flowering plants is given, with lectures, laboratory work and collateral reading throughout the year. Open to students who have completed course II, of which it is a continuation.

**IV. Taxonomy.**

Junior or senior I, II.

*Professor MacMillan and Assistant Professor Rosendahl.*

Lectures, reference reading and herbarium work. The course is primarily designed to afford students an opportunity to become proficient in the determination of plant species. Open to those who have completed course I or III.

**V. Cytology.**

Junior or senior I, II.

*Professor MacMillan and Assistant Professor Lyon.*

Laboratory work and collateral reading. The course includes a survey of cell structure and the various phenomena of division, fusion and metamorphosis, together with a review of the history of cytologic investigation from the time of Malpighi and Grew to the present. Assignments from the work of Strasburger, Hennebury, Hertwig, Wilson, Guignard, Beneden and Driesch will be made and methods of cytological research indicated in the laboratory. Open to those who have completed course III or IV. Open also as a major or minor to candidates for the degree of master of science.

**VI. Algae.**Junior or senior. I, II. *Assistant Professor Tilden.*

Lectures, laboratory and reference work. Instruction is also given in the preservation of material. The work of the first semester includes a detailed comparative morphological and taxonomic study of the freshwater algae. Cyanophyceae and Chlorophyceae. (with a systematic examination of the forms found in the Minneapolis water supply) and of the second semester of a similar course in the seaweeds, Phaeophyceae and Rhodophyceae. Either semester may be taken as a unit. Open to those who have completed course III. Open also as a major or minor to candidates for the degree of master of science.

**VII. Plant Ecology.**Junior or senior II. *Professor MacMillan.*

Lectures, collateral reading and field observations. The course is designed to cover generally the domain of adaptational adjustments in plant embryology, anatomy, physiology and distribution. Particular attention is devoted to the problems of ecological distribution. Open to those who have completed course I or III. Open also as a minor to candidates for the degree of master of science.

## FOR GRADUATES.

**VIII. Morphology and Taxonomy.***Professor MacMillan.*

Important literature and necessary apparatus will be provided for whatever research is entered upon under the direction of the department, and the results of the investigation will be required to be prepared for publication. The course is an elastic one and will be adapted to the special training and requirements of those pursuing it. Open as a major or minor to candidates for an advanced degree.

**IX. Problems in Algae.***Assistant Professor Tilden.*

Research work may be done on special groups or along any of the following lines: the freshwater algae of Minnesota; the algae of the Minneapolis and St. Paul water supplies; the algae of hot springs; lime-secreting algae; arctic marine algae (material from Vancouver Island); tropical marine algae (material from the Hawaiian Islands). Special facilities for study are offered by the Minnesota Seaside Station on Vancouver Island which is open during the summer vacation. Open as a major or minor to candidates for an advanced degree.

**X. Problems in Cytology and Embryology.***Assistant Professor Lyon.*

Special problems in cell morphology, life histories, embryology and histogenesis. The student will be provided with the necessary reagents, apparatus and plant-house facilities. Those so desiring may also select a subject for research from a large number of important problems, material on which has already been carefully selected and preserved for cytological and embryological study. Open as a major to candidates for an advanced degree.

**XI. Paleobotany.**Assistant Professor *Surdson*.

Lectures and laboratory work with collateral reading designed to cover the historical literature. Schenck's *Handbuch* will be used as a guide in the laboratory. Open as a partial minor to candidates for the degree of master of arts or of science.

## CHEMISTRY.

## FOR UNDERGRADUATES.

- I. (a) General Chemistry.** Freshman I, II. *Miss Cohen*.  
Recitations and laboratory work. The course includes a detailed study of chemical and physical properties of the non-metals and their more important compounds, with an introduction to Organic Chemistry.
- (b) Advanced General Chemistry.** Freshman I, II. *Professor Frankforter*.  
Lectures and laboratory work. This course is offered to those who have had an elementary course in general chemistry. The work largely devoted to physical chemistry with certain technological and metallurgical problems essential in an exhaustive study of the chemical elements.
- II. Qualitative Analysis.** I. *Assistant Professor Nicholson*.  
Lectures and laboratory work. The course includes the general reactions of the metals and their qualitative separation.
- III. Identification of the Acids.** II. *Assistant Professor Nicholson*.  
Lectures and laboratory work. Open to those who have completed course II.
- IV. Quantitative Analysis (gravimetric).** I. *Professor Sidener*.  
Lectures and laboratory work. An introduction to gravimetric analysis and a quantitative separation of the metals. Open to those who have completed course III.
- V. Quantitative Analysis (volumetric).** II. *Professor Sidener*.  
Lectures and laboratory work. A continuation of course IV.
- VI. Organic Chemistry.** I, II. *Professor Frankforter*.  
Lectures and laboratory work. The course includes the aliphatic series with a preparation of the more important compounds, supplemented by Levy's *Anleitung für Darstellung Organischer Präparate*. Also the aromatic series with a preparation of some of the more important compounds supplemented by Fischer's *Organischer Präparate*. Open to those who have completed course III.
- VII. Teachers' Course. [1]** Senior II. *Professor Frankforter*.  
This course is especially arranged for the students in the College of Education. The course will be largely didactic with experimental work necessary to a thorough understanding of the new methods and theories.  
For technical courses see catalogue of the School of Chemistry.

## FOR GRADUATES.

1. *Special Inorganic Chemistry.*
2. *Electro-chemistry.*
3. *Organic Chemistry.*
4. *The Alkaloids.*
5. *Analytical Chemistry.*

## COMPARATIVE PHILOLOGY.

*Professor Klaeber.*

This department, besides offering courses in the general principles of linguistic science, affords an opportunity for elementary studies in comparative Indo-Germanic philology. The main starting point for the comparative treat-

ment of the Indo-Germanic languages will be the Germanic family; individual old Germanic dialects also will be investigated in detail. Students are advised to consult with department before choosing courses.

#### FOR UNDERGRADUATES.

- I. *General Introduction to the Science of Language.* [2]  
This course will be sufficiently general in its nature to be of use to all students who wish to obtain an insight into the life of language.
- II. *The Life of Words.* [2] I.  
Etymology and Semasiology. Growth of vocabulary, change of words in form and meaning. Lectures and exercises, with special reference to English and other Germanic languages.
- III. *History of the Alphabet.* [2] I.
- IV. *The Science of Grammar* [1] II.
- V. *Introduction to Teutonic Philology.* [1] II.
- VI. *Comparative Phonology of English and German.* [3] II.  
II and III, IV and V will be given in alternate years.  
Students are advised to consult with the department before selecting courses.

#### FOR GRADUATES.

- VII. *Gothic Grammar.*  
The relation of Gothic to the other Germanic dialects will be particularly emphasized.
- VIII. *Urgermanische Grammatik.*
- IX. *Old Saxon.*  
Grammar and interpretation of the Heliand.
- X. *Old High German.*
- XI. *Comparative Grammar of the Greek, Latin and Germanic languages;* with a general survey of the field of Indo-European philology.

The undergraduate courses are open to graduate students subject to the rules of the Graduate Department.

Related courses will be found under "English."

#### DRAWING.

*Miss Clopath.*

The practical aim of this work in the University is two-fold: to help the students who need drawing for scientific work and to train those who wish to prepare for teaching drawing. The educational side of the work is emphasized in the development of the powers of the mind in the order of observation, memory, and imagination. Special efforts are made toward educating the taste to an appreciation of what is good in form, construction and color and in showing the relation of artistic and aesthetic principles to life.

A certain amount of work is given in the different mediums used in the schools and in the representative, decorative and constructive work found in all educational courses in drawing.

Lectures are offered on the theory and practice of drawing as related to education and on the principles which are at the foundation of all art, illustrating these by the best examples of pictorial and decorative work.

##### I. *Drawing A. Elementary.*

It includes drawing from objects, from plants, from landscape and from figure poses in pencil and in water color; the study of perspective; work from cast in charcoal; brush drawing.

- ii. *Drawing B.* II.  
More advanced work from objects and from cast. Work in water color and colored chalks. Pen and ink drawing. Simple exercises in lettering and composition.
- iii. *Design.* I, II.  
Exercises in composition illustrating the various principles of decorative work, adaptation of plant forms, stencils, illuminated lettering. Designs applied to simple forms of handicraft.  
Lectures on the fundamental principles of designs illustrated by art masterpieces.  
Open to those who have completed Course I.
- iv. *Historical Design.* I, II.  
Original designs in different styles applied to articles of household use. Color harmony. Simple forms of pottery with applied designs. Lectures and collateral reading.  
Open to those who have completed Course III.

## ECONOMICS.

See Social Sciences, page 158.

## EDUCATION.

Course I in Philosophy and Courses I and II in Education are specified as necessary for the University Teacher's Certificate. One other three-hour course for a half year is required for this certificate and is elective from the courses in Education.

Graduates from Normal Schools who receive one year's credit at the University must fulfill the same conditions for the University Teacher's Certificate, but may not offer for this either course V or course VII in Education.

A long course in education means not less than six hours per week for one year, selected from the following list.

For additional information, consult the Bulletin of the College of Education.

- i. *The History of Education to the Renaissance.*  
Junior I. Professor James and Mr. Holl.  
An introductory study of early educational history, conducted by means of lectures, assigned readings, reports and discussions. The purpose of the course is to arouse an interest in educational problems, to secure some perspective for use in current investigation, with some command of the facts and some ease in the methods of educational history and study. An attempt is made to bring out education as one phase of civilization, and to show the connection of schools with other social institutions.
- ii. *History of Modern Education.* Junior II. Professor James and Mr. Holl.  
A continuation of Course I with a somewhat intensive study of certain men, periods and systems in the history of modern education. This course is a direct preparation for an understanding of the educational systems, theories and practices of the present.
- iii. *Educational Psychology.* I, or II. Dr. Miner.  
The study of mental development in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education. This course is announced also as Course II in Philosophy.  
Prerequisite: Course I in Philosophy.
- iv. *Secondary Education* I. Professor James.  
This course is a study of secondary education in the United States, with such references to secondary schools of other countries as will lead to a clearer understanding of the place and function of the high school, its curriculum, the problems of present-day importance, and the relation of the high school to other parts of the system of public instruction. The course will be conducted by lectures, reports and discussions.

- v. *Practice of Elementary Teaching.* I. Associate Professor Rankin.  
 This course includes a consideration of the principles of teaching, which underlie the best methods of instruction, and is both theoretical and practical. It is conducted by means of lectures, assigned readings, discussions and reports, accompanied by either observation or practice in the elementary schools under the direction of the instructor. It is planned for all students who expect to teach in the high schools or to be principals or superintendents. No credit is given in this course to graduates of Normal Schools, receiving one year's credit at the University.  
 Prerequisite: Course I in Philosophy.
- VI. *Practice of Secondary Teaching.* II. Associate Professor Rankin.  
 This course includes lectures on the general methods of secondary teaching, assigned readings, reports and discussions, with either observation or practice of secondary teaching under the charge of the instructor. It is planned more particularly for those who expect to teach in high schools.  
 Prerequisite: Course IV in Education.
- VII. *The Theory of Education.* II. Professor James.  
 This is an introductory course in educational theory and includes a somewhat detailed study of the principles which underlie a scientific theory of education. No credit is given in this course to graduates of Normal Schools, receiving one year's credit at the University.  
 Prerequisite: Course I in Philosophy.
- VIII. *School Administration.* I, or II. Associate Professor Rankin.  
 An introductory study of school administration, conducted by lectures, reports and discussions; the organization of school systems—the work of school boards, superintendents, principals and teachers—school buildings, and hygiene. This course is planned for students without any teaching experience, who hope later to do work in supervision.
- IX. *School Supervision.* II. Associate Professor Rankin.  
 An advanced course, treating of the duties of school principals and superintendents, intended, primarily, for graduates with experience in teaching. (Credit will not be given both for course VIII and for course IX.)
- X. *Comparative Study of School Systems.* I. Professor James.  
 This course deals with the school systems of Germany, France, England, and the United States, different phases receiving attention in alternate years. The course is conducted partly by lectures and partly by assigned readings, reports and discussions.
- XI. *Modern Educational Theories.* II. Professor James.  
 An advanced course in educational theories, dealing particularly with the contributions of Rousseau, Froebel and Herbart.  
 Prerequisite: Course I in Philosophy.
- XII. *Current Problems in Elementary Education.* I. Associate Professor Rankin.  
 A seminar course for senior and graduate students.
- XIII. *Current Problems in Secondary Education.* II. Professor James.  
 A seminar course for senior and graduate students.

## ENGLISH LANGUAGE AND LITERATURE.

- I. *Chaucer.* Freshman I. Miss Peck and Mr. Firkins.  
 II. *Spenser.* Freshman II. Professor Klaeber, Miss Peck and Mr. Firkins.  
 III. *Early English.* Sophomore, junior and senior I, II. Professor Klaeber.  
 IV. *Sixteenth and Seventeenth Century Lyric.* Sophomore and junior II. Miss Peck.

- v. *Shakspeare's Predecessors.* Sophomore and junior I. Miss Peck
- vi. *Milton.* Sophomore, junior and senior I. Assistant Professor Potter.
- vii. *The Lake Poets.* Sophomore, junior and senior II. Assistant Professor Potter.
- viii. *Construction and Development of Modern Drama.*  
Junior and Senior I. Miss Peck.
- ix. *Late Nineteenth Century Drama.* Junior and senior II. Miss Peck.
- x. *Early Nineteenth Century Poetry.* Junior and senior I. Assistant Professor Potter.
- xi. *Late Nineteenth Century Poetry.* Junior and senior II. Assistant Professor Potter.
- xii. *Shakspeare.* Sophomore, Junior, senior II. Assistant Professor Potter.
- xiii. *Teachers' Course: The English Critics.* [2] Senior I, II. Assistant Professor Potter.
- xiv. *Introduction to Middle English Language and Literature.* I. Professor Klaeber.
- xv. *Piers the Plowman.* [2] I. Professor Klaeber.  
Courses XIV and XV will be given in alternate years.
- xvi. *English Prose.* Junior and senior II. Professor Burton.
- xvii. *Literary Criticism.* Junior and senior I. Professor Burton.
- xviii. *Browning.* Junior and senior II. Professor Burton.
- xix. *Tennyson.* Junior and senior II. Professor Burton.
- xx. *Nineteenth Century Essays.* Junior and senior II. Mr. Firkins.  
*Senior Seminar (1906-07) Hakluyt's Voyages.* Miss Peck.

## FOR GRADUATES.

(Graduate students will not receive credit for work taken in undergraduate courses except as minors.)

- I. *Anglo Saxon. Grammar and reading of texts.* Professor Klaeber.
- II. *Beowulf.* Professor Klaeber.
- III. *Historical Grammar of the English Language.* Professor Klaeber.
- IV. *The Rise of Continental Drama and its Connection with Elizabethan Drama.* Assistant Professor Potter.
- V. *The Drama as a Literary Form.* Professor Burton.

## FRENCH, SPANISH AND ITALIAN.

## FOR UNDERGRADUATES.

- I. *French, beginning.* [5] I, II. Mr. Frelin, Madame Bertin, Mr. Melom.  
Fraser & Squair's French Grammar and Reader; modern texts.
- II. *French, second year's work.* I, II. Mr. Frelin and Madame Bertin.  
Grammar and composition continued; modern texts will be read including selections from Merimée, Daudet and Scribe.
- III. *Advanced Grammar and Composition.* I, II. Mr. Frelin.  
Francois Introduction to French Composition; readings from modern authors including selections from Coppé, Feuillet, Sandeau.  
Open to those who have completed the French required for entrance.
- IV. *Conversation.* [2] I, II. Professor Benton and Madame Bertin.  
A course in conversational French.  
Open to students taking Courses II or III.



- V. *Lectures and conversations concerning the writers of the classical period and readings of works produced during this period, including La Fontaine, Corneille, Racine, Moliere.* Some modern authors will be read for the purpose of comparison. *Professor Benton.*  
Open to those who have completed courses I and II or course III.
- VI. *Advanced Conversation.* [2] I, II. *Professor Benton and Mr. Frclin.*  
Open to students in 4th or 5th year French.
- VII. *Lectures, in French, on the Literature of the NINTH Century.* I, II. *Professor Benton.*  
The works of many of the writers of this century will be read and reports given in class, including Chateaubriand, Victor Hugo, Balzac, Renan, Taine, Bourget; Francois' Advanced French Composition.
- VIII. *Romance Philology.* I, II. *Professor Benton.*  
(a) Old French [1]. Lectures on the phonetical development of the French and other Romance languages from popular Latin. Reading old French texts.  
(b) Italian [2] Edgren's Grammar, Dante.
- IX. *Spanish, beginning.* [5] Freshman I, II. *Mr. Melom.*  
Grammar and easy texts, including Galdos, Alarcon, etc.
- X. *Spanish, advanced.* I, II. *Mr. Melom.*  
Advanced grammar, Cervantes, Calderon, Lope de Vega.

## FOR GRADUATES.

- XI. *Romance Languages. Old French.*  
French and other Romance languages from popular Latin. Morecaux choisis des Auteurs Français du Moyen Age, par L. Clédat. Some of the oldest monuments of the French language interpreted and translated into modern French, such as Serments de Strasbourg; La Vie de Saint Alexis; La Cantilene d'Eulalte; the chronicles of Villehardouin, La Chanson de Roland, Froissart. Phonetic changes studied and their laws examined. Special attention is given to those forms which have entered into the English language. This course is especially valuable to students in English philology.
- XII. *History of the Drama.*
- XIII. *Italian.* Dante's Divine Comedy.
- XIV. *Old Spanish.* Development of Castilian dialect. El Poema del Cid.

## GEOLOGY AND MINERALOGY

## GEOLOGY.

- I. *General Geology.* Junior and senior I. *Professor Hall.*  
Comprises: (1) Geodynamics, in which are set forth phenomena of the atmosphere, water, heat, gravity and plants and animals as geologic agents; (2) Structural Geology, wherein stratification, displacement and veining of rock masses are described; (3) Physiographic Geology, pointing out prominent earth features and inquiring into the causes producing them; (4) an outline of Historical Geology.
- II. *The Essentials of Physical Geography.* Junior or senior I. *Professor Hall*  
A discussion of the principles of earth sculpture and description of the structural features of continents, with special reference to the ethnic movements and commercial activities of mankind.
- III. *Industrial Geography.* Junior or senior II. *Professor Hall*  
(a) The relations of the Industrial development of North America to its physical structure.  
(b) The geography of Minnesota in its relations to the industrial resources and development of the state.  
Open to those who have taken course I or II.

- IV. Geology of Minnesota.** Junior or senior II. *Professor Hall.*  
 (a) An historical survey of the facts and principles of pre-Cambrian geology as exemplified in the geological features of the Lake Superior region and of Northern and Eastern Minnesota.  
 (b) A discussion of the geology and mineral resources of the state, particularly with reference to its deposits of clay, building stones, and ores.  
 Open to all who have taken course I.
- V. Historical Geology.** Junior or senior II. *Assistant Professor Sardeson.*  
 A course in Historical Geology from the biologic side including a study of the more important types of fossils in their geological relations. Lectures and demonstrations. Open to those who have completed course I, course VI or course XIII.
- VI. Paleontology.** Junior or senior I. *Assistant Professor Sardeson.*  
 This course includes an elementary study of fossil organisms, and a discussion of the sources and interpretation of paleontologic evidence and the relation to it of theories of evolution. Lectures and demonstrations. Occasional excursions will be arranged. Open to students of geology and biology.
- VII. Paleontology.** Senior I, II. *Assistant Professor Sardeson.*  
 The chief types of organisms as represented by fossils will be studied successively. The leading fossils and their phylogenetic history will be treated with considerable detail. Lectures and demonstrations. Open to students of geology and biology.
- VIII. Paleontologic Practice.** Senior I, II. *Assistant Professor Sardeson.*  
 The course may be taken by advanced students in Geology and Biology in conjunction with course VII. Exercise in the preparation and study of materials, examination of collections, and reading will be carried on with a view to more complete knowledge of the groups of fossil organisms as presented in course VII. Laboratory, and field work.
- IX. Elements of Rock Study.** Junior or senior I. *Mr. Parsons.*  
 1. The origin and occurrence of rocks. 2. The structure and texture of rocks. 3. Preliminary studies of the mineral, physical and chemical constitution of crystalline rocks with a view to their general description. 4. An introduction to the use of the microscope. *Kemps' Handbook of Rocks*; reference reading and demonstrations.
- X. Petrography** Junior or senior II. *Mr. Parsons.*  
 An investigation of the megascopic and microscopic characters of crystalline rocks; a discussion of their habit, mineral composition and genetic relations. The course discusses the historical succession and broader stratigraphic relations of rocks; it also extends into an examination of some Minnesota groups of crystallines. Practically a continuation of course IX. Laboratory, with lectures and reference reading.
- XI. Applied Geology.** Junior or senior I. *Mr. Parsons.*  
 An outline of the economic relations of Geology. The course comprises a discussion of the nature and distribution of non-metallic materials of economic value, including coal, mineral oil and natural gas; phosphates and other natural fertilizers; soils; the geologic conditions of water supply; abrasive and fertile materials; natural and artificial building stones; mortars and cements; road-making materials; followed by a brief summary of the nature and distribution of ore deposits. *Williams' Applied Geology* and reference reading.
- XII. Ore Deposits.** Junior or senior I. *Professor Hall.*  
 History of mineral discovery and development in the Americas; a discussion of the origin and distribution of ore deposits, embracing the chemical processes involved in their formation and subsequent alterations; a description of the geology and mineralogy of ore bodies, particularly those yielding gold, silver, copper, iron, lead and zinc.
- XIII. Outline of General Geology.** [1] Junior or senior I, II. *Professor Hall.*  
 This course treats of the leading physiographic facts and principles; the

Microscopic characters of the common rocks and a discussion of the general principles of Petrographical and Stratigraphical Geology. Lectures and reading supplemented by excursions and practical problems. Desirable especially for teachers.

XIV. *Special Problems.*

Senior II. *Professor Hall.*

The investigation by individual students of particular problems, involving the field work of an investigation of some particular formation and with the laboratory investigation and reading incident to the study of the material collected. The methods of systematically recording and interpreting geological and mineralogical data as observed in the field, the keeping of note-books and the preparation of geological maps, profiles and sections will be taught.

XV. *Field and Laboratory Practice.*

*Professor Hall.*

A study of the geography and geology of Minneapolis, Saint Paul and adjacent territory, embracing the salient physiographic, stratigraphic and economic features of this interesting region. Relief, topography and map work will receive attention in the laboratory as well as in the field. For teachers and others who wish to learn the methods of field geography and geology.

FOR GRADUATES.

XVI. *Petrographical Problems.*

*Professor Hall and Mr. Parsons.*

A study of rocks as geological bodies; the genesis of rocks and their chemical and dynamical alterations, illustrated in the gneisses and gabbro schists of the Minnesota river valley or the granites and basic eruptives of central Minnesota.

XVII. *The Keweenaw Eruptives I.*

*Professor Hall and Mr. Parsons.*

1. Of eastern and northeastern Minnesota, their stratigraphic relations, textural and structural characters; or, 2. Other problem to be selected on consultation.

XVIII. *Glacial Geology.*

*Professor Hall.*

The local features of glacial phenomena. Field work will form the special feature of this course, embracing the formations at Minneapolis or some area accessible from it, as a survey of the glacial axes in the vicinity, the gorge of the Falls of Saint Anthony, the Dalles of the Saint Croix and other problems. The special field to be selected on consultation.

XIX. *Paleontologic Geology.*

*Assistant Professor Sardeson.*

A study of the Ordovician fauna with special illustrations from the Ordovician of Minnesota and neighboring states.

XX. *Paleontology.*

*Assistant Professor Sardeson.*

The study of a selected group of fossils; a practical acquaintance with the forms and literature of the group is sought. The course is to be supplemented by a thesis.

Note 1: "Double courses" may be arranged by students of Geology by electing the following "Single courses:": Courses I and II; I and VI; V and IX; VI and VII; VII and VIII; XI and XII for the first semester, and courses III and IV; IV and V; VII and VIII; VII and X for the second semester.

Note 2: By vote of the General Faculty credit will be given to students who satisfactorily complete any of the field courses in Geology offered in the joint announcement of various universities for the summer of 1906.

MINERALOGY.

I. *Elements of Mineralogy.*

*I. Professor Hall and Mr. Parsons.*

(a) The morphology of minerals; the physical and chemical characters of minerals, with demonstrations; a study of the native elements and of economic minerals; the basis of classification.

(b) Laboratory work; this consists of practice in the recognition of crystal forms, tests illustrating the range of minerals, and the application of chemical and blowpipe analysis to the identification of species.

- II. Descriptive Mineralogy.** **II. Professor Hall and Mr. Parsons.**  
 (a) A study of the rock-forming minerals; the projection and construction of figures of crystals; the calculation of crystal-axes. **Theses.**  
 (b) Laboratory work; includes quantitative blowpipe analysis, crystal measurement, the slight determination of minerals, and reference reading.
- III. Quantitative Mineralogy.** **Sophomore or junior II.**  
*Professor Appleby and Mr. Christianson.*  
 Determination of value of ores. Lectures, recitation and laboratory work. Course I, Metallurgy, in the School of Mines.
- IV. Optical Mineralogy.** **Junior or senior II. Mr. Parsons.**  
 A study of the microscopic structure of crystals and crystal grains. An application of methods used in determining minerals by their optical properties: gonometric and stauoscopic practice, embracing the elements of lithology. Lectures and laboratory work.
- V. The Morphology of Minerals.** **Junior or senior I. Mr. Parsons.**  
 A study of crystallography, embracing projection and the geometric relations of crystal planes. The identification of minerals from crystal measurement and mathematical calculation. Crystal nomenclature.
- VI. Physico-chemical Methods with their Applications.** **Senior II. Mr. Parsons.**  
 The method of micro-chemical analysis described and demonstrated; the leading elements found in minerals are determined through the aid of crystalline precipitates of known compounds. Special attention is given to the study and determination of the rock-making minerals.
- VII. An Outline of Mineralogy.** [1] **Junior or senior. Mr. Parsons.**  
 A study of methods of identification of minerals, with their applications. Conferences, reading and demonstrations. Throughout the year.

## FOR GRADUATES.

- VIII. Original Problems in Morphological and Physical Mineralogy.**  
*Professor Hall and Mr. Parsons.*  
 Investigations in mathematical crystallography and its application to crystal development and structure. Further applications than are made in course IV of the optical characters of minerals in identification of mineral species.
- IX. Special Investigations in Physical and Chemical Mineralogy.** **Mr. Parsons.**  
 Special attention is here given to tenacity and electrical properties and their relation to crystal form, cleavage and fracture. Dimorphous compounds are investigated and the conditions governing their formation studied. The physical properties of artificial mineral compounds are compared with those of natural minerals.
- X. Description of Mineral Occurrence and Association.**  
*Professor Hall and Mr. Parsons.*  
 Genetic relationships. Field work in connection with the different phases of the particular problem in hand.

## GERMAN LANGUAGE AND LITERATURE

- I. German, beginning.** [5] **I, II.**  
*Professor Schlenker, Assistant Professor Wilkin, Mr. Juergensen, Mr. Burkhard and Mr. Williams.*  
 Pronunciation, grammar, selections in prose and verse. German conversation and composition (Bernhardt); short stories.
- II. German, intermediate.** **I, II.**  
*Professor Schlenker, Assistant Professor Wilkin, Mr. Juergensen, Mr. Burkhard and Mr. Williams.*  
 First semester—Selections from modern prose, narrative and descriptive;

- German lyrics and ballads. Second semester.—A drama of Lessing, Goethe or Schiller. Open to students who have completed course I.
- III. *Scientific Prose, intermediate.* I, II. *Mr. Juergensen.*  
 First semester.—Hodge's German Science Reader (or equivalent). Second semester.—Brandt and Day's German Scientific Reading. This course aims to give the student a reading knowledge of German for use in scientific studies. Open to students who have completed course I.
- IV. *Classic Prose and Poetry.* I, II.  
*Professor Moore, Assistant Professor Wilkin, Mr. Burkhard and Mr. Williams.*  
 First semester.—Meissner's Aus deutschen Landen; Goethe's Gedichte. Review of German grammar. (Etymology.) Second semester.—Heine's Prosa; Buch der Lieder. Review of German grammar (Syntax). Open to students who have presented German for admission.
- V. *Conversation and Composition.* [2] I, II.  
*Assistant Professor Wilkin, Mr. Juergensen, Mr. Burkhard and Mr. Williams.*  
 Translation into German of short English selections; conversation on topics of every-day life; narrative and descriptive essays, and letters in German. This course is designed to be supplementary to courses II, III or IV.
- VI. *The Drama.* I, II.  
*Professor Schlenker, Assistant Professor Wilkin, Mr. Juergensen and Mr. Burkhard.*  
 First semester.—Modern drama. Sudermann's Johannes, and Hebbel's Herodes and Marianne. Study of the present day drama in Germany. Assigned readings and reports; occasional lectures on related subjects. Second semester.—Classic drama. Lessing's *Nathan der Weise* and Goethe's *Egmont*. Study of dramatic structure; history of the drama in the 18th century. Open to students who have completed either course II, III or IV.
- VII. *Advanced Scientific Reading.* I, II. *Mr. Juergensen.*  
 Reading of monographs and periodicals. Open to students who have completed courses III or IV.
- VIII. *Advanced Conversation, Grammar and Composition.* [2] I, II.  
*Professor Schlenker and Assistant Professor Wilkin.*  
 Essays on assigned subjects; letter-writing; oral exercise in German by means of discussions on every-day subjects; debates, narration, and the like.  
 This course is intended as a preparation for course XVI and is open to students who have taken or are taking course VI. It is recommended that students shall have taken course V.
- IX. *German Literature of the Classic Period.* I, II. *Professor Moore.*  
 First semester.—Goethe's Faust; its genesis; Faust legend; its treatment in literature before and since Goethe's time. Plan of Goethe's Faust; change in the order of the scenes; solution of the Faust problem in Part II. Lectures and collateral reading; essays by the class. Schiller's ballads and other representative poems of this period. German versification.  
 Second semester.—Reading and discussion of Lessing's more important critiques; the Laocoon and Dramaturgie. Open to those who have completed course VI or VII.
- X. *Modern Authors. German Literature of the Nineteenth Century.* I, II  
 First semester.—Romantic School and Junge Deutschland. *Professor Moore.*  
 Second semester.—German literature since 1848. Open to those who have completed course IX.
- XI. *History of German Literature.* [2] I, II. *Mr. Juergensen.*  
 Lectures in German on the History of German Literature. Reviews and topical research on the part of the students. Open to graduates and seniors who have completed course IX.

- XII. Seminar in German Drama.** [1] I, II. *Professor Schlenker.*  
This course aims to give in outline the history of German dramatic literature from its beginning to, and including the classic drama. Open to graduates; also by permission of the instructor, to undergraduates, but without credit.
- XIII. Middle High German.** [2] I, II. *Professor Schlenker.*  
Study of the language and literature of the period. Paul's Mhd. Grammatik. Selected readings from Armer Heinrich, Nibelungen Lied, Gudrun, Walter von der Vogelweide, etc.  
Open to seniors and graduates who have completed course IX or X.
- XIV. History and Literature of the Reformation.** [2] I, II. *Professor Moore.*  
Brandt, Luther, Hutten, Sachs, Murner, and Fischart. Selections from Jansen and Egelhaaf. Open to seniors and graduates who have taken course IX or X.
- XV. The German Volkslied.** [2] II. *Mr. Williams.*  
Outline of the history and development of the Volkslied. Study of selected numbers in Umland's *Volkslieder* with references to other general and special collections. Influence of the folk-song upon lyric and ballad writers.  
Open to graduates who have completed course IX or X.
- XVI. Teachers' Course.** [2] II. *Professor Moore.*  
This course is especially designed for students who intend to become teachers in High Schools. Open to students who are taking or have completed course IX or X.

## GREEK.

- I. Brook's Introduction to Attic Greek,** [5] *Anabasis begun.* [5] I, II. *Professor Hutchinson.*  
Greek composition in connection with the text.  
No credit will be granted for the first semester's work unless that of the second also be completed.
- II. History. Anabasis continued.** I. *Assistant Professor Savage.*  
*Epic poetry. Iliad (elementary course).* *Professor Hutchinson.*  
The entire course must be taken to secure credit.  
For those who have completed course I.
- III. History. Xenophon; Cyropedeta or Hellenica; Herodotus.** I, II. *Assistant Professor Savage.*  
For those who offer two years of preparatory Greek for admission to the Freshman class. Open also to students who have finished course I when in the judgment of the Department they are qualified for the course.
- IV. Oratory.** I. *Assistant Professor Savage.*  
The author read will vary from time to time.  
Open to those who have finished course II or III.
- V. Philosophy. Plato.** II. *Assistant Professor Savage.*  
Open to those who have finished course II or III.
- VI. Poetry. Lyric and Bucolic Poets.** I. *Professor Hutchinson.*  
Open to those who have finished course II or III.
- VII. Poetry. Tragedy. Aeschylus or Sophocles.** II. *Professor Brooks.*  
Open to those who have completed course V.
- VIII. Philosophy (advanced course).** I. *Professor Hutchinson.*  
The Republic of Plato.  
Open to those who have completed course V.
- IX. Oratory (advanced course).** I. *Professor Hutchinson.*  
Demosthenes; De Corona.  
Open to those who have completed course IV.  
Courses VIII and IX are offered in alternate years course VIII in 1906-7.

- X. *Poetry. Epic (advanced course).* II. *Professor Hutchinson.*  
The Iliad and the Odyssey are offered in alternate years; the Odyssey in 1906-7. Open to those who have completed course VII.
- XI. *Modern Greek.* I. *Professor Brooks.*  
Open to all who have completed course IV or V.
- XII. *Archaeology of Greek Art.* I, II. *Professor Brooks.*  
Open to all Juniors and Seniors. A knowledge of Greek is not required.
- XIII. *Poetry. Dramatic.* [2] *Assistant Professor Savage.*  
*Euripides* I. *Aristophanes* II.  
Open to all who have completed course II or III.
- XIV. *Greek Composition (advanced course)* [1] I, II. *Professor Hutchinson.*  
Recommended to all who expect to teach Greek.  
Open to those who have finished courses IV and V.
- XV. *Greek Life and Literature.* [2] I, II. *Assistant Professor Savage.*  
This is a lecture course, and is open to all Juniors and Seniors. A knowledge of Greek is not required.
- XVI. *Greek Political Antiquities.* [1] I, II. *Professor Hutchinson.*  
A lecture course open to all Juniors and Seniors. A knowledge of Greek is not required.
- XVII. *Seminar.* [1] I. *Professor Hutchinson.*  
*In Connection with the Republic of Plato.*  
*In Connection with Course VII in Tragedy.* II. *Professor Brooks.*

## GRADUATE COURSES.

- XVIII. *Advanced Courses in Poetry.* *Professor Hutchinson.*  
*Epic and Lyric.* *Professor Brooks.*  
*Dramatic.*
- XIX. *Advanced Course in Oratory.* *Assistant Professor Savage.*
- XX. *Later Greek.* (322 B. C.—200 A. D.). *Professor Hutchinson.*
- XXI. *Advanced Course in Modern Greek.* *Professor Brooks.*

## HISTORY.

See social sciences. Page 160

## LATIN.

- I. *Livy Books, I, II, XXI, XXII. Selections.* **Freshman I.**  
*Professor Clark and Assistant Professor Granrud.*  
The course consists of (a) a correct translation of the Latin into idiomatic English with a study of the difference in the idioms of the two languages. (b) Latin composition and review of the principles of Latin syntax.
- II. *Plautus, Terence, Ovid. Selections.* **Freshman II.** *Professor Clark and Assistant Professor Granrud.*  
Translation of text with an outline study of the rise of the Roman drama and a study of Roman political institutions.
- III. *Horace—Selections from the Odes, Epodes, Satires and Epistles.*  
**Sophomore I.** *Professor Pike and Assistant Professor Granrud.*
- IV. *Selections from Pliny's Letters, with the History of Latin Literature.*  
**Sophomore II.** *Professor Pike and Assistant Professor Granrud.*
- V. *Teachers' Course in Caesar.* **Junior I.** *Professor Pike.*  
A review and teachers' drill upon Books I-IV of the Gallic war. A review of grammar and elementary Latin composition; a discussion of various problems connected with the teaching of Latin.  
For courses VI and VII, students must have taken courses I-IV.

- VI. *Teachers' Course in Virgil.* Junior II. *Professor Pike.*  
A review and drill upon Books I-VI of the Aeneid, a review of prosody and practice in the quantitative method of pronouncing Latin verse.
- VII. *Advanced Latin Composition and Lectures on Latin Style.* [2]. Junior II. *Professor Pike.*
- VIII. *Virgil's Aeneid, Books VII. II.* [1] Junior I. *Professor Pike.*  
The instructor will translate and comment. The student will not be required to prepare a translation, but will be expected to read the Latin understandingly after the instructor's explanation. Only students who are taking or have taken course VII will be allowed to register for this work.
- IX. *Roman Elegiac Poetry.* Senior I. *Professor Clark.*  
Catullus, Tibullus, Propertius and Ovid, with a study of the rise, development and characteristics of Roman elegiac poetry. Open to students who have completed the first four courses.
- X. *Correspondence of Cicero.* [2] Senior I. *Professor Clark.*  
A reading course in the letters of Cicero with a study of his life and of the history of his times.
- XI. *Roman Satire.* Senior II. *Professor Clark.*  
Juvenal, Persius, Horace, and fragments of early satire with a study of the rise, development and nature of Roman satire.  
FOR GRADUATES.
- XII. *Lucretius.* [2] *Professor Clark.*  
Translation and interpretation of the VI books "de rerum natura" with a study of his philosophy in its relation to his sources and to other Roman writers.
- XIII. *Outlines of Roman Law.* [2] *Professor Clark.*  
Reading of Robinson's Selections of Roman Law and first book of the Institutes of Justinian with lectures and topical study of Roman private law.
- XIV. *Graduate Seminar.* [2] *Professor Pike.*  
Interpretation of the Epistles of Seneca with a study of Stoic philosophy at Rome.
- XV. *The Orations of Cicero.* [2] *Assistant Professor Granrud.*  
Reading and interpretation of a few representative speeches. Special attention will be devoted to the technique and the language and grammar of the orations.

## MATHEMATICS.

### FOR UNDERGRADUATES.

The courses proceed in the order given through the first seven courses, though courses XI, XII and XIV can be taken earlier if desired. After that the courses may be taken in any order.

- I. *First Part Higher Algebra.* Freshman I. *Mr. Shumway.*  
For those not having an entrance credit in this subject.
- II. *Solid Geometry.* Freshman II. *Mr. Shumway.*  
For those not having an entrance credit in this subject.
- III. *Second Part Higher Algebra.* Freshman and Sophomore I. *Assistant Professor Bauer, Dr. Manchester, Dr. Dunkel, Mr. Shumway.*  
For those having a credit in course I. Variation, quadratic equations, special higher equations, simultaneous equations of the second degree, maxima and minima of algebraic functions, differentiation of algebraic functions, development of functions, logarithms, theory of equations and solution of numerical higher equations.
- IV. *Trigonometry.* Freshman and Sophomore II. *Assistant Professor Bauer, Dr. Manchester, Dr. Dunkel, Mr. Shumway.*  
For those having credits in courses I and II. Text, tables, and numerous applications.



- v. *Analytical Geometry*. [3 and 2] Sophomore I.  
*Professor Downey and Dr. Dunkel.*  
 The conic sections, both by rectilinear and polar co-ordinates, producing equations of loci whose law of development is known, constructing and discussing such equations, transformation of co-ordinates, properties of loci by means of their equations.
- vi. *Differential Calculus*. [3 and 2] Sophomore II.  
*Professor Downey and Dr. Dunkel.*  
 Differentiation of algebraic and transcendental functions, development of functions, indeterminate forms, maxima and minima, treatment of tangents, subtangents, normals, subnormals, asymptotes, direction and rate of curvature, evolutes, envelopes and singular points.
- vii. *Integral Calculus*. I. Professor Downey and Dr. Dunkel.  
 Integration of the various forms, rectification of curves, quadrature of plane and curved surfaces, cubature of volumes, equations of loci by means of the calculus, successive integration with applications, hyperbolic functions.
- viii. *Advanced Curve Tracing*. II. Professor Downey.  
 By aid of the Calculus. Open to those who have completed the first six courses.
- ix. *Differential Equations*. [3 and 2] I. Dr. Manchester.  
 Open to those who have completed the first seven courses.
- x. *Solid Analytical Geometry*. [3 and 2] II. Assistant Professor Bauer.  
 The plane, the straight line in space, quadric surfaces, applications. Open to those who have had the first seven courses.
- xi. *Theory of Equations*. II. Mr. Shumway.  
 Based on the text of Burnside and Pantou. Open to those who have completed the first six courses.
- xii. *Mathematical Pedagogy*. [1] I. Assistant Professor Bauer.  
 Elementary and Higher Algebra, Plane and Solid Geometry, with special reference to the fundamental principles and the unity of the respective subjects.  
 Open to those who have completed the first six courses.
- xiii. *Method of Least Squares*. [2] Professor Leavenworth.  
 A study of the combination and adjustment of observations and the discussion of their precision as applied especially to Engineering, Physics and Astronomy. Open to those who have completed the first seven courses.
- xiv. *Descriptive Geometry*. [2] I, II. Assistant Professor Kirchner.  
 Problems relating to points, lines, planes, solids, surfaces of revolution and warped surfaces; orthographic, isometric, horizontal, oblique, and perspective projections; shades and shadows. Recitations, lectures and practice. Open to those who have completed the first five courses.
- xv. *Applied Mechanics*. [5] I, II. Professor Eddy.  
 Statics, dynamics, strength and elastic properties of the ordinary materials of construction, hydro-mechanics (study of the laws of pressure and the flow of liquids). Recitations and lectures. Open to those who have completed the first seven courses.

## FOR GRADUATES.

- xvi. *Advanced Differential and Integral Calculus*. [2] Professor Downey.  
 This course goes farther into some of the subjects treated in courses VI and VII and takes up some important subjects not included in those courses.
- xvii. *Theory of Curves and Surfaces*. [2] Assistant Professor Bauer.  
 This is a course in Differential Geometry. The fundamental equations of the theory of curves and of surfaces will be developed. The work will be based upon Scheffer's *Theorie der Curven* and *Theorie der Flachen*.

- XVIII. *Theory of Functions of a Complex Variable.* [2] *Dr. Manchester.*  
Lectures, readings and problems. The course presupposes a knowledge of Differential and Integral Calculus and Differential Equations.
- XIX. *History of Mathematics.* [2] *Professor Haynes.*  
Lectures and reading, under direction, of works in the mathematical library on the ancient and the modern development of Mathematics.
- XX. *Projective Geometry.* [3] *Assistant Professor Kirchner.*  
A study of the theory and methods of Projective Geometry, perspective, homology, duality, cross-ratios, collineation, reciprocals, conics, systems of conics, ruled surfaces, and special problems and exercises.
- XXI. *Perspective.* [32] *Assistant Professor Kirchner.*  
The principles and practice of Perspective, including shadows, reflections, distortions, corrections, systems, methods, inverse constructions, and the practical problem.  
Courses V to XV inclusive are offered to those who do not elect them in their undergraduate years, courses VIII, IX, X, XIII, XV counting as minors in graduate courses.

## MILITARY SCIENCE AND TACTICS.

CAPTAIN EDWARD SIGERFOOS, Ph. B. 5th U. S. Infantry, Commandant.

For the instruction in military drill and administration the students are organized into a corps of cadets, consisting of four battalions of infantry, a band and a platoon of artillery.

A uniform of prescribed pattern is worn by all cadets during drill.

The uniform consists of blouse, trousers, vest and cap, modelled after the U. S. Military Academy cadet uniform, and costs in Minneapolis about \$15, and is as neat and economical dress as the student can obtain.

Drill is required of all men in the freshman and sophomore classes.

Military drill may be taken voluntarily by others outside of the freshman and sophomore classes; and to encourage this, as it is considered beneficial, not only to the individual student, but to the State generally, the extra work is considered by allowing a year's drill to count as a two-hour credit for one semester, but no credit will be allowed for such drill for less than one year.

In addition to the above, a course is given in Military Science, optional with the seniors and juniors, during the 2d semester, two hours a week. This work when satisfactorily completed taken in connection with the year's drill will give a four-hour credit for the semester.

Military instruction is intended to be so conducted as to develop a soldier-like bearing and foster a spirit of gentlemanly courtesy, soldierly honor and obedience to lawful authority, as well as to familiarize students with company and battalion manoeuvres, guards and the theoretical and practical use of fire-arms.

On graduation of each class the Commandant will report to the Adjutant-General of the Army the names of the graduates who have shown special aptitude for the military service and furnish a copy thereof to the Adjutant General of the State.

The officers and non-commissioned officers are required to be good students in the other departments, soldier-like in the performance of their duties, exemplary in their general deportment and able to pass a creditable examination in drill regulations. In general, the officers are selected from the senior class; the sergeants from the junior class; and the corporals from the sophomore class.

Freshman—Practical instruction in schools of the soldier, company and battalion; signals, ceremonies; schools of the cannoner and battery.

Sophomore—Practical and theoretical instruction in schools of the company and battalion: Advance and rear guard drill; practical and theoretical instruction in guard duty. Gallery practice. Ceremonies.

Junior, senior—Theoretical instruction—Advance and rear guards, outposts, reconnaissance, camping; duties of company commander; articles of war; records.

## ROSTER OF THE CORPS CADETS.

## FIELD STAFF AND BAND.

Cadet Lieutenant-Colonel, Chas. P. Schouten.  
 Cadet Captain and Adjutant, R. M. Funk.  
 Captain and Quartermaster, H. P. Councilman.  
 Instructor of Music, B. A. Rose.  
 Cadet Chief Musician, A. T. Rowe.

## FIRST BATTALION.

Cadet Major, Wm. Dawson.  
 Cadet First Lieutenant and Battalion Adjutant, H. H. Miller.  
 Cadet Second Lieutenant and Battalion Quartermaster, R. W. Muir.

## COMPANY A.

Cadet Captain, H. C. Mackall.  
 Cadet First Lieutenant, L. A. Frey.  
 Cadet Second Lieutenant, A. L. McAfee.

## COMPANY B.

Cadet Captain, F. W. Putnam.  
 Cadet First Lieutenant, W. G. Coapman.  
 Cadet First Lieutenant, R. T. Knight.

## COMPANY C.

Cadet Captain, M. D. Bell.  
 Cadet First Lieutenant, C. W. Norton.  
 Cadet Second Lieutenant, E. G. Eklund.

## SECOND BATTALION.

Cadet Major, Roy H. Smith.  
 Cadet First Lieutenant and Battalion Adjutant, R. G. Davidson.  
 Cadet Second Lieutenant and Battalion Quartermaster, E. J. Pohlman.

## COMPANY D.

Cadet Captain, L. D. Burwell.  
 Cadet First Lieutenant, W. H. Sprague.  
 Cadet Second Lieutenant, R. J. Moulton.

## COMPANY E.

Cadet Captain, H. C. Hawley.  
 Cadet First Lieutenant, E. C. Starrett.  
 Cadet Second Lieutenant, J. H. Ray.

## COMPANY F.

Cadet Captain, A. C. Peterson.  
 Cadet First Lieutenant, L. A. Jones.  
 Cadet Second Lieutenant, C. L. Wilson.

## THIRD BATTALION.

Cadet Major, Elbe A. Lathrop.  
 Cadet First Lieutenant and Battalion Adjutant, F. H. Sargent.  
 Cadet First Lieutenant and Battalion Quartermaster, E. S. Ramstad.

## COMPANY G.

Cadet Captain, H. D. Garrett.  
 Cadet First Lieutenant, C. H. Seavey.  
 Cadet Second Lieutenant, W. C. Garrett.

## COMPANY H.

Cadet Captain, F. W. White.  
 Cadet First Lieutenant, S. Vinje.  
 Cadet Second Lieutenant, H. C. Christie.

COMPANY I.

Cadet Captain, R. L. West.  
Cadet First Lieutenant, G. S. Taylor.  
Cadet Second Lieutenant, J. I. Swedberg.

FOURTH BATTALION.

Cadet Major, Jas. B. Angell.  
Cadet First Lieutenant and Battalion Adjutant, E. C. Rudolph.

COMPANY K.

Cadet Captain, W. C. McClure.  
Cadet First Lieutenant, E. Ulrich.  
Cadet Second Lieutenant, J. Haw.

COMPANY L.

Cadet Captain, H. F. Murphy.  
Cadet First Lieutenant, R. N. Hall.  
Cadet Second Lieutenant, W. S. Skogland.

COMPANY M.

Cadet Captain, C. H. Winters.  
Cadet First Lieutenant, H. H. Clapp.  
Cadet Second Lieutenant, O. K. Lathrop.

DETACHMENT ARTILLERY.

Cadet Captain, C. G. Stadfield.  
Cadet Second Lieutenant, W. R. Robb.

MUSIC.

I. *Theory of Music—Harmony (thorough bass)* [2] Junior I, II.

- Assistant Professor Scott.*
- (a) First semester—Intervals, scales, principal triads and their inversions; the chord of the dominant seventh and its inversions; a short practical course of ear-training to begin simultaneously with the triads.
- (b) Second semester—The secondary triads and secondary chords of the seventh and their inversions; the nature of modulations, suspensions, passing notes, organ point, chromatically altered chords; cross relations; chorals—ear-training to be continued part of semester, to be followed by short course of musical analysis; sonata form, the rondo, the string quartette, the symphony, illustrated on classic models.

II. *Advanced Musical Theory—Counterpoint.* [2] Senior I, II.

*Professor Oberhoffer or Assistant Professor Scott.*

This course is open only to students who have completed course I, or equivalent.

- (a) First semester—Single counterpoint, imitation, canon; musical history introduced, chronological comparison and biography.
- (b) Second semester—Double counterpoint, the fugue composition; musical form and history continued.

III. *Choral Culture.* [2] Junior or senior I, II. Professor Oberhoffer.

A popular course in choral practice for four-part mixed voices, with occasional selections for male voices and female voices separately; features—sight singing with hints on proper tone-production, correct breathing, vocalization and solfeggio; the art-forms in choral compositions will be studied and analyzed. (Chorus a capella, motet, cantata, oratorio.)

A single credit may be secured for chorus work, provided that students pursuing the work for credit pursue courses I or II at the same time. Students may pursue the chorus work, without credit, by paying the required fee and securing consent of the director.

IV. *Pianoforte* (advanced). Junior and senior I, II.

*Professor Oberhoffer and Assistant Professor Scott.*

For students who intend to pursue the higher branches of the art of pianoforte playing (2 years—4 semesters), for those who intend to

fit themselves for piano teachers. While private lessons are the rule, classes of no more than four students may be arranged. Students in this course should have mastered technical difficulties of the degree of Czerny's School of Velocity and the easier Haydn and Mozart sonatas.

*Resume*—The practical aim of the theoretical courses is to acquaint the student with the laws underlying musical composition, enabling him at the same time through critical analysis to arrive at the keenest perception and appreciation of masterworks in music, and finally to stimulate latent talent to self-expression of musical thoughts in correct form.

All students electing courses I or II must pay a registration fee of four dollars a semester; courses II and III, five dollars; course III alone, two dollars. Students electing the piano must pay, in addition, a fee, the amount to be announced upon application.

Students entering the University for the express purpose of studying music must register for at least one subject outside of the department of music.

For courses I or II 2 credits are given.

For course IV, one lesson a week, 1 1-2 credits are given; two lessons a week, 3 credits are given.

For courses I or II together with course IV 3 credits are given.

## PHILOSOPHY AND PSYCHOLOGY.

The introductory courses in this department are I, IX, XIV. Course I is required for all advanced work in Psychology and either I, IX or XIV for all work in Philosophy.

- I. *Elements of Psychology. I or II. Professor Wilde, Mr. Swenson, Dr. Miner.*  
This course is required for all advanced work in Psychology and for the teacher's certificate; it also serves as an introduction to the courses in Philosophy. The purpose of the course is to acquaint the student with the general characteristics and laws of mental life and with the aims and methods of Modern Psychology. The work consists of text books, lectures, and essays. Open to sophomores, juniors and seniors.
- II. *Educational Psychology. I or II. Dr. Miner.*  
The study of mental development in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education. Open only to those who have completed course I.
- III. *Analytic Psychology. II. Mr. Swenson.*  
An advanced course treating in detail the more important problems of Psychology. Open only to those who have completed course I.
- IV. *Outline of Experimental Psychology. II. Dr. Miner.*  
A study of the methods and accredited results of experimental investigation in Psychology. Class-room demonstrations, lectures, and discussions. Open only to juniors and seniors who have completed course I.
- V. *Experimental Psychology—the Senses. I. Dr. Miner.*  
Four hours of laboratory work and one hour of discussion. With course VI, this provides a broad survey of experimental methods and results as well as a training for laboratory research in Psychology. Typical experiments on sensation and movement. Open only to those who have completed course I. (Not given until 1907-8)
- VI. *Experimental Psychology—Higher Mental Processes. II. Dr. Miner.*  
If possible this course should follow course V. It continues the same plan, with experiments on affection, memory, attention, and such other processes as can be studied by laboratory methods. The quantitative phase of Experimental Psychology is taken up for special discussion. Open only to those who have completed course I. (Not given until 1907-8)
- VII. *Psychological interpretation. I. Dr. Miner.*  
Unusual and pathological mental states are studied for the light they throw upon normal mental life. The student is given drill in psycho-

- logical explanation of mental defectives and of characters in history and literature. The subconscious, dreams, suggestibility, telepathy, nervous disorders, insanity, secondary personalities, and the crowd are among the topics treated. Open only to those who have completed course I.
- VIII. *Research in Psychology.* I or II. *Dr. Miner.*  
Original work on special topics. Credit hours to be determined by conference with the instructor. Open only to those who have completed courses v and vi, or their equivalent.
- IX. *Logic.* I or II. *Professor Wilde, Mr. Swenson.*  
A study of the nature of knowledge, the laws of reasoning, and the principles and methods of scientific proof. The aim of the course is to produce accuracy of thought as well as to familiarize the student with the logical grounds of modern science. Textbook, lectures and reports. Open to sophomores, juniors and seniors.
- X. *Ancient and Medieval Philosophy.* I. *Professor Wilde.*  
This and the following course are designed to give such an outline of the history of thought as is desirable in a general education. Emphasis is placed upon the human significance of philosophy rather than upon its purely technical aspect. In this first semester the main work will be upon the philosophies of Plato and Aristotle but the later development will be traced as far as the Renaissance. Open only to juniors and seniors who have had course I, IX, or XIV.
- XI. *Modern Philosophy.* II. *Professor Wilde.*  
Lectures on the representative systems of Modern Philosophy from the Renaissance to our own day, the purpose of the course being to prepare the student to understand the philosophical tendencies of the present. The work will include a study of Bacon, Descartes, Spinoza, Leibnitz, Locke, Berkeley, Hume, Kant, Mill, Shopenhauer. Open only to juniors and seniors who have had course I, IX or XIV.
- XII. *The Principles of Ethics.* I. *Professor Wilde.*  
An introductory course, comprising a study of the distinction between moral and non-moral phenomena, an analysis of voluntary conduct, and a discussion of the nature of conscience, the meaning of right and wrong, the purpose of life, human responsibility, and the authority of moral law. Open to those who have completed course I, IX or XIV.
- XIII. *Philosophy of Religion.* II. *Professor Wilde.*  
A study of the religious consciousness, its origin, development, and significance; an analysis of the conception of God and a discussion of the place and function of religion in modern life. Open only to those who have completed course I, IX or XIV.
- XIV. *Logic of Science.* I. *Mr. Swenson.*  
This course serves as an introduction to philosophy through the medium of the special sciences, its aim being to suggest a system of the sciences through a discussion of the nature and relations of their fundamental principles.
- XV. *Philosophy of Herbert Spencer.* [2] II. *Mr. Swenson.*  
The course will consist of a critical reading of the First Principles, with references also to the philosophical position of such scientists as Huxley, Tyndall, and Darwin; the aim being to discuss the epistemological foundations of science, and to consider the relative position of science among the other interests of life.

## FOR GRADUATES.

Courses from the following list will be offered to graduates each year as determined by the needs and qualifications of the students presenting themselves. It is desirable that students consult with the department as early in the session as possible in order that the courses and hours may be arranged to suit the greatest number.

- XVI. *The Philosophy of Aristotle.* *Mr. Swenson.*  
A critical reading of his logical treatises, the *Metaphysics*, and the *Psychology* in the original Greek.

- XVII. *The Philosophy of Kant.* Mr. Swenson.  
A critical reading of the three critiques; the relation of Kant to the development of modern philosophy.
- XVIII. *The Philosophy of Hume.* Mr. Swenson.  
A critical reading of Hume's philosophical works, the position of Hume in the development of English philosophy.
- XIX. *The Philosophy of Descartes, Spinoza, and Leibniz.* Mr. Swenson.
- XX. *The History of Ethics.* Professor Wilde.  
A critical reading of the chief works in the History of Ethics.
- XXI. *Systematic Ethics.* Professor Wilde.  
A detailed study of the principles of conduct and the basis of moral obligation.
- XXII. *German Idealism.* Professor Wilde.  
A critical discussion of the philosophies of Fichte and Hegel.
- XXIII. *Metaphysics.* Professor Wilde.  
A critical and constructive discussion of theories of knowledge and reality.
- XXIV. *Swedish Philosophy.* Professor Carlson.  
A historical review of Swedish philosophy during the XIX century and a critical study of the rationalistic idealistic system of Bostrom and his followers.
- XXV. *Psychological Problems.* Dr. Miner.  
Minor or major research in experimental, educational, analytic, genetic or comparative psychology.

## PHILOSOPHICAL SEMINAR.

The seminar meets bi-weekly in the evening during the winter months to read and discuss contemporary philosophy. The membership consists of the professors, instructors, and qualified students of the department.

## PHYSICAL CULTURE.

## FOR WOMEN.

Miss Butner and Miss Matson

The course in Physical Culture is offered to the women of the University as a regular part of their work in the freshman year, and may be taken in any of the following years. A full year of work, in addition to the work required in this department, counts as a two-hour credit in the second semester of the senior year. The work consists of systematic exercises for the development of all parts of the body. Women pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and bloomers, with the regulation gymnasium shoes. All suits must be of black material.

It is a common observation that students often enter the University with an imperfect physical development because of an excessive use of some muscles, while others are weakened through disuse. This occasions attitudes and movements that are unseemly in appearance and unhealthy in their general effect.

The purpose of this course is to develop a strong and symmetrical physique with a graceful and easy carriage.

A physical examination is made of each student and physical measurements are taken in the fall and again in the spring.

In addition to the regular class work, sports and pastimes are open to all young women of the University. These include basket ball, battle ball and numerous other ball games, and also running games, all of which tend to cultivate the play instinct and give the nerve stimulus that comes from natural play.

## FOR MEN.

Dr. Cooke and Dr. Litzenberg.

A well equipped Gymnasium in charge of a professional Medical Director is open for the young men. The training and exercise is under the immediate oversight and authority of the Medical Director and is wholly with a view to the healthful physical development of the whole student body.

All young men are required to be examined by the Medical Director of

physical culture upon registration and during the course as often as the indications of the physical condition may require.

The decision of the Director will be either:

1. Advisory, indicating what course of hygiene and exercise will best sustain and improve the health of the student, or
2. Mandatory, requiring the students to pursue the course of hygiene and physical exercise necessary for the proper care of health and the discharge of their duties as students.

Gymnasium work is required of all men in the freshman class, one hour per week (in two half-hour periods if the director so decides) throughout the year. The required work includes a course of lectures on personal hygiene, during the first term.

### PHYSICS.

- I. *Mechanics, Properties of Matter, Heat, Sound.* [6] Sophomore I.  
*Professor Jones and Assistants.*  
Experimental Lectures, Recitations and Laboratory Work.  
Open to those who have completed Algebra and Trigonometry of Courses III and IV.
- II. *Light, Electricity and Magnetism.* [6] Sophomore II.  
*Professor Jones and Assistants.*  
Experimental Lectures, Recitations and Laboratory Work.  
Open to those who have completed Course I.
- III. *Electrical Measurements.* [3] Junior and senior I.  
*Assistant Professor A. Zeleny.*  
Lectures and Laboratory Work.  
Open to those who have completed Course II.
- IV. *Physical Manipulations and Laboratory Technique.* [3] Junior and senior II.  
*Professor J. Zeleny.*
- V. *Theoretical Mechanics.* [3] Senior II and Graduates.  
*Professor Jones.*  
Open to those who have completed Calculus and Course I.
- VI. *Advanced Laboratory Work.* [3] Senior I and Graduates.  
*Professor J. Zeleny.*
- VII. *Advanced Laboratory Work.* [6] Senior I and Graduates.  
*Professor J. Zeleny.*  
Open to those who have completed Course II.
- VIII. *Advanced Laboratory Work.* [3] Senior II and Graduates.  
*Professor J. Zeleny.*  
Open to those who have completed Course II.
- IX. *Advanced Laboratory Work.* [6] Senior II and Graduates.  
*Professor J. Zeleny.*  
Open to those who have completed Course VI.

### FOR GRADUATES.

- X. *Kinetic Theory of Gases.* [3] Graduates.  
*Mr. Erikson.*  
Open to those who have completed Course II.
- XI. *Radio-activity.* [3] Graduates.  
*Mr. Kovarik.*
- XII. *Discharge of Electricity through Gases.* [3] Graduates.  
*Professor J. Zeleny.*  
Open to those who have completed Course II.
- XIII. *The Theory of Light.* [3] Graduates.  
*Professor Jones.*  
Open to those who have completed Course II.
- XIV. *The Mathematical Theory of Electricity and Magnetism.* [3] Graduates.  
*Professor J. Zeleny.*  
Open to those who have completed Course III.

### POLITICAL SCIENCE.

See Social Sciences, page 164.



## RHETORIC AND ELOCUTION.

## RHETORIC.

- I. Rhetoric.** Freshman I, II.  
This course includes the study of formal Rhetoric, the writing of compositions, and the study and analysis of masterpieces of prose. Students who have had special preparation in Debate may, by consent of the Head of the Department, substitute Argumentation for Rhetoric. This course aims at instruction in the science of argumentation and in the art of debate. The work consists of study of the laws and processes of reasoning, and their application to written and spoken argument. Speeches of eminent lawyers, made before courts in the trial of famous cases, are briefed and analyzed. Practical exercises in debate on the floor are a feature of the course.
- II. Rhetoric.** Sophomore I, II. *Assistant Professor Comstock.*  
A continuation of course I. Open also to sophomores of whom, at entrance, Rhetoric was not required. The making of plans and outlines and writing of compositions will form the greater part of the work. Some study of models of prose will be required.
- III. Literary Criticism.** Junior I, II. *Professor Sanford.*  
Study of models of English poetry, oratory, fiction, etc., with critical essays.
- IV. Lectures upon History of Art.** Senior II. *Professor Sanford.*  
With essays on art subjects.
- V. Debate.** Senior I, II. *Professor Sanford.*  
This course aims at the training of men in public speaking. It consists of theoretical work in argumentation. Standard debates and orations are analyzed and briefed; original debates are briefed, written and rehearsed for criticism. Special emphasis is laid upon class room debate with criticism on delivery, thought and composition. Not offered in 1906-7.
- VI. Advanced Rhetoric.** Junior I, II. *Assistant Professor Comstock.*  
Structure and style, theoretically and practically considered, are subjects of study in this course. Some time is given to the oral presentation of topics. In the composition work the student is allowed to select his own subjects and methods of treatment.

## ELOCUTION.

- VII. Reading.** Freshman I, II. *Professor Sanford.*  
The object of this course is voice building and training in interpretation and expression. The text used is Shaksperes Plays. Three times per week, to count for two credits.
- VIII. The Physical Side of Vocal Expression.** Junior, senior I. *Assistant Professor McDermott.*  
This course aims at the following objects: An understanding of the vocal mechanism; the strengthening and cultivation of the voice; the correction of foreign accent, defective enunciation and common faults of quality such as aspirated, oral, pectoral, guttural and nasal tones; the specific application of the principles of clearness, simplicity, strength and variety in delivery. Interpretation is approached from within not from without and correct thinking is made the basis of correct expression.
- IX. The Psychological Side of Vocal Expression.** Junior or senior II. *Assistant Professor McDermott.*  
In this course the functions of the dramatic instinct, the will, the intellect, the imagination and the emotions, are considered independently and conjointly with reference to delivery. The effect upon expression of the neglect of any one of these elements is shown and literature is studied with a view to the harmonious development of all.
- XII. American Oratory.** Junior or senior I. *Assistant Professor McDermott.*  
Standard orations are analyzed: synopses, oral biographies, accounts of historical settings and expositions of the orator's style and logic are required. Forensics and debates are prepared and one original oration

each semester is required, and a short selection from the oration under consideration is committed for practice in delivery, and short stories from best modern authors are retold for fluent command of English. Besides class work each student is given a brief period for individual criticism; for this reason only a limited number can be admitted.

- XIII. *British Oratory and Ancient Oratory.* Junior or senior II.  
*Assistant Professor McDermott.*  
 A continuation of course XII.

FOR GRADUATES.

- XIV. *Principles of Criticism.* *Mr. Firkins.*  
 This course consists of a brief survey of the elements of literature, and a longer review of the forms (e.g. the lyric, the epic, the drama, the short story, the novel, the biography, and the like), which literature assumes.

SCANDINAVIAN.

*Professor Carlson.*

FOR UNDERGRADUATES.

- I. *Swedish, beginning.* [5] Elementary study of the language. I, II.  
 II. *Swedish, advanced.* I, II.  
 Grammar, composition, oral and written exercises, translations and an elementary study of the literature.  
 III. *Danish-Norwegian, beginning.* [5] Elementary study of the language. I, II.  
 IV. *Danish-Norwegian, advanced.* I, II.  
 Grammar, composition, oral and written exercises, translations and an elementary study of the literature.  
 V. *Old Norse.* [2] I, II.  
 Grammar and composition.  
 VI. *Scandinavian Literature.*  
 History of the literature and study of special authors.

FOR GRADUATES.

- VII. *Icelandic or Old Norse.*  
 The history, language and literature of Iceland and Norway from earliest times to 1500 A. D.  
 VIII. *Old Swedish.*  
 The history, language and literature of Sweden from earliest times to 1500 A. D.  
 IX. *Old Danish.*  
 The history, language and literature of Denmark from earliest times to 1500 A. D.  
 X. *Modern Danish Language and Literature.*  
 XI. *Modern Swedish Language and Literature.*  
 XII. *Modern Norwegian Language and Literature.*

SEMITIC LANGUAGES.

*Rabbi Deinard.*

- I. *Elementary Hebrew.* I, II.  
 Harper's Elements of Hebrew and reading of easy prose passages of the Old Testament.  
 II. *Advanced Hebrew.* I, II.  
 Critical reading of some Old Testament book, with a review of Hebrew grammar.

- III. *Elementary Arabic.* I, II.  
Socin's Arabic Grammar and reading of the prose selections contained in it.
- IV. *Advanced Arabic.* I, II.  
Selected Suras of the Koran and a review of Arabic grammar.
- V. *Elementary Aramaic or Syriac.* I, II.  
Strack's Grammatik des Biblischen Aramaisch, and Brockelman's Syrische Grammatik.
- VI. *History of the Hebrews to the Close of the Persian Period.* I, II.  
Political, religious and social. The English Bible will be used as a text book, a careful study of the Palestinian and Assyro-Babylonian inscriptions will be made, and the works of some modern writers on Hebrew history will be consulted. No knowledge of any Semitic language is required for this course.

## SOCIAL SCIENCES

The departments of Economics and Politics, History, and Sociology constitute a Social Science group. The subjects are intimately inter-related, and they are all of especial importance to students who intend to engage in law, business, public service at home or abroad, journalism, the work of Charities and Corrections, or to give instruction in one of the Social Sciences. Students who are interested in the work of any one of the departments of the Social Science group ought to be familiar at least with the elements of the subjects offered in the other departments. A student who really specializes in any one of them ought to have more than the elements of the others.

To emphasize these common interests, and to facilitate the choice of related subjects by the student, the courses of these departments are grouped in the following pages under the common heading "Social Sciences;" and, to aid students in planning their work, the Departments unite in the following recommendations.

### GENERAL RECOMMENDATIONS.

#### I. Freshman and Sophomore Years.—

1. In order that he may arrange long sequences to the best advantage, the student should take the elementary work of each Department within the group as early as possible. Accordingly the following courses are recommended:

Freshman year:—History II (English Constitutional); sophomore year:—History V (American); Economics I, first or second semester; Politics I, first or second semester.

2. The student is advised to take in these years his required long course in science from the Departments of Botany or Animal Biology, and his required long course in language from French or German beginning courses—unless he has a reading knowledge of both these languages at entrance.

#### II. Junior and Senior Years:—

A minimum of ten three-hour semester-subjects is advised from the Social Sciences (five semester-subjects for each of these years).\*

With the preparation indicated above for the first two years, the student will be fairly fitted to choose his upper years' work from the catalog courses according to his individual needs and purposes. It is recommended, however, that, before the close of the sophomore year, each student who is specializing within the Social Science group choose an advisor from the faculty of these Departments, and that, for all subsequent registration, he have the counsel of such advisor. The officers of these Departments will be glad to receive into this relation such students as may signify their desire for it.

\*The total of work suggested in the Social Science group is a little less than two-fifths of the college course.

## ECONOMICS.

#### I. *Elements of Economics.*

I or II. *Professor McVey.*

A thorough course in the elements of economics. The aim is to inculcate accepted doctrine, and show the nature and bearing of economic theory on present day problems. Given in each semester.

Text book, problems, lectures and discussions.

- II. *Economic Geography.* I. *Professor McVey.*  
A course in geographical influences on commerce and trade together with a presentation of the growth of industry and a consideration of the development of commercial centers. Not given in 1906-7.  
Text book, lectures and special papers.
- III. *Money and Banking.* II. *Professor McVey.*  
A course open to students who have had course I.  
Students desiring but one year's work in economics are advised to take this course following the work in elements of economics. If a longer course is desired, advanced economics should follow course III. This is an elementary course illustrated by constant references to monetary legislation. Text books, lectures, papers and discussions.
- IV. *Modern Industrial Legislation.* II. *Professor McVey.*  
A general course open to sophomores and upper classmen.  
A course based upon McVey's *Modern Industrialism*. This course deals with the problems and legislation arising from industrial conditions such as labor questions, trusts, monopolies, etc. Assigned topics, lectures, and collateral reading.
- V. *Corporation Finance.* I. *Professor McVey.*  
This course is open to students who have had course I.  
A study of the methods of financing modern corporations, their position in the law and the analysis of their accounts and statements. Text-books, Green, *Corporation Finance*; Ripley, *Trusts, Pools and Corporations*; Wyman's *Cases*; Robinson's *Investment Securities*; Woodlock, *Anatomy of a Railroad Report*. Lectures, collateral reading and problems.
- VI. *Public Finance Part I.* I. *Professor Folwell.*  
Public expenditures, national, state and local from the standpoint of public wants; budget framing; treasury administration and accounting; public debts in peace and war. Illustrations chiefly from American practice. Lectures and exercises.
- VII. *Public Finance Part II.* II. *Professor Folwell.*  
The public revenue, national, state and local—from taxation and other sources. In particular, the principles and practice of taxation in the United States.
- VIII. *Advanced Economics.* I. *Professor McVey.*  
In this advanced course further consideration is given to selected topics from the course in elementary economics. Caryer *Distribution of Wealth* and Taylor's *Economics of Agriculture* are used as texts, supplemented by readings and problems. Lectures, papers and discussions.
- IX. *Transportation. [2]* II. *Professor Folwell.*  
The evolution of transportation in the United States, and of railroads in particular. Economic aspects, public policy and finance of railroad-ing. Open to seniors in the College of Engineering.
- X. *Monetary History of the United States. [1]* I, II. *Professor McVey.*  
In this course the problems arising from the changes and alterations in the money of the United States from 1770-1900 are discussed. The work consists of lectures and assigned topics based upon Hepburn's *Contest for Sound Money* and Noyes' *Thirty Years of American Finance*. Students registering for this course are required to have the element of economics, course I, and money and banking course III. The section meets one hour each week throughout the year. The hour of meeting will be determined by the convenience of students and instructor.
- XI. *Economic Conditions in American Cities. [1]* I. *Mr. Solenberger.*  
Students must have course I in Economics or course I in Sociology to register for this subject.  
A study of the causes of economic dependence in American cities, the standard of living and the constructive agencies for economic betterment.
- XII. *Methods of Investigation. [1]* II. *Professor McVey.*  
Open to Juniors and Seniors who have had course I.  
A course in methods of using libraries, collecting and organizing material, followed by the actual investigation of important questions.

XIII. Insurance.

I. Lecturers.

A course in the principles of life insurance, its history and theory with application to standard policies. Lectures are provided by the Minneapolis Life Underwriters Association. The lectures are given once a week during part of semester. The course is open to any student without credit. In addition the same association gives a prize of \$50 for the best essay on Life Insurance by a member of the class.

The titles of the lectures are as follows: (1) The History of Insurance and its Development in the United States. (2) Definition of Life Insurance, Terms and Types of Policies. (3) Computation of the Premium: The Reserve and its Organization and its Use. (4) The Dividend in Life Insurance (a) Deferred; (b) Annual. (5) Assessment Insurance. (6) The Work of the Agent and his Relation to the Company and the Policy Holders: The Rights of the Policy Holder. (7) Medical Selection. (8) Life Insurance as an Economic Force.

XIV. Economic Schools and Movements.

d. h. I. II. Professor Folwell.

XV. Statistics and Economics.

d. h. I. II. Professor Folwell.

The two courses last named are given in rotation with course X in politics in a seminar for graduates and seniors especially interested and qualified. Course XIV will be offered in 1906-7. Additional courses may be offered by Professor Folwell.

FOR GRADUATES.

The particular lines and subjects of study are selected by individuals or groups after consultation with the professors of the department. When insufficiently grounded in elementary subjects, graduates are permitted to join undergraduate sections, but are expected to do more work than is required of undergraduates.

HISTORY.

Course I or course II is required for admission to any of the higher courses.

Course I is designed for students who have had less than two years of history in preparatory schools. It does not count towards a long course. Students who have had the requisite entrance history (see next paragraph) may omit I and take II. Course I admits directly to II, III, IV, XV.

Course II is required for all courses in American history (V-VIII, XI, XIII and XIV), for course XX, and will admit also to III, IV or XV. Students who intend to specialize in history or in any social science should elect this course as freshmen. It is open to freshmen who have previously completed two years of general history (one year in ancient history and one in modern history), or who are pursuing course I also. See statement of entrance requirements. For the year 1906-7, any two years in preparatory history will be accepted for admission to this course.

SUMMARY OF COURSES.

The starred courses are offered only in alternate years.

	Prerequisites.	Semester.
I. Europe. 31 B. C.—1500 A. D.	None	I, II.
II. English Constitutional	I (or two years "preparatory history")	I, II.
III. Renaissance and Reformation.	I or II	I, II.
IV. Europe Since 1789	I or II	I, II.
V. American Constitutional to 1840.	II	I, II.
* VI. American constitutional to 1840.	V	II.
* VII. Making the Constitution.	II, V	I, II.
* VIII. American Constitutional Law	VII	I.
* IX. American Statesmen	II, V	I.
* X. Historical Masterpieces.	III, IV, or V	II.
* XI. American Diplomacy.	II, V	I.
* XII. European Diplomacy since 1789.	IV	II.
* XIII. Colonial Administration.	IV or V	II.
* XIV. New England Sources [2]	V	I, II.

- XV. Historical Method [2] I or II . . . . . II.
- XVI. Teachers' Course. [1] Three courses. . . . . I, II.
- XVII. French Medieval Institutions II or III. . . . . I, II.
- XVIII. English Judicial Institutions II. . . . . I, II.
- \* XIX. American Expansion (Roads). I. . . . . I, II.
- XX. England, 1690-1900 II . . . . . I, II.
- XXI. History of Greece I or II. . . . . I, II.
- XXII. Selected field in Greek history . . . . .

I. *European History from the Establishment of the Roman Empire to the Reformation*, 31 B. C.—1500 A. D. I, II. Assistant Professor Westermann.  
 See opening statement under History. The course will show how modern institutions are largely derived from Roman imperial institutions. The leading topics will be the gathering up of the contributions of the older world by Rome, the imperial organization of the first "political people," the Germanic invasions, the growth of the Frankish state and Charlemagne's premature attempt at organization, the medieval church, the feudal system, the crusades, the rise of the towns, and the development of modern nations. This last topic will be studied mainly as it is illustrated in the history of Germany and of France from 814 to 1500.  
 A definite portion of the course (about one-third) will go to the careful use of source material.

II. *English Constitutional History to the Accession of George I.* I, II. Assistant Professor White and Miss Judson.  
 Open to those who have completed course I or two years of "preparatory history." See opening statement of this Department.

III. *The Renaissance and Reformation.* I. Assistant Professor White.  
 Open to those who have completed either I or II, and a desirable preparation for IV.  
 The Renaissance and Reformation will be studied as general European movements, with the emphasis upon the work of individual men and upon ideas rather than upon politics and institutions. The purpose of the course will be to show how the medieval world became the modern world.

IV. *Europe since 1789.* I, II. Professor Anderson.  
 Open to those who have completed course I or II.  
 The entire class meets twice each week for lectures or recitations. The third exercise is devoted to the study of important historical documents, drawn principally from Anderson's Constitutions and other Select Documents illustrative of the History of France, 1789-1901. This work is done in small groups which meet in the European history seminar room.  
 The history of France occupies the most prominent place in the course, that of other countries being grouped about it, as far as possible. Much attention is given to international affairs, the principal territorial changes being illustrated with a series of wall maps prepared for the course under the direction of the instructor. A special effort is made to put the students into a position to understand the present governments and politics of the leading European states.

V. *Constitutional History of the United States to 1840.* I, II. Professor West.  
 Open to those who have completed course II; and required for courses VI—IX, and XI, XIII, and XIV. The aim is to make this a "practice course;" the work is done partly by co-operative topical reports, and students are expected to consult primary sources to a greater degree than is possible in most undergraduate courses. During part of the year the class will meet once a week in small sections for the study of documents.

VI. *American History, 1841-1885.* II. Professor Anderson.  
 Open to those who have completed or are pursuing course V.  
 Special attention is given to the development of the slavery issue in politics, the political history of the civil war, and reconstruction.

VII. *The Making of the Constitution of the United States.* I, II. Professor West.  
 Open to those who have taken course V with distinction, and to graduates.  
 Each member of the class studies in detail the transition in one of the

original colonies to commonwealth government, with the constitution of his chosen state. The work of the Philadelphia convention is then taken up and the accounts of later writers are compared with the sources. "We the people," the "compact" theory, and the province of the supreme court as "final arbiter," are topics especially investigated, with such further aids as the writings of the day and the discussions of the ratifying state conventions afford. Besides the class work each student will present a written report upon the history of some important bill providing for the admission of a state, and some constitutional question in connection with congressional legislation.

- VIII. *American History since 1789 as Shown in the Development of Constitutional Law.* I. Professor West.  
 In alternate years, not offered in 1906-7. Open to seniors who have completed course v, to graduates, and to qualified law students. Course vii is a desirable preparation. This course is not designed to be a systematic treatment of either history or constitutional law. It consists of a careful analysis of cases selected from Thayer's Cases on Constitutional Law, studied in their historical setting and with reference to the course of development.
- IX. *Studies in American Biography.* I. Professor Anderson.  
 Open to seniors who have completed course v and to graduates. In this course the work will each year center about the political activity of a single important character. In the choice of a subject two points will be especially borne in mind.  
 1. To select a character not only important *per se* but representative of some great historical movement or idea.  
 2. To select one who has left an abundance of material, valuable not only for his own part, but throwing light upon the action of others.  
 It is the aim to give each member of the class an opportunity to work up carefully topical divisions of the field and some acquaintance with the entire body of writings relating to the subject. Not given in 1906-7. When next offered, the subject will be Thomas Jefferson.
- X. *A Critical Study of Historical Masterpieces.* II. Professor Anderson.  
 Open to undergraduates who have taken two courses in history, and to graduates.  
 The object of this course is to develop the habit of reading history critically. Each year a masterpiece of historical literature will be minutely and critically studied. Every student will be required to read critically the entire work studied and in addition, to analyze and report upon assigned portions of it. These reports will be made the basis of the class work, which will consist mainly of discussions carried on by the students under the direction of the instructor. Not given in 1906-7.
- XI. *The History of American Diplomacy.* I. Professor Anderson.  
 Offered to seniors and graduate students who have had two courses in history or one in history and one in international law. History V is the best preparation. The course is designed to afford instruction upon the following matters: (1) the organization and methods of the diplomatic corps; (2) the history of the most important diplomatic negotiations; (3) the effect of the foreign policy upon the internal affairs of the country.
- XII. *The History of European Diplomacy, since 1789.* II. Professor Anderson.  
 Offered to seniors and graduate students who have had two courses in history or one in history and one in international law. History IV is the best preparation. Ability to read easy French is required. The course centers about a critical reading of the principal treaties.
- XIII. *Colonial Expansion and Administration.* II. Professor West.  
 Open to those who have completed iv or v. The history of the colonial acquisitions of the great nations will be surveyed rapidly, and colonial institutions and governments will be studied and compared in detail.
- XIV. *A Critical Study of Authorities for early New England History—based upon a reading of Winthrop's New England.* [2] I. II. Professor West.  
 Open to graduates and to seniors who have completed course v. This is primarily a course in historical criticism. Each member of the seminar has a group of secondary authorities assigned him which he is to criticize in the light of the original sources. The study involves also a

careful comparison of the chief sources with each other, and incidentally it leads to a minute treatment of political, social and economic development in early New England. The number admitted to the course is strictly limited to eight. Given in alternate years.

- xv. Historical Method and Bibliography.** [2] **II. Assistant Professor White.**  
Open to those who have completed course I or course II. The course is designed especially for those intending to do advanced work in history. It aims to make clear to the student the genesis of the modern historical method and to introduce him in a practical way to the use of the best tools in historical study. The work divides naturally as follows:
1. Exercises in historical criticism and interpretation. One or more important historical sources will be studied intensively by the class.
  2. History of historical writings; especially the work of Von Ranke and his followers and the origin of the seminar system. Some account will be taken of present methods and advantages of study in Germany and France.
  3. Bibliography. Purpose, to gain a working knowledge of existing helps to historical study, such as standard bibliographies, historical magazines, source material, etc.
- While the knowledge of Latin or the modern languages is an advantage, it is not a necessity in this course.
- xvi. Teachers' Course.** [1] **I, II. Professor West.**  
Designed for those who intended to teach history in high schools, and open to all who have had three courses in history, provided one of these courses is an "advanced course" (VII-XIX). A course in progress may be counted toward the three. Students taking this course will do well to take course XV also, in the second semester. Professor West will be assisted by other members of the department.
- xvii. Interpretation of Medieval Economic Documents.** [2] **II. Assistant Professor White**  
Open to qualified graduates and to seniors who have completed not less than two year-courses in history. Characteristic documents relating mainly to 12th and 13th century economic history are to be carefully studied with reference both to language difficulties and historical criticism. Such documents will be selected as will tend to throw the most light on the leading economic problems of the medieval period. The work is to be based on *Documents Relatifs a L' Histoire et du Commerce en France*, edited by Fagniez. Not offered in 1906-7.
- xviii. Studies in the Origin of the English Judicial System.** **II. Assistant Professor White.**  
Open to those who have completed course II with distinction and to graduates. The work will consist of detailed study in the sources of the twelfth and thirteenth centuries, and will aim to show how the king's court, from which the present judicial system has grown, superseded the older communal and private courts, the development of the primitive king's court into a system of courts, and the growth in it of a new procedure. In this last connection the critical stages in the early history of the jury will receive special attention.
- xix. Expansion of America as Studied in its Highways of Immigration.** **I, II.**  
Open to students who have completed course V and to qualified graduates. This is a study of roads and methods of pioneer travel in that westward movement of population which extended the inhabited area of the United States from the seaboard to the Mississippi valley. Not offered for 1906-7.
- xx. English History, 1660-1905.** **I. Professor Anderson.**  
Open to those who have completed course II. The period from 1660 to 1815 is covered in a rapid survey. From 1815 the work in more intensive, the topics and readings affording an opportunity to become acquainted with the principal British reviews and with two or three of the leading newspapers.
- xxi. History of Greece.** **I. Assistant Professor Westermann.**  
Open to students who have completed I or II, and required for XXII; especially recommended, also, to prospective teachers. Particular at-



tention is given to the permanent influence of Greek civilization; and a relatively large portion of the course is devoted to the period of wide-spread Hellenism after Alexander.

- XXII. An Intensive Course in a Special Field of Greek or Roman History.** II. I. Assistant Professor Westermann.  
Open to graduates and students who have completed three courses in history including XXI. The subject of this course will vary from year to year, and will be announced during the first semester.

#### POLITICS.

- I. *Elements of American Government.* I or II. Professor Schaper.  
An elementary course on American Government intended as a preparation for the advanced courses in Politics and for teaching in secondary schools, as well as for good citizenship. A study of the organization and actual workings of the national, state and local governments. A series of lectures on the nature and origin of the American governmental system precedes a study of the text and assigned topics. Special attention will be given to important statutes on naturalization, organization of the judiciary and executive departments, banking, bankruptcy, interstate commerce, trusts, etc. Repeated in the second semester.
- II. *Comparative Government.* I. Professor Schaper.  
Open to all students who have taken American Government. An account of the government as the agent of the state; a comparative study of the organization and workings of the government of the great European powers of today, including the French, German, British and others. Text with lectures and assigned reading.
- III. *The Elements of Jurisprudence.* I. Professor Schaper.  
Open to students who have taken American Government. A study of those human relations requiring legal regulation considered from the American point of view; the nature and sources of law, status, rights and wrongs, sovereignty, corporations, etc. The course is intended as a preparation for active citizenship as well as for the study of law. The student will practice looking up cases, summarizing principles. The course is based on a text, with lectures and assigned reading.
- IV. *American Constitutional Law.* [2] I, II. Professor Schaper.  
Open to graduates and others who have taken courses I, II, and VIII. This is an advanced course in the study of the principles of our constitutional law based on important supreme court decisions and standard works. Given in alternate years beginning with 1905-6. Not given in 1906-7.
- V. *International Law.* I. Professor Folwell.  
Open to students who have taken courses I and II. An elementary treatment by lectures with required exercises; illustrations chiefly from American history.
- VI. *Introduction to Political Science.* [2] I. Professor Schaper.  
Intended primarily for seniors in the college of engineering.
- VII. *Municipal Administration.* I. Professor Schaper.  
A comparative study in modern city charters and methods of administration. The relation of the city to the state, the delimitation of its sphere of activity, its liability for tort, and an investigation into the causes of municipal corruption and merits of proposed reforms. A text and lectures.
- VIII. *Theory of the State.* II. Professor Schaper.  
Open to students who have taken courses I and II. A study in the theory of the state, its origin, nature, purpose and its justification, including an examination of the state on its physical side, that is, the elements of population and territory. Important theories, like the divine, contract, instinct, the modern socialistic, anarchistic and social welfare, are considered; also the question of state interference and state management of industries. It includes a study of classification of states and of governments, a study of sovereignty, the origin, nature and classification of law. A text book with lectures and topical readings.

- IX. *Politics and Administration.* [2] I. II. *Professor Schaper.*  
Open to graduates and those who have taken I, II and VIII. An advanced course in politics and administration throughout the year. A study of the extra-legal institution, the political party; its nature, organization, function, evils and reforms. Such topics as the initiative and referendum, proportioned representation and direct primaries versus the convention plan are taken up. Also a study of administration as a science and the administrative law of the federal government, being mainly the law of officers, important cases and text.
- X. *Political Schools and Movements.* [1] d. h. I, II. *Professor Fotwell.*  
Open to graduates and seniors of suitable preparation. An advanced course for graduates and seniors, given in a seminar in rotation with courses, 12 and 13 in economics. See Economics.
- XI. *Seminar in Political Science* [1] I, II. *Professor Schaper.*  
Open to graduates and seniors of suitable preparation. A seminar for special research work in the field of Political Science. A feature of the seminar is the discussion of current problems in politics and administration. Open to graduates and those seniors who are prepared to do advanced work along this line.

## SOCIOLOGY.

- I. *Elements of Sociology.* I. *Assistant Professor Jenks.*  
A preliminary course designed to give students a general knowledge of the whole field of modern sociology, the attempt being to prepare the student for any special investigations he may wish to make. Text books, lectures and reports. Open to sophomores.
- II. *Social Pathology.* I. *Professor Smith.*  
Dealing with problems of poverty, crime, insanity, social degeneration, and a discussion of the child problem and methods of social amelioration.
- III. *Social Theory.* I. *Professor Smith.*  
This course includes a study of the leading American, English, French and German writers to discover their methods of approach to the science, and the leading results they have secured.
- IV. *Anthropology.* I, II. *Assistant Professor Jenks.*  
A general introductory course. A study of the essential characteristics of man; the series of activities and the various institutions which have had their beginnings in primitive society; and the general features of the several races of mankind. Text books, lectures, assigned readings and reports. Open to Juniors and Seniors.
- V. *Social Groups.* I. *Professor Smith.*  
An examination of the clan and the village in primitive life, a study of demography to discover the effect of environment upon social organization, and a comparison with the nature of and reasons for the modern city.
- VI. *The Study of Institutions.* I. *Professor Smith.*  
The genesis of custom and the beginnings of law with the geographical and race influences in the growth of states, will be studied, as well as the various forms of the family and their relation to forms of civilization.
- VII. *Elements of Sociology.* I. *Assistant Professor Jenks.*  
This course is similar to I, but will be more exhaustive. Text books, lectures, assigned readings, and thesis. Open to Juniors and Seniors.
- VIII. *Anthropology.* II. *Assistant Professor Jenks.*  
An advanced course. A study of the different races of America, Asia, Africa, and Oceania: a description of the types of primitive culture; an investigation of the origin and development of various phases of culture—as of forest, plain, desert, and island; and a presentation of anthropological problems. Text books, lectures, assigned readings and thesis. Open to Juniors and Seniors.

*IX. The Philippines.*1. *Assistant Professor Jenks.*

This course will present the geography, physiography and resources of the Philippine Islands. A careful comparative study of the four large culture groups of people will be made; tropical influence will be noted; the present policy of the Insular Civil Government will be outlined, so far as it tends to modify the natural characteristics and the modern culture of the inhabitants. This course aims to present a model for the investigator of human culture, and to prepare students for government, business or missionary service in the Philippines. Lectures, illustrated lectures, assigned readings and reports.

THE COLLEGE *of* ENGINEERING  
*and* THE MECHANIC ARTS

# The College of Engineering and the Mechanic Arts

## FACULTY

- CYRUS NORTHROP, LL. D., *President.*  
FREDERICK S. JONES, M. A., *Dean.*  
FREDERICK H. BASS, B. S., *Assistant Professor of Civil Engineering in charge of Municipal and Sanitary Engineering.*  
WILLIAM BROOKE, B. C. E., M. A., *Assistant Professor of Engineering Mathematics.*  
FRANK H. CONSTANT, C. E., *Professor of Structural Engineering.*  
HENRY T. EDDY, C. E., Ph. D., LL. D., *Professor of Engineering and Mechanics.*  
JOHN J. FLATHER, Ph. B., M. M. E., *Professor of Mechanical Engineering.*  
WILLIAM W. FOLWELL, LL. D., *Professor of Political Science.*  
GEORGE B. FRANKFORDER, M. A., Ph. D., *Professor of Chemistry.*  
ARTHUR EDWIN HAYNES, M. S., M. Ph., Sc. D., *Professor of Engineering Mathematics.*  
WILLIAM R. HOAG, C. E., *Professor of Civil Engineering, in charge of Road and Topographical Engineering.*  
FREDERICK S. JONES, M. A., *Professor of Physics.*  
WILLIAM H. KAVANAUGH, M. E., *Assistant Professor of Mechanical Engineering, in charge of Experimental Engineering.*  
WILLIAM H. KIRCHNER, B. S., *Assistant Professor of Drawing.*  
FRANCIS P. LEAVENWORTH, M. A., *Professor of Astronomy.*  
EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry.*  
WILLIAM S. PATTEE, LL. D., *Lecturer on Contracts.*  
EDWARD P. SANFORD, M. A., *Assistant Professor of English.*  
FREDERICK W. SARDESON, Ph. D., *Assistant Professor of Geology.*  
WILLIAM A. SCHAPER, M.A., Ph.D., *Professor of Political Science.*  
GEORGE D. SHEPARDSON, M. A., M. E., *Professor of Electrical Engineering.*  
CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*  
CAPT. EDWARD SIGERFOOS, *Professor of Military Science.*  
FRANK W. SPRINGER, E. E., *Assistant Professor of Electrical Engineering.*  
JOHN ZELENY, B. S., B. A., *Associate Professor of Physics.*

## INSTRUCTORS.

- HENRY A. ERIKSON, B. E. E., *Instructor in Physics.*  
 EDWARD JOHNSON, *Instructor in Foundry Practice.*  
 ALOIS F. KOVARIK, B. A., *Instructor in Physics.*  
 WILLIAM H. MERRIMAN, *Instructor in Machine Work.*  
 EDD. C. OLIVER, M. E., *Instructor in Machine Design.*  
 JOHN H. QUENSE, C. E., M. E., *Instructor in Drawing.*  
 B. S. SHOOP, B. S., *Instructor in Mechanical Engineering and Assistant in Engineering Mathematics.*  
 JAMES M. TATE, *Instructor in Carpentry and Pattern Work.*  
 ANTHONY ZELENY, M. S., *Instructor in Physics.*

## ASSISTANTS AND OTHERS.

- HARRY W. DIXON, *Chief Engineer.*  
 H. K. DOUGAN, *Assistant in Civil Engineering.*  
 PETER JOHNSON, *Machinist.*  
 JULIUS A. DOERFLER, *Student Assistant in Drawing.*  
 EARL W. KELLY, *Student Assistant in Drawing.*  
 GEORGE P. MUNGER, *Assistant in Forge Work.*  
 JOHN NEKOLA, *Student Assistant in Drawing.*  
 ARTHUR C. RINGSRED, *Student Assistant in Engineering Mathematics.*  
 LAWRENCE A. STENGER, *Student Assistant in Electrical Engineering.*  
 HENRY ULRICH, *Assistant in Carpentry.*  
 ROBERT WHERLAND, *Assistant Engineer.*

## STANDING COMMITTEES.

- Enrollment*—PROFESSORS CONSTANT, FLATHER, SPRINGER.  
*Curriculum*—PROFESSORS EDDY, FLATHER, HOAG, JONES, SHEPARDSON.  
*Degrees*—DEAN JONES, PROFESSORS FLATHER, SHEPARDSON, HOAG.  
*Library*—PROFESSORS SPRINGER, CONSTANT, KAVANAUGH.  
*Military Affairs and Athletics*—PROFESSORS HOAG, HAYNES, NICHOLSON.  
*Students' Work*—PROFESSORS JONES, HAYNES, KIRCHNER, HOAG, SHEPARDSON, KAVANAUGH, BROOKE.  
*Graduate Studies and Degrees*—PROFESSOR EDDY.  
*Program*—PROFESSORS KIRCHNER AND BARE.

### NON-RESIDENT LECTURES.

Electrical Engineering Department, 1904-1905.

Chas. E. Downton, Foreman of Apprentices, Westinghouse Electric and Manufacturing Company, Pittsburg, "The Training of Engineering Apprentices in an Electrical Manufacturing Plant."

Fred G. Dustin, City Electrical Inspector for Minneapolis, "The National Electrical Code and Its Enforcement."

W. G. Middleton, Chief Electrician, Twin City Telephone Company, Minneapolis, "Telephone Cables."

Chas. L. Pillsbury, Consulting Engineer, St. Paul, "The Electric Motor in Modern Industries."

A. L. Rohrer, Electrical Superintendent, General Electric Company, Schenectady, "A Trip through the Largest Electrical Factory in the World."

O. Dickinson Street, Contract Department, Western Electric Company, Chicago, "The Electrical Engineer in Business."

Benj. Waller, Chief Engineer, Northwestern Telephone Exchange Company, Minneapolis, "Engineering and Economic Problems in Telephony."

### ORGANIZATION OF THE COLLEGE.

In this college there are four regular courses of study, viz.; civil, mechanical, electrical and municipal engineering, leading to corresponding professional degrees.

There is also organized in this college a four years' course of study in science and technology, leading to the degree of bachelor of science, with an additional year leading to the professional degree.

### UNCLASSED STUDENTS.

Unclassed students are permitted to pursue, under the direction of the faculty, one or two lines of study, selected from some regular course. Such students must be persons of mature years, and present preparation sufficient to admit them to the freshman class. Persons of mature years who shall give satisfactory evidence of ability to do with credit the work applied for, may be admitted by vote of the faculty.

### FEEES.

A registration fee of fifteen dollars per semester, payable in advance, is required of all residents of the state who register in this college. Non-residents are charged double this fee, or thirty dollars per semester. No reduction is made for late entrance or for leaving before the end of the semester. In addition to this fee students who take laboratory work are charged a sum sufficient to cover the cost of material and breakage. The

fees are as follows: *Freshman year* (per semester)—Shop work, \$7; chemistry, \$5. *Sophomore year* (per semester)—Shop work, \$7; physics, \$3; chemistry, \$3, first semester only. *Junior year*—Shop work, \$4.50; mechanical laboratory, first semester, \$6; second semester, \$3; electrical laboratory, second semester, \$4.50. *Senior year*—Electrical laboratory, E. E. first semester, \$3; second semester, \$4.50; mechanical laboratory, first semester, \$4.50 E. E.; \$6 M. E.; second semester, \$6.

#### ADVANCED STANDING.

*Advanced standing*—The University accepts records from all reputable colleges for credit to advanced standing. Such records are accepted as far as they are equivalent to the work done in this University, subject to the approval of the department concerned. In bringing records from other institutions, the certificate must be on the official blanks of the institution granting the certificate, and should show:

1. The subject studied and ground covered.
2. The time spent upon each subject.
3. In case of laboratory subjects a concise statement of work done.
4. The result—it is sufficient to state that the subject was creditably completed.

The credit to be allowed will be decided in individual cases by the enrollment committee in consultation with the departments concerned.

#### GRADUATION.

Students completing the course of study to the satisfaction of the faculty of the college, are entitled to receive the professional degree. Any person may undergo, at suitable times, examination in any subject, and if such person pass in all the studies and exercises of the course, he is entitled to the appropriate degree; *provided*, however, that at least one full year must 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.

#### THESES.

*Theses.* Every member of the senior class of this college is required to prepare a thesis on some subject particularly relating to his course. The thesis must embody the results of original research made by the student himself and be creditable from a literary as well as from a technical point of view.

Theses are to be written in a clear hand, or typewritten. The subject of the thesis is required to be reported to the head of the department in which the student is a candidate for a degree, and the work of preparation must be formally begun early in the senior year. During the



second semester the student is expected to devote at least ten hours a week to the preparation of his thesis.

The subject of the thesis and character of the work to be done upon it will be suggested in a large measure by the course of study pursued by the student. Great emphasis is laid upon the careful and accurate preparation of the thesis; because, more than any other work the undergraduate does, this certifies to his ability to undertake the difficult and responsible duties involved in the direction of engineering and industrial interests. The thesis must be completed and put into the hands of the faculty not later than the Friday before commencement, upon a good quality of paper  $8\frac{1}{2}$  by 11 inches, leaving a margin  $1\frac{1}{2}$  inches wide at the left for binding and a margin about  $1\frac{1}{4}$  inches wide on the other side. The original drawings, tracings, negatives, etc. are to be placed in the department files. Clear prints therefrom are to accompany the manuscript. The thesis shall be bound in black cloth and leather and shall be deposited in the department library.

#### ADMISSION.

Entrance examinations are held only at the beginning of the college year. Students prevented from entering at the beginning of the year may be admitted at a subsequent date when the circumstances are such as to justify the action. However, such students are at a great disadvantage and all students expecting to enter the University are urged to be present at the beginning of the year.

All applicants should present themselves to the registrar, who will furnish them with application blanks and directions how to proceed with their examinations and registration.

*In all cases the faculty reserves the right to require a student to take supplementary examinations if he does not sustain himself creditably in his course.*

*N. B.—Students proposing to enter this college should be specially thorough in their mathematical preparation, since the prosecution of the work of the course depends so largely upon the preliminary work done in this line. In order to gain admission to this college, the applicant shall present State High School Board certificates for each of the mathematical subjects required for admission; or, in lieu thereof, take the entrance examinations in the said subjects.*

*It is further provided that no student shall be admitted, who fails to obtain credit in all of the mathematical subjects required for admission to this college.*

*Every person admitted to the University is examined in reading, writing, spelling and composing the English language, and all who fail to obtain a grade of seventy-five per cent are required to pursue a course of instruction to be provided, and no person shall ever receive a diploma*

*or other certificate of merit or proficiency until he has passed such examination and obtained the specified credit. See Appendix "A."*

Students desiring to enter this college should be prepared in the full entrance requirement in chemistry, since qualitative chemistry must be pursued during the freshman year.

#### REQUIREMENTS FOR ADMISSION.

*English*, four years, including

- (a) Classics. (b) Principles of composition.
- (c) Practice in written expression.

*Algebra*, elementary, one year, *Algebra*, higher, one-half year.

*Geometry*, plane, one year. *Geometry*, solid, one-half year.

*Chemistry*, one year.

In addition to the above named subjects which are required and for which substitutes cannot be accepted, applicants shall present evidence of preparation in *seven* year-credits, or their equivalent; of the credits thus offered, at least *two* year-credits shall be chosen from one of the *language groups*.

*Latin* (four years).

- Grammar, one year.
- Cicero, six orations, one year.
- Caesar, four books, one year.
- Virgil, six books, one year.

*Greek* (two years).

- Grammar, one year.
- Anabasis, four books, one year.

*German* (two years).

- Grammar, one year.
- Literature, one year.

*French* (two years).

- Grammar, one year.
- Literature, one year.

*Spanish* (two years).

- Grammar, one year.
- Literature, one year.

*History*, Ancient, to Charlemange, one year.

- Modern, from Charlemange, one year.
- England, one-half year.

Senior American, one-half year.

Until the opening of the University year 1907-08, half-year credits will be accepted in ancient, medieval and modern history.

*Civics*, one-half year.

*Political Economy*, one-half year.

*Physics*, one year.

*Botany*, one-half or one year.

Zoölogy, one-half or one year.

Astronomy, one-half year.

Geology, one-half year.

Physiography, one-half year.

Commercial Geography, one-half or one year.

Drawing, see paragraph X, General Regulations.

Shop Work, see paragraph X, General Regulations.

### GENERAL REGULATIONS.

I. Students will be admitted to the freshman class on *passing the regular entrance examinations.*

II. No student will be admitted with conditions in more than one year-credit or two half-year credits.

III. Graduates of any Minnesota State high school will be admitted *without examination, provided—*

(1) That the school maintain a *full four-year high school course.*

(2) That the applicant present to the registrar the principal's certificate showing the satisfactory completion of *all the studies required for admission* to the desired University course.

IV. Graduates of Minnesota State high schools who are deficient in *not more than two half-year subjects* or their equivalent, *may be excused* from entrance examinations in *such subjects as the enrollment committee may decide*; such candidates should present themselves to that committee *not later than Tuesday of examination week.*

V. Graduates of Minnesota State high schools whose principal's certificate shows them to be deficient in *more than two half-year subjects* or their equivalent, even though they have made such additional preparation as they deem necessary, must take, nevertheless, the regular entrance examination in all subjects, as provided in sections I and II unless excused by vote of the faculty; and persons wishing to present reasons for such excuse *should report to the enrollment committee not later than Tuesday of examination week.*

VI. Graduates of the *advanced courses of Minnesota normal schools* will be admitted upon the same terms as graduates of State high schools.

VII. Any Minnesota high school or academy *not under supervision of the State High School Board*, but requiring for graduation a *four years' course*, exclusive of the common school branches, conforming *essentially in distribution of time* to the entrance requirements of at least one of the University courses, will, upon application, be inspected by a committee, and after favorable recommendation, *may be accredited by the faculty* in all respects as are the state high schools, *provided—*

(1) That the school be *open to inspection* at any time by the University;

(2) That it take such *supplementary examinations as may be prescribed* from time to time.

VIII. *Graduates from schools in other states*, whose diplomas admit to *reputable colleges* in the state in which the school is located, will be received subject to the regulations that apply to graduates of Minnesota State high schools. The University accredits schools in other states *only under this general provision*.

IX. Applicants from schools not coming within any of the above classes *must take the regular entrance examinations* or present State High School Board certificates. High School Board certificates will be accepted in lieu of an examination in the subjects which they represent.

X. Students presenting two year-credits from approved courses in drawing and shop-work may receive a one-year entrance credit for the drawing and may present the shop work for either a one year entrance credit or one semester of advanced standing. Students presenting three year-credits in drawing or shop work, or both, from approved courses, may receive one-year entrance credit in each and advanced standing of one semester in drawing or shop, or both. Students presenting four year-credits in shop work or drawing, or both, from approved courses, may obtain in addition to one year entrance credit in each, advanced standing of freshman drawing and first semester freshman and one-half semester sophomore shop work.

*N. B.—All students obtaining advanced standing as stated in paragraph X must take equivalent courses as approved by the faculty.*

*Students bringing records from accredited schools are required to present them on the blank form provided for the purpose by the University. Blank forms may be obtained from the Registrar. No other form of certificate will be accepted. Students who do not bring their certificates on the proper form of blank will not be allowed to register until they have secured the certificate on the required form.*

## SYLLABUS

The following statements indicate, in a general way, the ground expected to be covered in the study of the various subjects accepted for admission.

### *English (four years).*

In order to secure a definite plan of study and unity of method on the part of preparatory schools, the entrance requirement in English is outlined below somewhat in detail. Where texts are mentioned they are merely suggestive and not arbitrary. Equivalents will be accepted in lieu of any of the texts mentioned. The entrance requirement in English covers four years of the high school course, and not less than four hours a week should

be devoted to the subject. The headings under which instruction will naturally fall are:

- (a) English classics.
  - (b) The principles of rhetoric.
  - (c) Practice in written expression.
- (a) English classics should include a critical reading, in class, of English masterpieces. The following are suggested as well adapted for such study: Shakespere's "Macbeth," Milton's "Paradise Lost," books one and two, Burke's "Conciliation with America," Carlyle's essay on "Burns." In the study of these works the student should come to know the leading facts connected with the author and his time; he should become familiar with the subject matter of the work; thoroughly at home with the story and have a clear idea of the form and structure of the work as a whole.

A less critical knowledge of other standard or classic works, which may perhaps be read by the student at home, with written reports and brief oral discussions in class. The following works are noted as indicative of the minimum amount of work expected: At least two of Shakespere's plays, beside the one read in class, one of Irving's works, one of Hawthorne's novels, one of Stevenson's novels, one of Webster's orations.

- (b) The work in the principles of composition should include the principles and technical terms of ordinary texts upon the subject, whether acquired by the direct study of such texts or mainly by the study of selected English masterpieces. It should not be forgotten that this is not an end in itself, but simply a means of teaching the student the correct use of English.

- (c) Not less than one hour each week throughout the four years of the high school course should be devoted to practice in written expression. The instructor may choose such topics as local conditions may require or make most profitable, but whatever line of work is pursued, the student should be taught to use language correctly and forcibly and learn to express himself clearly and logically in writing.

#### *Elementary Algebra* (one year).

Addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, simple equations (with one, two, and several unknown quantities) followed by problems, theory of exponents, involution (including the binomial theorem for positive integral exponents), evolution, radicals, inequalities, ratio, proportion, progression, and quadratic equations with problems.

#### *Higher Algebra, First Part* (one-half year).

While this subject does not include any topics not named under elementary algebra a much fuller treatment of those topics is expected in this work. Principles as well as processes should be learned, theorems and rules should be rigorously demonstrated, the exercises and problems should be more difficult, and students should be drilled in short methods and rapid work. Unless candidates have a good knowledge of the fundamental topics named below, they are not prepared to pursue successfully at the University the second part of higher algebra.

The topics are addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, theory of exponents, involution, evolution, surds, imaginaries and simple equations with problems.

*Plane Geometry* (one year).

Any of the standard texts on this subject will furnish the necessary preparation. Isoperimetry, symmetry and maxima and minima of figures are not required. The exercises requiring solutions and demonstrations should not be omitted.

*Solid Geometry* (one-half year).

Any of the standard texts on this subject will furnish the necessary preparation. The exercises requiring solutions and demonstrations should not be omitted.

*Latin Grammar* (one year).

This will include the subjects of orthography, etymology and syntax.

Proficiency is particularly desired in the following subjects: the analysis of the verb forms, the rules of syntax, and the principal parts of the irregular verbs.

*Caesar* (one year).

First four books, or selections from the seven books equivalent to four; or three books, with thirty pages of Cornelius Nepos, or two books with sixty pages of Cornelius Nepos. Special attention should be paid to the translation of passages of the text into correct and idiomatic English; grammatical questions connected with the text; more especially on the subjunctive mood, indirect discourse and the sequence of tenses. The pupil should be able to rewrite in oratio recta all the passages of oratio obliqua that occur in the text. The student is expected to be familiar with the life of Caesar and an account of his wars.

*Cicero* (one year).

Six orations: four against Catiline and any two of the following: "Poet Archias," "Ligarius," "Marcellus," "Manilian Law" (to count as two orations), the Fourteenth Philippic, the student should be familiar with the life of Cicero and the history of his times.

*Vergil* (one year).

Six books of Aeneid, or five of Aeneid and one of the Metamorphoses of Ovid, or the Eclogues. The student should be familiar with the life of Vergil, and an account of his times and writings. A correct rythmical reading of the text is to be encouraged.

*Greek Grammar* (one year).

*Xenophon's Anabasis* (one year)— Four books.

*German* (two years).

First year—the pupil should acquire:

- (1) A correct pronunciation, training of the ear, eye and organs of speech.
- (2) A vocabulary of a thousand words of every day use; facility in combining these words into simple sentences. (As a means to this, 100 to 150 pages of easy narrative prose and poetry should be read, from which questions and answers may be formed. To test the student's memory and knowledge of the word-order he should relate or write out the story anew in his own words.)

- (3) From two to three hundred German idioms.
- (4) The essentials of German grammar, to be taught by means of oral and written exercises based upon the reading lessons.

Second year—

- (1) Read 150 to 200 pages of prose and poetry.
- (2) Practice in reading smoothly and with expression.
- (3) Carefully translate selected passages of the text into idiomatic English (to translate easy sentences which the student already understands is a waste of time).
- (4) Translate sentences from English into German, using words and idioms of the text read.
- (5) Study topically German grammar; chief rules of orthography, etymology and syntax; illustrate these by words, phrases and sentences selected or composed by the student.

French (two years).

The principles of French grammar, including acquaintance with the verb, regular and irregular; an ability to translate easy English sentences into French and simple French prose into English.

Spanish (two years).

First year—Grammar and reader.

Second year—Grammar reviewed; reading of some modern writer; composition and conversation.

Ancient History (one year).

- (a) This study should begin with from five to seven weeks upon the oriental peoples who have most influenced European development, noting the early civilizations in the valleys of the Nile and Euphrates, the spreading and meeting of these civilizations in the intermediate region, with notice of the more important states in that district, and the union of the East under Persia. This survey should aim to give an idea of the reach of recorded history, of the distinguishing features of the successive oriental nations, and of their more important influence upon later European development.
- (b) In the Greek and Roman age emphasis should be put upon the evolution of institutions, and considerable attention should be paid to the later Hellenistic period, after the rise of Macedon, and to the Roman Empire, with its bearing upon subsequent history. Some of the work should be illustrated by the use of sources, and maps should be used constantly.
- (c) The subject should be carried down to the establishment of Charlemagne's Empire. This will bring together all the chief lines of influence which were afterwards to make our modern world, will show the meaning of the preceding eras as can not be done if the study stops at an earlier date, and will leave the subject at a period of comparative order and simplicity.

Modern History (one year).

From Charlemagne to the present. The topics to which special attention are called are the period of disorder after Charlemagne and the consequent rise of feudalism, the Holy Roman Empire and the papacy, the medieval church, the crusades, the free cities, the rise of national monarchies, the intellectual renaissance and the Protestant reformation, the French revolution and the subsequent democratic movements in politics and industry.

It is desirable to give at least half of the year to this last period from 1789.

Instead of these two subjects, Ancient and Modern History, the University will, until 1907, continue to accept the following:

History of Greece and Rome (one-half year).

Medieval History (one-half year).

Modern History (one-half year).

**English History** (one-half year).

The Saxon period should be passed over rapidly. In the remainder of the work, besides the narrative, constitutional points should receive attention, and easily accessible documents, like Magna Charta, should receive careful study.

**Senior American History** (one-half year).

No attempt should be made to cover the whole field in this time. Either the colonial history or the period from 1783 to 1832 offers quite enough material. In any case considerable use should be made of collections of documents and sources.

**Civics** (one-half year).

The subject should be approached from the historical side. The best arrangement is to combine the study with the senior American history and to give a year to the two.

**Political Economy** (one-half year).

Some good elementary text book should be mastered. It is desirable that students be encouraged to study local and general economic phenomena and conditions. The time should be wholly devoted to the elements of the science of political economy. The beginner should not be confused with problems of applied economics such as tariff, trusts, bimetalism, etc.

**Physics** (one year).

It is suggested that the year's work be confined to four of the seven subjects mentioned below.

1. Mechanics of solids; 2. liquids and gases; 3. sound; 4. heat; 5. light; 6 and 7, electricity and magnetism (to count as two subjects but not to be divided).

**Chemistry** (one or one-half year).

The full year's work should include a study of both the non-metals and metals with laboratory experiments illustrating the common chemical laws and the commoner chemical reactions.

The half year's work should cover the non-metals only, with laboratory experiments similar to the first half of the full year's work. After the opening of the year 1906-07, the one-half year credit will not be accepted for admission.

**Botany** (one or one-half year).

Schools which give one-half year of botany should devote particular attention to plant relations, making the course largely ecologic in bearing. When a whole year is given to the subject, additional work upon plant structures should be offered, and together with fundamental conceptions of ecology a general idea of morphology and taxonomy should be the aim of the course.

**Zoology** (one or one-half year).

The course of zoology, whether a half year or a year course, should be a natural history rather than a modern morphological course. Collecting and classifying (as a means) should be encouraged as much as possible. Animals should be studied as living units, in their relation to one another and their environments. The gen-



eral and special structural feature in relation to the habits, the food and manner of obtaining it, the enemies and means of protection against them, hibernation, migration, the differences in habits, form and structure between the old or mature animal and the young, the relation of parents to their offspring, etc.—in short, all about the life of the animal under consideration should be the prominent feature, and as much as possible of this should be made out by direct observation of the animal in its natural home and in confinement.

The course, on the whole, should aim to foster and develop a love for nature, train the power of observation toward accuracy and give a healthful stimulation to the imagination. The pupil should be guarded against the habit of confounding the facts of observation with his interpretation, his judgments.

The animals for direct observation should be selected from as many branches of the animal kingdom as possible, and the changes during the year in the character of the fauna of the locality in general as well as of some particular region should be noted. In some localities the work will of necessity be largely restricted to land and air animals, but no locality in Minnesota is so poor in animal life that very profitable work cannot be laid out along the line indicated above.

It will be noticed that such a course of necessity includes so-called laboratory work. The amount and extent of the laboratory work will depend upon conditions, but even under the best conditions it is hardly advisable to go into detailed dissections and embryology. Continued, repeated and close observation, aided now and then, by a simple hand lens or a compound microscope, will reveal an abundance of material and opportunity for disciplining the mind.

*Astronomy* (one-half year).

An elementary course in general astronomy as presented in any good modern text-book.

*Geology* (one half-year).

These sub-divisions should receive special attention: physiographic geology, which treats of the building of the land and the evolution of its existing contours, geo-dynamics, the study of the forces, atmosphere, water, terrestrial heat, plants and animals, modifying the earth; and a brief survey of historical geology.

*Physiography* (one-half year).

The following topics should be emphasized: Meteorology, to an orderly arrangement of the leading facts relating to the atmosphere, and its phenomena, including some acquaintance with the work of the U. S. Bureau; Land Sculpture, as it treats of the origin, development and decadence of land forms and the influence of these processes on the physical environment of man.

*Commercial Geography* (one-half or one year).

The work usually provided in larger schools will cover this requirement.

*Drawing* (one year).

The work usually provided in the manual training course of high schools will satisfy this requirement.

*Shop Work* (one year).

The work usually provided in the manual training courses of high schools will satisfy this requirement.

## FACULTY REGULATIONS.

Students shall not receive credit for work for which they have not been registered.

*Examination for Credit.*—Students who have made up work by themselves, and wish to take examinations to gain credit in their University course, shall apply to the faculty for a committee to conduct the examination.

*Reports.*—In determining the standing of any student in any subject, the result of his daily work in that subject shall be combined with the result of the final examination in the ratio of two to one.

At the end of each semester each student shall receive a mark in each subject for which he is registered. The several marks shall be as follows: A—Pass with honor; B—Pass with credit; P—Pass; C—Conditioned; F—Failed.

*Repeat Work.*—Any student in the college of Engineering whose average standing for the year is below passing grade will be required on re-entering the University to pursue again all the subjects of the year in which he has not passed with credit.

Students who receive a condition or failure in work of either semester so as to make it impossible for them to continue the same line of work in the following semester shall not be allowed to elect an advanced subject in place of the one omitted, but shall be required to devote their full time to the remaining subjects of the course.

However, those students who attain an average grade of B in the remaining subjects pursued may elect an advanced subject in the place of the one omitted.

*Conditions and Failures.*—No student will be allowed to omit any freshman work in order to make up entrance conditions.

No student, with an entrance condition, will be allowed to register for any sophomore subject, nor will any student with a freshman condition or failure be allowed to register for a junior subject; nor will any student with a sophomore condition or failure be allowed to register for any senior subject.

A "condition" not made up before the subject is offered again becomes a "failure," subject to rules governing failures.

Students conditioned in the work of the first semester are given an opportunity to remove their conditions at the beginning of the first semester of the following year. Students conditioned in the work of the second semester are given an opportunity to remove their conditions at the beginning or end of the first semester of the following year, at the date regularly set by the program for such examinations. It is provided that if a student attempts to remove a condition at the first examination he shall not be allowed to try the following examination, but shall be required to take the work over in class. "Failures" must be taken over again in class.

Dropped from Rolls.—Any student receiving three conditions or failures in the first semester shall be dropped from the rolls, and shall not be allowed to re-enter the University until the opening of the following year.

### UNIFORM NOMENCLATURE OF COURSES.

All schools and colleges in the University of Minnesota have adopted a uniform nomenclature to designate the length of all courses offered in its respective schools and colleges.

I. Two hours of laboratory, clinical or practical work, shall be reckoned as being equal to one hour of recitative work.

II. Three hours per week of didactic or recitative work for one semester of eighteen weeks (54 hours) shall constitute a major unit, designated by the symbol Mj.

III. Three hours of didactic or recitative work for one half semester of nine weeks (27 hours) shall constitute a minor unit designated by the symbol M.

For the convenience of students accustomed to the old nomenclature both systems are printed in this issue, the new being prefixed in parenthesis before the number of hours indicated for each course.

### COURSES OF STUDY.

(Figures at the left indicate the number of credit hours per week assigned to the various subjects, two hours in shop, drawing room or laboratory being equivalent to one hour in class or lecture. Figures at the right indicate the course numbers as explained on pages 39 to 49.)

#### FRESHMAN YEAR.

##### FIRST SEMESTER.

##### ALL COURSES

- (1½Mj) 5 Mathematics, I, II.
- (1½Mj) 4 English, I.
- (1½Mj) 4 Chemistry, I.
- (1½Mj) 4 Drawing, Ia, Ib.
- (1½Mj) 4½ Shop, I.
- (Mj) 3 Drill, I.

##### SECOND SEMESTER.

##### CIVIL & MUNICIPAL ENGINEERING.

- (1½Mj) 5 Mathematics, II, III, IV.
- (1½Mj) 4 English, I.
- (Mj) 3 Chemistry, I.
- (1½Mj) 5 Drawing, Ic.
- (1½Mj) 4 Surveying, XIV, XV.
- (Mj) 3 Drill, II.

##### ELECTRICAL & MECHANICAL ENGINEERING

- (1½Mj) 5 Mathematics, II, III, IV.
- (1½Mj) 4 English, I.
- (Mj) 3 Chemistry, I.
- (1½Mj) 5 Drawing, Ic.
- (1½Mj) 4½ Shop, II.
- (Mj) 3 Drill, II.

## SOPHOMORE YEAR.

## FIRST SEMESTER.

CIVIL & MUNICIPAL ENGINEERING.	ELECTRICAL & MECHANICAL ENGINEERING
(1½Mj) 5 Mathematics, V.	(1½Mj) 5 Mathematics, V.
(2Mj) 6 Physics, Ia.	(2Mj) 6 Physics, Ia.
*(Mj) 3 Technological chem., II.	(Mj) 3 Technological chem., II.
(Mj) 3 Drawing, IIa, IIIa.	(Mj) 3 Drawing, IIb, IIIb.
(1½Mj) 4½ Topography, XVI, XVII.	(1½Mj) 4½ Shop, III, IV.
(Mj) 3 Drill, III.	(Mj) 3 Drill, III.

## SECOND SEMESTER.

CIVIL & MUNICIPAL ENGINEERING.	ELECTRICAL & MECHANICAL ENGINEERING
(1½Mj) 5 Mathematics, V, VI, VII.	(1½Mj) 5 Mathematics, V, VI, VII.
(2Mj) 6 Physics, Ib.	(2 Mj) 6 Physics, Ib.
(½ Mj) 2 Drawing, IIa, IIIa.	(½Mj) 2 Drawing, IIb, IIIb.
*(½Mj) 2 Astronomy, I.	(½Mj) 2 Kinematic drawing, X.
(1½Mj) 4½ Topography, XVIII, XIX.	(Mj) 3 Mechanism, IX.
(½ Mj) 2 Highways, VIII.	(1½Mj) 4½ Shop, IV.
(Mj) 3 Drill, IV.	(Mj) 3 Drill, IV.

## JUNIOR YEAR.

## FIRST SEMESTER.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.
(1½Mj) 5 Mechanics I.	(1½Mj) 5 Mechanics, I.
(Mj) 3 Physics, II.	(Mj) 3 Physics, II.
(½Mj) 2 Mechanical lab., XXV.	(Mj) 3 Stresses, IX.
(1½Mj) 4½ Curves & earthworks, IV.	(1½Mj) 4 Machine design, XI.
(Mj) 3 Field work, V.	(½M) 1 Steam boilers, XVII.
(Mj) 3 Stresses, IX.	(½Mj) 2 Mechanical lab., XXV.
	(Mj) 3½ Shop, V.
ELECTRICAL ENGINEERING.	MUNICIPAL ENGINEERING.
(1½Mj) 5 Mechanics, I.	(1½Mj) 5 Mechanics, I.
(Mj) 3 Physics.	(Mj) 3 Physics, II.
(Mj) 3 Stresses, IX.	(½Mj) 2 Mechanical lab., XXV.
(½Mj) 2 Applied electricity, I, II.	(Mj) 2½ Water analysis, IV.
(½M) 1 Steam boilers, XVII.	(½Mj) 2 Curves & earthworks, IV.
(1½Mj) 4 Machine design, XI.	(Mj) 3 Field work, V.
(½Mj) 2 Mechanical lab., XXV.	(Mj) 3 Stresses, IX.

## SECOND SEMESTER.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.
(1½Mj) 5 Mechanics, II.	(1½Mj) 5 Mechanics, II.
(Mj) 3 Structural details, X.	(Mj) 3 Steam engines, XVIII.
(Mj) 3 Stresses, IX.	(1½Mj) 4 Machine design, XI, XII.
(1½Mj) 5 Railroad work, VI.	(M) 1st ½) 3 Fuel & Gas analysis V.
(Mj) 3 Geology, I.	(M) (2d ½) Gas engines & Producers, XIX.
(½Mj) 2 Hydraulic laboratory, XXVII.	(1½Mj) 4 Mechanical lab., XXVI, XXVII.
ELECTRICAL ENGINEERING.	MUNICIPAL ENGINEERING.
(1½Mj) 5 Mechanics, II.	(1½Mj) 5 Mechanics, II.
(1½Mj) 4 Dynamos and Motors, II.	(Mj) 3 Biology, I.
(Mj) 3 Steam engines, XVII.	(Mj) 3 Stresses, IX.
(½Mj) 2 Machine design, XI.	(1½Mj) 5 Railroad work, VI.
(½M) 2 Electrical design, XI.	(Mj) 3 Geology, I.
(Mj) 3 Electrical laboratory, XIV.	(½Mj) 2 Hydraulic lab., XXVII.
(½Mj) 2 Mechanical laboratory, XXVI, XXVII.	

\* Students pursuing the course in municipal engineering will choose quantitative analysis [2] in lieu of this subject.

SENIOR YEAR.

FIRST SEMESTER.

CIVIL ENGINEERING.

- (1½Mj) 5 Masonry, XII.
- (¾Mj) 2 Experimental lab. XIII.
- or
- Railway Economics.
- (¾Mj) 3 Electric power, XX.
- (1½Mj) 5 Structural design, XI.
- (¾Mj) 2 Political science, I.
- (1½Mj) 4 Water supply engineering I.
- Thesis.

MECHANICAL ENGINEERING.

- (Mj) 3 Thermodynamics, XX.
- (¾Mj) 2 Water Turbines, XXII. †
- (¾Mj) 2 Mechanical engineering, XXIII.
- (1½Mj) 4 Electric power, XX.
- (1½Mj) 4 Steam engine design, XIII.
- or
- (1½Mj) 4 Gas engine design, XIII.
- (¾Mj) 2 Political science, I.
- (Mj) 3 Mechanical lab., XXIX.
- (¾ or 1½Mj) 0 to 2 Elective.
- Thesis.

ELECTRICAL ENGINEERING

- (Mj) 3 Thermodynamics, XX.
- (Mj) 3 Alternating currents, III.
- (¾Mj) 2 Electrical engineering practice.
- (¾Mj) 2 Water Turbines, XXII. †
- (¾Mj) 2 Political science, I.
- (¾Mj) 2 Electrical laboratory, XV.
- (¾Mj) 3 Mechanical lab., XXVIII.
- (1½Mj) 3 Elective.\*
- Thesis.

MUNICIPAL ENGINEERING.

- (1½Mj) 5 Masonry, XII.
- (¾Mj) 2 Experimental lab., XIII.
- (Mj) 3 Electric power, V.
- (1½Mj) 5 Structural design, XI.
- (¾Mj) 2 Political science, I.
- (1½Mj) 4 Hydraulic engineering, I

SECOND SEMESTER.

CIVIL ENGINEERING.

- (1½Mj) 5 Structural design, XI. ½
- (¾Mj) 2 Least squares, IX.
- (Mj) 3 Geodesy, XX.†
- (¾Mj) 2 Political science, II.
- (Mj) 3 Sanitary engineering, II.
- (¾Mj) 2 Contracts & specifications, I, II.
- (1½Mj) 4 Thesis,

MECHANICAL ENGINEERING.

- (¾Mj) 2 Steam Turbines XXI
- or
- Railway Mechanical Engineering.
- (¾Mj) 1 Compressed air,
- or
- Refrigerating Machinery.
- (¾Mj) 2 Contracts & Specifications, I, II
- (¾Mj) 2 Political science, II.
- (1½Mj) 4 Machine design, XIV. or
- (1½Mj) 4 Railway design, XXXIV
- (1½Mj) 4 Gas engine lab., XXX.
- (¾ to 1½Mj) 2 to 4 Elective.
- (Mj) 3 Thesis.

ELECTRICAL ENGINEERING

- (Mj) 3 Alternating currents, III.
- (¾Mj) 2 Electrical engineering practice.\*
- (¾Mj) 2 Contracts and specifications, I, II.
- (¾Mj) 2 Political science, II.
- (Mj) 3 Electrical design, XIII.
- (Mj) 3 Electrical laboratory, XV.
- (Mj) 3 Elective.\*
- (Mj) 3 Thesis.

MUNICIPAL ENGINEERING.

- (1½Mj) 5 Structural design, XI.
- (¾Mj) 1 Public health, III.
- (Mj) 3 Bacteriology, II.
- (¾Mj) 2 Political science, II.
- (1½Mj) 5 Sanitary engineering, II.
- (¾Mj) 2 Contracts and specifications, I, II.
- (Mj) 3 Thesis.

\* See note on page 201.

† This course in Water Turbines is a prerequisite to the course in Steam Turbines in the second semester, and all students desiring to take the latter course should not omit Water Turbines in the first semester. Senior Mechanical Engineers wishing to take Railway Mechanical Engineering may be allowed to substitute "Railway Technology" for Water Turbines but may, nevertheless, elect Water Turbines in preparation for Steam Turbines as an elective in the second semester. Senior Electrical Engineers wishing to specialize in Telephone Engineering will be allowed to elect an optional course in Telephony instead of Water Turbines, but they may, nevertheless, elect Water Turbines as preparation for Steam Turbines of the second semester if they desire to take Steam Turbines as an elective.

## COURSE IN SCIENCE AND TECHNOLOGY.

## FRESHMAN YEAR.

- ( $1\frac{1}{2}$ Mj) 5 Engineering mathematics.  
 ( $1\frac{1}{2}$ Mj) 4 English.  
 (Mj or  $1\frac{1}{2}$ Mj) 3 or 5 French or  
 German.  
 ( $1\frac{1}{2}$ Mj or Mj) 4 or 3 Chemistry or  
 History.  
 (Mj) 3 Military drill.

## SOPHOMORE YEAR.

- ( $1\frac{1}{2}$ Mj) 5 Engineering mathematics.  
 (Mj) 3 History, Chemistry, French or English.  
 ( $1\frac{1}{2}$ - $1\frac{3}{4}$ Mj) 4-5 Engineering drawing.  
 ( $\frac{2}{3}$ M) 1 Rhetoric.  
 ( $\frac{2}{3}$ Mj) 2 Military drill.

## JUNIOR YEAR.

## FIRST SEMESTER.

- ( $1\frac{1}{2}$ Mj) 5 Mechanics.  
 (Mj) 3 Physics.  
 (Mj) 3 Engineering Drawing.  
 ( $1\frac{1}{2}$ Mj) 4 Technical work.  
 ( $1\frac{1}{2}$ Mj) 4 Elective work.

## SECOND SEMESTER.

- ( $1\frac{1}{2}$ Mj) 5 Mechanics.  
 ( $\frac{2}{3}$ Mj) 2 Engineering drawing.  
 ( $1\frac{1}{2}$ Mj) 5 Technical work.  
 ( $2\frac{1}{2}$ Mj) 7 Elective.

## SENIOR YEAR.

- (4Mj) 12 Elective.  
 ( $2\frac{1}{2}$ Mj) 8 Technical work.
- (4Mj) 12 Elective.  
 ( $2\frac{1}{2}$ Mj) 8 Technical work.

## POST SENIOR YEAR.

Subjects all elective.

For more detailed statement of this course, see pages 205 to 209.

# Courses of Instruction

## ENGLISH

### *Course I. English.* [4]

Freshman I, II. MR. SANFORD

The work for this course is planned with special reference to the needs of engineering students. Two hours a week will be given to the study of English composition, and two hours to the study of a general survey of English literature.

Essays will be required every week. Special emphasis will be given to the subjects that an engineer must write upon when, in the line of his business, he makes specifications, estimates, description of processes or of principles, and their application to given results; or when he wishes to inform the public upon engineering work, its principles and details.

While in the study of literature one object will be the general broadening of the mind by an acquaintance with the masterpieces of English prose and poetry, especial attention will be given to the work of those writers who have handled scientific subjects with clearness and power.

## MATHEMATICS.

In imparting a knowledge of the mathematical subjects, special emphasis is placed upon their practical application. This gives the student a firmer grasp of the more important parts of these subjects and some appreciation of their real value, before reaching those technical studies where mathematics furnishes the only sure basis for professional knowledge and a most powerful instrument for use in original research.

### *Course I. Higher algebra.*

Freshman I. 75 hours

Advanced work on equations containing radicals, simple and quadratic equations, proportion, variation, progressions, summation of special series, binomial theorem, indeterminate coefficients, logarithmic series, Taylor's formula and the treatment of higher equations, including Cardan's rule for cubics.

### *Course II. Plane trigonometry.*

Freshman I, II. 45 hours.

Trigonometric functions of acute angles, of angles in general, applications of logarithms, solution of right triangles, general properties of triangles, practical applications, including the solution of cubic equations having real and unequal roots. Open to those who have completed course I.

### *Course III. Spherical trigonometry.*

Freshman II. 15 hours.

Review of some truths of solid and spherical geometry. Napier's rules, solution of right spherical triangles, general properties of spherical triangles and the application of spherical trigonometry to the solution of practical problems. Open to those who have completed Course II.

**Course IV. Analytical geometry.**Freshman II, 36 hours;  
Sophomore, I, 70 hours\*.

Co-ordinate systems, transformations of co-ordinates, algebraic equations of different degrees produced and discussed by the aid of these systems, transcendental equations and loci:—three dimensions; the point, plane, line, surfaces and solids. Open to those who have completed Course III.

**Course V. Differential calculus.**

Sophomore I, II. 55 hours.

The differentiation of algebraic and transcendental functions, successive differentiation, series, derivatives, maxima, minima, tangents, subtangents, normals, subnormals, illusory forms, asymptotes, direction and rate of curvature, radius of curvature, evolutes, envelopes, singular points and curve tracing. Open to those who have completed Course IV.

**Course VI. Integral Calculus.**

Sophomore II. 40 hours.

The integration of various algebraic and transcendental differentials, rectification of plane curves, quadrature of plane surfaces, areas of surfaces of revolution, cubature of volumes of revolution, and the production of the equations of loci by integrating certain conditional differentials. Open to those who have completed Course V.

**Course VII. Some practical applications**

Sophomore II. 15 hours.

of the calculus to mechanics and physics, maxima and minima, center of gravity, center of hydrostatic pressure and moment of inertia.

The foregoing courses in mathematics are required, *in the order given*, of all undergraduates in each of the engineering courses.

In order to enter any year of the course in Engineering Mathematics, the student must have a passing mark in all the required preceding mathematics.

\*Of the five hours per week required in sophomore mathematics, four are devoted to recitations and one hour to lectures. These lectures are devoted to the philosophy and use of the slide rule, to a review of the work of the preceding four hours and to practical problems requiring the application of the differential and the integral calculus for their solution.

**Course VIII. Advanced calculus and differential equations.**

Junior or Senior I, II. 24 hours.

Preparation courses v and vi.

**Course IX. Method of least squares.**

Senior II, 36 hours.

PROFESSOR LEAVENWORTH.

A study of the combination and adjustment of observations and the discussion of their precision, especially as applied to engineering problems.

**DRAWING.****Course I. (a) Freehand.**

Freshman I. [2] 68 hours.

Lettering, geometric forms and engineering details in outline, including working sketches, translations and the elements of perspective.

**(b) Mechanical.**

Freshman I. [2]. II [3] 170 hours.

Conventional methods, lettering, machine and structural details and standard sizes and shapes.

**(c) Descriptive geometry.**

Freshman II [2] 34 hours.

Problems relating to points, lines, planes, solids, interpenetrations, surfaces of revolution, tangents and developments, including the constructive geometry involved. Recitations and lectures.



*Course II. Descriptive geometry.* Sophomore I. [2] 68 hours.

Orthographic, isometric, horizontal, topographic, oblique and perspective projections, shades and shadows, line shading and brush tinting. Open to students who have completed course I.

- (a) Civil.
- (b) Mechanical and electrical.
- (c) Mining.

*Course III. Working drawings.* Sophomore I [1]. II [2] 102 hours.

Engineering details, assembly drawing, tracing and blue printing. Study of shop methods and drafting room systems. Details are obtained from actual machines and structures as far as possible.

- (a) Civil.
- (b) Mechanical and electrical.
- (c) Mining.

*Course IV. Instrumental.* I, II. [4] 238 hours.

Problems, projections, sections, developments and interpenetrations. With conventional renderings in line and wash.

#### FOR GRADUATES.

*Course V. Advanced work in descriptive geometry and applications.*

*Course VI. Projective geometry.*

#### MECHANICS.

##### (a) APPLIED MECHANICS.

*Course I. Statics, dynamics and mechanics of materials.* Junior I. 90 hours.

The laws of equilibrium, motion, work and energy as applied to rigid bodies, and a study of the strength and elastic properties of materials of construction required in the design of beams, posts, masonry arches and equilibrium polygon. Recitations and lectures. Open to students who have completed the work of the first two years in mathematics and physics.

*Course II. Hydraulics and pumping machinery.* Junior II. 90 hours.

Hydraulics, including the laws of the equilibrium, pressure and flow of fluids; the theory of the action of pumps. Recitations and lectures. Open to those who have completed course I.

##### (b) THEORETICAL MECHANICS AND MATHEMATICAL PHYSICS.

For Graduates and Undergraduates who have completed calculus and physics.

*Course I. The potential function and spherical harmonics.*

*Course II. Analytical statics and electrostatics.*

*Course III. Dynamics of rigid bodies.*

*Course IV. Circular, hyperbolic and elliptic functions with their physical applications.*

#### FOR GRADUATES.

Open only to those who have completed advanced work in mathematics.

*Course V. Directional calculus, vector analysis and determinants.*

*Course VI. Analytical theory of the conduction of heat.*

*Course VII. Theories of elasticity and sound.*

*Course VIII. Wave theories of light, heat and electricity.*

*Course IX. Kinetic theory of gases.*

*Course X. Hydrodynamics and fluid motion.*

*Course XI. Theory of functions with applications.*

## PHYSICS.

## FOR UNDERGRADUATES.

The mathematics of the freshman year are required as preparation for all courses in this department.

*Course I.*

[6] Sophomore I, II.

(a) Mechanics, heat, and sound.

(b) Electricity, magnetism, and light.

Recitations, experimental lectures and laboratory work.

*Course II. Electrical measurements.*

[3] Junior I.

Recitations, experimental lectures and laboratory work.

*Course III. Advanced laboratory work.*

Senior I, II.

Open to those who have completed course II.

## FOR GRADUATES.

*Course IV. Advanced work* in some special field; experimental investigations being the principal feature of the work.

## GEOLOGY.

*Course I. Geology.*

Junior II, 51 hours. DR. SARDESON.

A condensed course in physical and historical geology, for civil engineers. Geodynamics, structural geology, physiography, stratigraphic and historical geology are treated of successively. Excursions to typical localities will supplement work done in the classroom. Lectures and references.

## CONTRACTS AND SPECIFICATIONS.

*Course I. Contracts.*

Senior II, 12 hours. DEAN PATTEE.

Lectures on the law of contracts; essential elements of a legal contract; contracts by agents; mutual assent; misrepresentation in the contract; invalidity of contract through fraud; alterations; consideration. Agreements—oral and written; enforcement of contract.

*Course II. Specifications.*

Senior II, 12 hours. PROFESSOR FLATHER.

A study of engineering specifications. Classes of specifications; essential features; clauses; details. Examples. Lectures, recitations and practice in writing specifications.

## ASTRONOMY.

*Course I. Practical astronomy.*

Sophomore II, 34 hours.

PROFESSOR LEAVENWORTH.

Spherical co-ordinates; time; latitude; longitude, and other astronomical problems. Lectures.

## POLITICAL SCIENCE.

*Course I. Introduction to political science.*

Senior I, 34 hours.

PROFESSOR SCHAPER.

A study of the elements of jurisprudence including partnerships, corporations, liability of officers, citizenship, etc. Lectures and reading.

- Course II. Transportation.* Senior II. 34 hours. PROFESSOR FOLWELL.  
The evolution of transportation in the United States, and by railroads in particular. Economic aspects and public policy of railroads.

BIOLOGY AND BACTERIOLOGY.

- Course I. Biology.* Junior II. 54 hours.  
Brief course in general biology. Microscopical examination of samples of water for small plants and animals of frequent occurrence in public water supplies. Sedgwick-Rafter method.
- Course II. Bacteriology.* Senior II. 54 hours.  
Brief course in general bacteriology. Preparation of media and study of cultures, especially those of pathogenic bacteria found in water and sewage.

BOTANY AND PLANT PRODUCTS.

- Course I. Water Supply Algae.* Junior I. 54 hours  
ASSISTANT PROFESSOR TILDEN.  
This course includes a detailed comparative morphological and taxonomic study of the Fresh Water Algae, with a systematic examination of the forms found in the Minneapolis and St. Paul water supplies. (Sedgwick-Rafter method).

CHEMISTRY.

- Course I. Qualitative analysis.* Freshman I, II. 272 hours.  
ASSISTANT PROFESSOR NICHOLSON.  
The course includes general reactions of the metals and their qualitative separation; reaction and identification of acids, followed by practical problems in qualitative analysis. Lectures and laboratory work.
- Course II. Chemical technology.* Sophomore I. 68 hours.  
ASSISTANT PROFESSOR SIDENER.  
Includes technical analysis of materials of engineering, with especial reference to iron and steel, lectures and laboratory work.
- Course III. Quantitative analysis.* Sophomore I, II, 72 hours.  
Volumetric and gravimetric analysis.
- Course IV. Water analysis.* Junior I. 72 hours.  
Sanitary chemical analysis of water. Samples collected by the students tested for nitrogen in its several conditions, chlorine, color, turbidity, hardness.
- Course V. Fuel and gas analysis.* Junior II. 90 hours.  
PROFESSOR FRANKFORTER.  
The work includes an exhaustive chemical examination of fuels and the common gases, with a determination of their light and heat efficiencies. Lectures and laboratory work.

## CIVIL ENGINEERING.

## MUNICIPAL AND SANITARY ENGINEERING.

For the classes graduating in 1906 and thereafter, a course of elective studies is offered to students desiring to give special attention to the problems of city engineering, particularly those having a direct bearing upon questions of public health. The departments of chemistry, biology and bacteriology and also the State Board of Health have lent their aid to the efficiency of this course. A reduction in time given to structural work and geodesy makes it possible to devote more time to design of public works.

*Course I. (a) Hydraulic engineering.* Senior I. 40 hours.

Study of public water supplies, covering the means and methods of collection, purification and distribution of water to large and small communities. Details of construction. Turneure & Russell's *Water Supply*: text. Lectures on water power development, irrigation, river and harbor improvements and drainage. Required preparation, mechanics II. (Recitations and lectures.)

*Course I. (b) Hydraulic design.* Senior. 56 hours.

A series of problems in calculation of quantities and design. Estimates of cost. Required preparation: mechanics II. (Drawing room.)

*Course II. (a) Sanitary engineering.* Senior II. 56 hours.

Sewerage systems: separate and combined, hydraulics of sewers,—relation to rainfall and run-off, determination of size and capacity. Surveys for drainage systems, design of system in detail, specifications, estimates of cost, inspection of work. Methods of disposal, irrigation, filtration, chemical precipitation, bacteriolytic methods. House drainage. Garbage disposal. Preparation required, mechanics II. Folwell's *Sewerage*: text. (Recitations and lectures.)

*Course II. (b) Sanitary design.* Senior II. 68 hours.

Problems illustrative of work in course II. A complete design for collection and purification of sewage. Ogden's *Sewer Design*, Rideal's *Sewage*, Moore's *Sanitary Engineering*, &c.: References. Preparation, mechanics II. (Drawing room.)

*Course III. Public health.* Senior II. 18 hours.

Lectures upon general problems concerning public hygiene, by the professor of bacteriology.

## RAILWAY AND HIGHWAY ENGINEERING.

*Course IV. Curves and earthworks.* Junior I. 36 hours.

Problems attending final location surveys of railroads and track laying, theory of computation of volumes and preparation of preliminary estimates. Transition curve. Woodman: text book and notes.

*Course V. Execution in field of practical problems.* Junior I. 102 hours.

Illustrating the analytical work of course IV, including the computation of earthwork of railroad grades and pits, platting profiles and construction of maps.

**Course VI. Railway location and estimates.** Junior II. 102 hours.

Reconnoitering and preliminary surveys are made, followed by field maps and final location; profiles and cross-sectioning of a new route for a railroad, involving four or five miles of relocation. Complete estimates covering the cost of earth and rock work, timber structures and right of way involved in the actual construction of the line are made, together with plans of important bridges and a right of way map of the adopted location.

**Course VII. Railway economics.** Junior I, II. 34 hours.

This course consists of a course of lectures once a week through the junior year. During the first semester the subject of structures of permanent way, related to course IV, is treated, also the economic consideration controlling in the final selection of a line, the fixing of the grade line and placing of contracts for construction. In the second semester the science of location is treated preparatory to course VI.

**Course VIII. Highway construction and maintenance.** Sophomore II. 36 hours.

The economic relation of highways in transportation, with a treatment of the practical questions relating to materials and methods necessary to maintain good streets and highways. Lectures, Baker as text, with collateral reading, reports and essays. Tours of inspection of country roads and city pavements.

## STRUCTURAL ENGINEERING.

**Course IX. Stresses in framed structures.**

Junior I. 85 hours. Junior II. 85 hours.

Theory of structures and determination of stresses by graphical and analytical methods, for static and for moving loads. Lecture, one hour per week; work in drawing room in computation and graphic statics, supplemented by daily informal lectures, four hours per week. Reference books. Sondericker's Graphic Statics, Johnson's Stresses in Framed Structures. Open to students pursuing the course in mechanics.

**Course X. Structural details.**

Junior II. 102 hours.

Methods of proportioning individual members of framed structures and the design of joints and splices in steel and wooden structures. Practice in the use of handbooks of steel manufacturers. Design of a roof truss and railway plate girder bridge. Practice in making complete shop drawings. Six hours per week. Reference books: Handbooks of the Carnegie and Cambria Steel Companies. Johnson's Stresses in Framed Structures. Open to students who have completed first half of course IX.

**Course XI. Structural designs.**

Senior I. 170 hours; II. 170 hours.

Theory and design of steel structures, including railway and highway bridges, standpipes and towers, and other problems of structural interest. Theory of higher structures. Reference: Johnson's Stresses, Merriman's Part III and IV Bridge Series. Ten hours per week. Open to students who have completed courses IX and X.

**Course XII. Masonry construction.**

Senior I. 136 hours.

Properties of stones, bricks, cement and concrete, and their use in engineering structures. Foundations, retaining walls, piers and abutments, dams and chimneys. Theory of reinforced concrete.

Theory and design of masonry arches. Design of stone and concrete structures. Lectures and textbook work, two hours per week; drawing room work, six hours per week. Reference books: Baker's Masonry, Church's Mechanics, and current periodical engineering literature. Open to students who have completed course IX.

*Course XIII. (a) Experimental laboratory.* Senior I. 68 hours.

Experimental tests of the properties of cements, concrete, reinforced concrete and strength of joints, columns and framed structures. Laboratory work, four hours per week.

*(b) Cement laboratory.*

Junior I.

A short course in cement testing, supplemented by lectures upon the properties of cement and methods of testing. Given to all junior engineers in conjunction with the course upon strength of materials. Four hours per week for four weeks.

#### TOPOGRAPHICAL ENGINEERING.

*Course XIV. Surveying.* Freshman II. 68 hours.

Work consists of recitations, lectures and illustrative problems relating to chaining, field problems of employing chain; methods of keeping field notes; determination of area—D. M. D. and rectangular coördinate method; compass and transit surveying; study of instruments and their adjustment; methods for overcoming obstacles, determination of heights and distances inaccessible; methods of supplying omissions of platting compass and transit surveys; discussions of the methods of laying out and dividing land, including the public land surveys of the United States. The care, proper use and adjustment of all instruments used are treated in field exercises. Chain, compass and transit surveys are made and circuits of level-lines run by each party. A meridian line is established by each party by observations on Polaris.

*Course XV. Platting.* Freshman II. 34 hours.

This time is given to construction of diagonal scales, protractors, circular and straight veniers. All surveys made in the field are platted and areas computed. Solution of problems and usual office reduction of all field notes.

*Course XVI. Topography.* Sophomore I. 96 hours.

The methods of conducting topographical surveys are taken up in the order of increasing accuracy. At first a text-book is used to acquaint the student with the instruments employed; method of use and theory of adjustment. Lectures are given on the details of field work; parties of topographers are formed and each makes a complete topographic survey of a certain tract, employing stadia transit and rectangular methods.

*Course XVII. Mapping.* Sophomore I. 40 hours.

Notes taken in course XVI are reduced, areas computed and topographical maps made of land surveyed.

*Course XVIII. Higher surveying.* Sophomore II. 102 hours.

Analytical study of the aneroid and mercurial barometers and barograph is made for determining their efficiency in hypsometric surveys; of the solar compass and solar transit and various solar attachments for establishing government standard lines and the plane-table and stadia as a rapid means of prosecuting topographical surveys. Text-books: Johnson's Theory and Practice of Surveying, and Baker's Engineering Instruments.

*Course XIX. Field work and platting.* Sophomore II. 68 hours.  
Observations are made with barometers for difference of level: checked with spirit level. Meridians and parallels of latitude are run with solar compass and attachments, and an outline survey made, computed and platted. A plane-table survey, employing stadia and telemeter is made by each party, and each student makes a map of the same. A general map is compiled from all the maps, a tracing made and blue prints taken by each student.

*Course XX. Geodesy.* Senior II. 51 hours.  
Geodetic reconnaissance: base-line measurement, employing bars and steel tape; measurements of angles, horizontal and vertical; field methods for time, latitude, longitude, and azimuth; theory of computing geographical position. Lectures and text. Making and reducing observations illustrating work of course.

## MECHANICAL ENGINEERING.

### SHOP WORK.

*Course I. Carpentry and pattern making.* Freshman I. 162 hours.  
Woodworking, use of tools: lathe and bench work. Patterns for moulding, core boxes. Lectures and practice.

*Course II. Foundry practice and pattern making.* Freshman II. 162 hours.  
Patterns and flasks. Moulding, casting, mixing metals, brass work, and core making. Shop practice, recitations and lectures.

*Course III. Blacksmithing.* Sophomore I. or II. 90 hours  
Use of tools, forging, welding, tool dressing, tempering. Lectures and practice.

*Course IV. Machine work.* Sophomore I. and II. 270 hours.  
Chipping, filing, machine work, gear cutting, finishing; machine construction. Lectures and practice.

*Course V. Tool construction.* Junior I. 108 hours.  
Tools, taps, reamers, cutters and other special work. Lectures and practice. Preparation, course IV.

*Course VI. Carpentry, joinery and wood carving.* I. or II. 144 hours. (Elective.)  
A course in wood working designed with special reference to the needs of teachers of manual training.

*Course VII. Machine construction.* Senior I. or II. 144 hours. (Elective.)  
Construction of patterns and machine work for special apparatus, or machinery, designed by the students.

*Course VIII. Shop economics.* Senior II. 36 hours. (Elective.)  
Shop and factory organization and management; cost systems.

### MACHINE DESIGN.

*Course IX. Principles of mechanism.* Sophomore II. 54 hours.  
The transmission of motion without consideration of the strength of parts. Gear wheels, cams, belts, screws, epicyclic trains, parallel motions, quick-return movements. Lectures and recitations. Preparation: course V. in mathematics.

*Course X. Kinematics.* Sophomore II. 72 hours.  
Graphical diagrams of the paths, speeds and accelerations of important mechanisms: centroids, analysis of mechanisms: construction of cams: kinematic pairs. Preparation: course IX.

- Course XI. Machine Design.** Junior I and II. 216 hours.  
Calculation and design of such machine parts as fastenings, bearings, rotating pieces, belt and tooth gearing. Recitations, lectures and drawing-room practice. Open only to students pursuing course I in mechanics.
- Course XII. Machine design.** Junior II. 72 hours. (Second half semester.)  
Application of graphical methods to the design of valve gears and link motions: Zeuner diagrams, indicator cards. Lectures and drawing-room practice. Open only to those pursuing course XVIII.
- Course XIII. Machine design. Steam engine.** Senior I. 144 hours.  
Calculations and working drawings for a high speed automatic steam engine. Theoretical diagrams and determination of details. Preparation: Courses XII and XVII.  
**Gas engine.** An alternative course in gas engine design is offered those who have completed course XIX.
- Course XIV. Machine design.** Senior II. 144 hours.  
Original designing, including machinery for changing size and form. Boiler design, cranes, pumping and transmission machinery and engineering appliances. Lectures, problems and drawing-room practice. Preparation: course XI.
- Course XV. Tool design.** Senior I or II. 72 or 144 hours.  
Design of special tools for manufacturing interchangeable parts; jigs and milling fixtures. Preparation: courses V and XI.
- Course XVI. Engineering design.** Senior II. 72 or 144 hours.  
Problems, designs and estimates for power plants, central stations and factory equipment. Selection of motive powers, pumps, shafting, piping and accessory plant. Preparation: courses XVII, XVIII, and XIX.

#### STEAM ENGINEERING AND PRIME MOVERS.

- Course XVII. Steam boilers.** Junior I. 18 hours.  
Application of theory and practice in the design and construction of steam boilers, chimneys, boiler settings and accessories, smoke prevention, mechanical stokers; methods of operating boilers with safety and economy. Open only to students pursuing course I in mechanics.
- Course XVIII. Steam engine.** Junior II. 54 hours.  
Mechanics of the steam engine. Work in the cylinder: effect of reciprocating parts; steam distribution. Mechanism of the steam engine. A study of the details of modern steam engines. Valves and valve gears. A study of the slide valve, link motions and other reversing gear; automatic cut-off gears and the Zeuner diagram. The steam engine indicator. Principles and operation of the instrument, indicator rigging; indicator cards; compounding. Preparation, course I. in applied mechanics.
- Course XIX. Gas engines and producers.** Junior II. 36 hours.  
Principles of operation of two cycle and four cycle engines; cylinder construction and arrangement; valve gears and starting mechanisms; system of speed control, ignition and cooling. Application of the indicator and consideration of indicator diagrams.  
A study of the power gas producer including suction and pressure types for various fuels; construction and operation of the generator and accessory apparatus. Application to various industrial purposes. Recitations and lectures. Open only to students pursuing course V in chemistry.



- Course XX. Thermodynamics.** Senior I. 54 hours.  
The mechanical theory of heat as applied to the steam engine and other motors. Preparation: courses I and II in applied mechanics and course XVIII.
- Course XXI. Thermodynamics.** Senior II. 54 hours.  
*Thermodynamics of gas and oil engines*; heat losses and efficiencies. *Steam turbine*; elemental theory; axial and radial turbines; distribution of pressure; limiting velocities; thermodynamic efficiency.  
*Refrigerating machinery* and ice manufacture. Preparation: courses XVIII, XIX and XX.
- Course XXII. Prime movers.** Senior I. 36 hours. (Elective.)  
Theory of turbines, hydraulic motors and wind mills. Preparation: course II in applied mechanics.
- Course XXIII. Mechanical engineering.** Senior I. 36 hours.  
*Measurement of power.* A study of the methods employed in measuring power. Dynamometers, Prony brakes; measurement of water power: water meters; weir measurement, flow of water in pipes; measurement of electric power, efficiency of motors; power required to drive machine tools and shafting. Recitations and lectures. Preparation, course II in applied mechanics.  
*Air compressors and motors,* and the transmission of power by compressed air. Recitations and lectures. Preparation, course II in applied mechanics.
- Course XXIV. Mechanical engineering.** Senior I. 36 hours. (Elective.)  
*Heating and ventilation.* Principles of heating and ventilation. Construction and operation of heating apparatus. Steam, hot water, exhaust, vacuum and fan systems. Lectures, recitations and problems.  
*Journal Club*—Open to the seniors and juniors. Once a week.
- MECHANICAL ENGINEERING LABORATORY.**
- Course XXV. Strength of materials.** Junior I. 72 hours.  
Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams. Open only to students pursuing course I in mechanics.
- Course XXVI. Mechanical laboratory.** Junior II. 72 hours.  
Continuation of course XXV; also exercises in valve setting, indicator practice, calibration of steam gauges, calorimetry, efficiency of screws and hoists. Preparation: course XVIII.
- Course XXVII. Hydraulic laboratory.** Junior II. 72 hours.  
Hydraulic measurements, calibration of weirs, nozzles, orifices and meters, tests of water meters, rams, pulsometers, pumps and other hydraulic apparatus. Preparation: course XXV.
- Course XXVIII. Mechanical laboratory.** Senior I. 108 hours.  
Calibration of dynamometers and other apparatus. Testing lubricating value of oils; tests of injectors, steam-engines and boilers, and complete power and lighting plants. Preparation: course XXV.
- Course XXIX. Mechanical laboratory.** Senior I. 108 hours.  
Hydraulic measurements. Calibration of weirs, nozzles, orifices and meters. Tests of water motors, rams, pulsometers, steam pumps and other hydraulic apparatus. Calibration of dynamometers and other apparatus. Testing lubricating value of oils; tests of injectors, steam-engines and boilers. Preparation: course XXVI.

- Course XXX. Mechanical laboratory.* Senior II. 144 hours.  
Tests of gas and hot air engines; gas producers; air compressors; automobile and locomotive testing, and other special work.  
Preparation: course v in chemistry, and xxviii.
- Course XXXI. Mechanical laboratory.* Senior II. 72 or 144 hours. (Elective.)  
Special research work and commercial tests.
- Course XXXII. Mechanical laboratory.* Senior 72 hours.  
Special modification of courses xxix and xxx, covering work in hydraulic measurements, steam engine and boiler testing for students in mining and metallurgy.

#### RAILWAY MECHANICAL ENGINEERING.

The following courses are available to seniors desiring to prepare themselves for special work in railway engineering.

- Course XXXIII. Railway technology.* Senior I. 72 hours.  
The object of this course is to familiarize the student with the principal details of construction of locomotives, and consists of a systematic course of shop visits carried on in the various railroad shops in the vicinity.
- Course XXXIV. Railway design.* Senior II. 144 hours.  
(a) Of link and valve motions. Continuation of course xii with special applications of the Stephenson link.  
(b) Of locomotive and car details.  
(c) Of the locomotive boiler.  
(d) Of assembled parts. Preparation: course xxxiii.
- Course XXXV. Locomotive construction.* Senior II. 36 hours.  
Lectures, reading and recitations on design and construction of locomotives, supplementing course xxxiv. This treats—  
(a) Of parts not involving the boiler and use of steam; but including the carriage, as frames, springs and equalizing arrangements, running gear, brakes, trucks, lubrication.  
(b) Of locomotive boilers and connected parts. Types, proportions, grates, flues, smoke-box arrangements and stacks. Riveted joints, bracing and staying. Lagging, smoke prevention.  
(c) Of the locomotive engine. Details, heat insulation, cylinder proportions for various types, weight on drivers, special service; crank effort diagrams with inertia of reciprocating parts, cylinder and receiver ratios for compound engines, starting valves for compounds.
- Course XXXVI. Locomotive road testing.* Senior II.

#### FOR GRADUATES.

Courses are offered in:

- Engineering design.*
- Experimental investigation.*
- Railway engineering.*

#### ELECTRICAL ENGINEERING.

- Course I. Applied electricity.* Junior I. 36 hours.  
Outline of industrial uses of electricity; units; application of Ohm's law; methods and calculation of wiring; electrical instruments and measurements. Text book: Shepardson, *Electrical Catechism*.  
Preparation required: physics, course I.

*Course II. Dynamos and motors.* Junior II. 72 hours.

Theory of electro-magnet and direct current dynamo and motor; methods of regulation, construction and operation of dynamos and motors; methods of testing. Preparation required: electrical engineering, course I; physics, courses I and II (a); differential and integral calculus.

*Course III. Alternating currents.* Senior I, II. 108 hours.

Phenomena, measurement and use of alternating currents; theory of line, transformer, generator and motor; types of apparatus. Text-book: Steinmetz, Alternating Current Phenomena. Preparation required: electrical engineering, courses I and II.

*Course IV. Electrical engineering practice. Electric railway.*

Senior I. 18 hours.

History and development; different systems of distribution, location and calculation of feeders; line and track construction; choice of motors, trucks, generators and engines; operation and repairs. Text-book: Gotshall, Electric Railway Economics. Preparation required: electrical engineering, course II.

*Course V. Electrical engineering practice. Batteries.* Senior I. 18 hours.

General theory of primary and secondary cells; types and methods of construction; commercial applications; operation of battery plants; construction and test of cells by students; test of a commercial plant. Text-book: Lyndon, Storage Battery Engineering. Preparation required: electrical engineering, course II.

*Course VI. Electrical engineering practice. Electric lighting.*

Senior I. 18 hours.

Comparison of different sources of light; photometry, physics of the arc; history, design and regulation of arc lamps; adaptation to constant currents, constant potential and A. C. circuits; carbons; history, manufacture and economy of incandescent lamps; distribution of light. Text-book: Bell, Art of Illumination. Preparation required: electrical engineering, course II.

*Course VII. Electrical engineering practice. Electrical transmission.*

Senior II. 18 hours.

Utilization of natural forces; various methods of transmission; theory of electric motor; power distribution with constant current, constant potential and alternating systems; design of line; study of particular plants. Preparation required: electrical engineering, courses I, II and VI.

*Course VIII. Electrical engineering practice. Central stations.*

Senior II. 18 or 36 hours.

Preliminary surveys; choice of electrical systems; load diagrams; best units of power; comparison of steam, gas and water power; location, design and erection of station buildings; boilers, engines, dynamos, storage batteries, switch board and lines; operation and regulation; maintenance of plant; emergencies; examination of stations in Minneapolis and St. Paul. Preparation required: electrical engineering, courses II and VI.

*Course IX. Electrical engineering practice. Telegraph and telephone.*

Senior II. 18 or 36 hours.

Various systems and instruments used in local and long distance telegraphy and telephony, design and construction of switchboards and lines; protection from inductive and other disturbances; police, fire alarm and district messenger systems. Preparation required: electrical engineering, courses I and VI.

- Course X. Electrochemistry.* Senior II. 36 or 72 hours.  
Theoretical and experimental study of electrolysis, electrodeposition and electric furnaces.
- Course XI. Electrical design.* Junior II. 72 hours.  
Problems in designing circuits, electro-magnets and dynamos; complete working drawings and specifications to accompany each design. Text-book: Wiener, *Dynamo Electric Machines*. Preparation required: physics, courses I and II; electrical engineering, courses I and II; machine design, course XI.
- Course XII. Electrical design.* Senior I. 72 hours.  
Design of a dynamo or other problem as assigned. Preparation required: electrical engineering, courses II and IV.
- Course XIII. Electrical design.* Senior II. 108 hours.  
Designs, specifications and estimates for an electric light or power plant, or other approved problem. Preparation required: electrical engineering, courses IV and VI.
- Course XIV. Electrical laboratory.* Junior II. 108 hours.  
Tracing circuits and locating faults; measurements of conductivity and insulation; calibration and use of instruments; operation and characteristic curves of dynamos and motors. Preparation required: physics, courses I and II, electrical engineering, courses I and II.
- Course XV. Electrical laboratory.* Senior I. 72 or 144 hours; II. 108 hours.  
Photometric and electrical tests of incandescent and arc lamps and regulating devices. Experimental study of alternating currents; regulation and efficiency tests of alternators, transformers, rotaries and motors.
- Course XVI. Electrical laboratory.* Senior I or II. 56, 72 hours.  
Efficiency tests and special problems.
- Course XVII. Electrical measurements of precision.* Senior I, II. 72 hours.  
Lectures and laboratory work. Precise measurements of resistance, voltage, current, self-induction and capacity; standardization of measuring instruments. Open to a limited number.
- Course XVIII. Plant operation.* Senior I, II.  
Practice in operation and care of boiler, engines, motors, dynamos and circuits of the University lighting plant. Nine runs of four hours each.
- Course XIX. Journal reading.* Senior I. 36 hours; II. 36 hours.  
Weekly discussion of current electrical periodicals. The class meets monthly with the Minnesota Branch of the American Institute of Electrical Engineers.
- Course XX. Electric power.* Senior I. Civil, Mechanical and Mining Engineers, 54 or 72 hours.  
Elements of theory and practice of electrical measurements, wiring, dynamos, motors and electric lighting. Thirty-six lectures and recitations and forty-eight hours laboratory. Text-book: Shepardson, *Electrical Catechism*. Preparation required: physics, course I.
- Course XXI. Dental electricity.* Senior I. Dentists. 27 hours.  
Electrical and magnetic units; electrical instruments and measurements; electro-dental apparatus. Recitations and experimental lectures. Text-books: Shepardson, *Electrical Catechism*, and Custer, *Dental Electricity*. For seniors in dentistry.

Candidates for the degree of electrical engineer are required to take courses I, II, III, XI, XIII, XIV, XV, also 68 hours class room work selected from courses IV to IX.

*Electives* may be chosen from any courses given in the academic or engineering colleges for which the student has sufficient preparation. Attention is called to the following as desirable for electrical engineers:

*Botany*—Timber and timber diseases;

*Chemistry*—Quantitative analysis, fuel and gas analysis, electro-chemical analysis;

*Civil Engineering*—Short course in surveying for seniors; masonry construction, structural details; hydraulic engineering; railway economics.

*Drawing*—Advanced work.

*Electrical engineering*—any courses not taken as required work (except XX and XXI).

*Geology*—Mineralogy;

*Language*—English, French, German, Spanish.

*Mathematics*—Theory of turbines, hydraulic motors and wind engines; circular, hyperbolic and elliptical functions; wave theories of light, heat and electricity; directional calculus, vector analysis, differential equations, least squares;

*Mechanical engineering*—Measurement of power, air compressors and motors, shop work, heating and ventilation, machine design, railway technology, mechanical laboratory, gas engines and producers;

*Physics*—Advanced work on special problems;

*Political science*—Money and banking, corporation finance, public finance, modern industrial problems.

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## EQUIPMENT.

As an organization of the University of Minnesota, the college of engineering and of the mechanic arts has the general advantage of the University. Students find available all the resources of the institution so far as their technical lines will permit their use. For the information concerning methods of work and equipment, the following condensed statements are offered:

### CIVIL ENGINEERING.

*Geodesy.* For this work the department has a three hundred foot standard steel tape, astronomical transits and repeating theodolites, heliotropes, a telemeter, deflection magnetometer, precise levels, two marine chronometers, one on sidereal and the other on mean solar time.

*Highway engineering.* The department has suitable apparatus for conducting the usual tests applied to road materials.

*Railroad work.* The usual equipment of transits, levels, planimeters, gradientors, level-rods, range-poles, chains and tapes, is provided.

*Surveying.* The department has for this work the necessary outfit, consisting of compasses—plane, railroad and pocket; transits, tapes, hand levels, aneroid and mercurial barometers, solar compasses and solar attachments, pantometers and anemometers.

*Structural engineering.* The department has a collection of drawings of prominent structures throughout the country; photographs of bridges, buildings and roofs, in this country and abroad.

The cement and concrete laboratory is being rapidly developed and offers excellent facilities for experimental work with cement and its products. In connection with the experimental laboratory work of this department there is a large Olsen testing machine of two hundred thousand pounds capacity, with complete attachments, including automatic and autographic recording apparatus, extension head for full sized columns ten feet long, and transverse beam for bending tests upon twenty foot beams.

*Municipal and Sanitary Engineering.* A special course has been planned and is now offered to students in civil engineering. Laboratory work is given a prominent place in the curriculum. A collection of drawings and blue-prints of typical structures is being collected.

*Topography.* For this work the department has plane-tables, telemeter rods, stradia-transits, reduction charts and slide rules, clinometers, pedometers, current-meters, compasses, a complete topographic map of the District of Columbia, besides a large collection of topographic sheets presented by the United States coast and geodetic, and geological surveys.

*Library.* The civil engineering library is located on the main floor of the engineering building where are to be found all the more important books relating to this line of work. There are complete sets of the leading technical journals and proceedings, and reports of a large number of state and university engineering societies.

*Reading Room.* Here are to be found all the leading American periodicals, and some foreign, relating to civil engineering. The files of the most important are bound and are easy of access to the students.

*Methods of instruction.* It is the aim of the department to secure for its students special training in the preparatory studies which form the basis of all engineering work—such as mathematics, physics, mechanics and drawing—these being the tools for the special engineering which follows.

A thorough course is then given in the theory and practice of the more important professional lines, such as railroad and structural engineering and topography. Considerable time is devoted to hydraulics, municipal engineering, higher surveying and geodesy.

While theory is at all times made prominent it is always accompanied by practice according to the methods followed in actual professional work.

*Inspection tours.* The professional work of the department is illustrated in a practical manner by frequent visits to the engineering works and plants in the vicinity of Minneapolis and St. Paul.

## MECHANICAL ENGINEERING.

The plan of instruction in this course is intended to give the student a thorough training in mathematics and the physical sciences; and in the fundamental principles of engineering.

The work is planned to make him familiar with the various applications of these principles, and with the practical details of machine construction and design.

A new building especially designed to meet the requirements of instruction in the various lines of shop work, has recently been erected and the increased facilities thus afforded for the prosecution of this work are unexcelled.

This building consists of a two-story portion, containing the machine shop on the first floor and the wood shop on the second; beyond the machine shop and at a different level is the forge shop and foundry, both one story in height.

Slow burning mill construction is used throughout. This consists of brick walls and heavy timbers which, in case of fire, burn slowly and are safer than the ordinary iron and timber combination for this class of buildings.

A two-story extension has recently been added in which are located the mechanical engineering lecture and recitation rooms, drawing rooms, library and offices.

In the machine room a three-ton crane will cover a clear span of 12 feet, the entire length of the shop, thus giving ample space for erecting. This crane will also serve some of the larger machine tools.

The foundry has been the subject of especial study and possesses many features of interest and value. In accordance with the best modern practice for light work the floor is of concrete, and the gangways, leading from the cupola and extending lengthwise of the room, are of heavy iron plates set in cement.

A light traveling crane is also provided for the foundry. This has a span of 18 feet, and runs the entire length of the room.

The lighting, heating and ventilation of the building have received careful consideration. In the machine and pattern shops 60 per cent of the wall space above the benches is in glass. In the foundry and forge shop less light is allowed, since an abundant supply of overhead light is obtained from windows placed in the lantern or ventilator which extends over the roof. Pipe coils are employed in heating the building, and these are placed partly on the side walls under the windows and partly overhead. Electric power is used for driving the machinery. The group system has been selected as best adapted to the conditions, and a number of small motors are placed in the several departments; 220-volt continuous current motors are employed in connection with a

three-wire system of distribution, which is also used in the lighting circuit.

The machine shop contains representatives of the ordinary machine tools, gauges, and small tools usually found in a well-equipped modern plant.

The shop for pattern making and general wood work contains benches with vises and tools, lathes and lathe tools, an improved universal sawing machine, band saw, planer, and other power tools, and all hand tools used in carpentry and pattern making.

The forge shop is equipped with stationary and portable forges, a blower and exhaust fan, a one hundred pound drop hammer, and the necessary small tools used in blacksmithing.

The foundry contains a thirty-inch Whiting cupola, and two brass furnaces, which embody some novel features. There are two core ovens; one for ordinary work  $3\frac{1}{2} \times 3\frac{1}{2} \times 5$  feet, and one  $3\frac{1}{2} \times 7 \times 6$  feet for special cores which may be required. The feature of these core ovens is that the gases and products of combustion are caused to traverse suitable conduits under a plate floor and do not come into direct contact with the cores. The usual moulding tools, ladles, crucibles, and all of the tools and material needed in moulding and casting iron, brass or white metal, are provided.

The shop work is intended, not so much to give the student skill in the manual operations of the respective crafts, as a knowledge of the methods and processes of practical construction.

*The mechanical laboratory*, in which the experimental research of the department is conducted, has been considerably enlarged and its equipment greatly increased. Two testing machines of 50,000 pounds and 100,000 pounds capacity, and three transverse testing machines are provided for determining the strength, ductility, resilience and other characteristics of the various materials used in engineering work under tensile, compressive, transverse and torsional stress. Several forms of absorption and transmission dynamometers are available for determining the power generated by engines or other motors, or absorbed by shafting or machinery; a Carpenter coal calorimeter for determining the heat value of coal, and apparatus for the analysis of flue gases.

The laboratory is also provided with machines for determining the lubricating qualities of oils and the relative values of metals used for journals and bearings; a mercury column and a Crosby direct pressure-gauge tester, for use in calibrating gauges and other pressure indicators. Besides the boilers in the university heating plant, there are in the laboratory a 35 horse-power boiler and a high pressure boiler capable of carrying a working pressure of 300 pounds, with the necessary gauges, calorimeters, tanks and pyrometer, for making complete duty trials; several automatic steam engines equipped with condensers,



indicators, brakes, scales and thermometers, which are employed to determine the efficiency in the use of steam under various conditions assumed or found in actual practice, and for valve setting and indicator work.

The operation and economy of other heat engines are illustrated by an Otto gas engine of five horse-power, a White gasoline engine of eight horse-power, a Rider two-cylinder and an Ericsson single cylinder hot air engine, a pulsometer, and several steam pumps. The equipment also contains a Pelton and a Tuerk water motor, a water ram, injectors, weirs, nozzles, meters and other pieces of apparatus and instruments which an engineer is called upon to use in the course of his professional work.

The new engineering power plant is admirably equipped with other steam apparatus which constitutes a valuable part of the laboratory equipment.

The boiler plant contains a 130-h.p. Cahall (B. & W. type) water tube boiler designed to carry a working pressure of 250 pounds; a 60x16 foot multitubular boiler which carries 175 pounds pressure; a Sorge-Cochrane purifier of 300-h.p. capacity; and a large Sturtevant fan and direct-connected engine, to be used for experiments with mechanical draft.

In the engine room there is an Allfree automatic expansion 75-h.p. engine, connected by belting to a jack shaft equipped with roller bearings. A 150-h.p. cross-compound Corliss engine especially designed for the mechanical engineering department has recently been erected and will be available for experimental work.

This engine will be provided with a condenser and is arranged so that it may be run simple or compound, condensing or non-condensing, as desired. It thus constitutes a valuable part of the equipment of the experimental laboratory.

A constantly increasing quantity of commercial testing is being done in connection with the regular work of the course, which brings the student into actual contact with the engineering world and affords him valuable experience and data for his future work.

The library of the department contains a collection of historic and recent works, the best standard books being purchased as soon as issued. There are a number of complete files of the transactions of engineering societies and of the leading technical publications. The reading room is amply supplied with both the general mechanical and railway press.

*Railway mechanical engineering.* Courses have been arranged for students wishing to specialize in this subject. The various courses may be elected separately, subject to the requirements for previous preparation, to fill out the electives, or options in the regular senior year of any department.

Students planning to elect these courses are encouraged to work, under special arrangements, in railway shops during the summer vacations. This has proved its value as preparatory to the special work of the senior year. In every possible way the methods of the department are intended to place the students in touch with the best railway work keeping always in sight the limitations which railway experience has found financially and practically to exist.

The location of the University is particularly favorable, being between the cities of St. Paul and Minneapolis in proximity to the shops, yards and headquarters of the extensive railway systems of the Northwest, which offer exceptional facilities for the prosecution of this work. The Northwest Railway Club, meeting monthly for papers and discussions, is open for the attendance of students, while several are enrolled as members.

*Visits of inspection.* During the year numerous visits are made to the manufacturing plants of St. Paul and Minneapolis, which have proven to be of great value in supplementing the class room work.

#### ELECTRICAL ENGINEERING.

The electrical engineering department and the University electric light and power plant are housed in a commodious building of slow-burning mill construction. The part of the building devoted exclusively to the work of the electrical engineering department of instruction is 80 feet long by 60 feet wide with two stories and full basement. In the basement are standardizing laboratory, electro-chemical laboratory, shop, battery room, toilet and stock rooms. On the first floor are the dynamo laboratory, high tension laboratory, research laboratories, instrument rooms and office. On the second floor are laboratories for photometry, photography, meter and lamp testing and rooms for recitations, draughting, library and office.

*The laboratory equipment* includes about forty dynamo electric machines of various types and sizes for direct and alternating currents, such as constant current and constant potential direct current generators and motors, single phase and polyphase alternators, commutating, induction and synchronous motors and rotary converters, each furnished with suitable regulating devices. A number of these machines have been equipped with special devices for experimental purposes. Lamps, rheostats, batteries, fans and brakes afford convenient and ample means for taking up the energy of dynamos and motors. To facilitate testing, there are a number of pairs of similar machines. A three-ton traveling crane facilitates handling the machines. Power is obtainable from a main shaft driven by the engines of the lighting plant, or by motors connected with the University power circuits, with a storage battery or with the circuits of The Minneapolis General Electric Company, which

supplies direct current at 500 volts and alternating current at 2,250 volts. An excellent assortment of instruments of well-known American and foreign makers is available for laboratory use. A well equipped standardizing laboratory furnished with certified standards of current, electromotive force and resistance, allows the frequent checking of instruments, so that students may work to any desired degree of refinement. The meter and lamp testing laboratories are furnished with a wide variety of arc and incandescent lamps and meters with all necessary standards and other accessories. The electro-chemical laboratory provides facilities for the construction and testing of various cells, for electro-plating and other electrolytic processes and for the formation and study of electric furnace products. Alternators, rotary converters, transformers, lamps, motors, condensers, special apparatus and suitable instruments afford facilities for the experimental study of alternating currents. Telephone transmitters, receivers and accessories provide for practice in assembling and testing the ordinary telephonic apparatus and circuits and for investigation.

*The department library* contains an excellent collection of electrical and allied works, including a full set of United States Patent Office Gazettes. New books and trade publications are being added continually. Files of twenty-two journals are nearly complete and others are being collected and bound. These, with the files in the general and other departmental libraries of the University, offer excellent facilities for research work.

The reading room receives regularly the leading American and foreign periodicals devoted to electrical engineering and allied interests. A journal club meets weekly for the discussion of current literature in mechanical and electrical engineering, keeping the students in touch with current progress and best modern practice and teaching them the value of the technical press.

There is a growing collection of samples furnished by various manufacturers and dealers, a great help in exhibiting best modern practice and in teaching young engineers to appreciate the merits of different products. A collection of samples from repair shops and elsewhere is of special value in illustrating the treatment received by apparatus in commercial use and the necessity of careful design and construction. Free access is given to the private libraries and collections of the professors.

*Instruction.* The course aims to give the students a knowledge of phenomena and principles and the various applications of electricity, the methods and instruments used in measuring and transforming it, and practice in the design and operation of electrical apparatus. Practice and theory are taken together as far as possible. During the junior and senior years students have daily work with electrical instruments and apparatus and with commercial problems. Occasional inspection

tours among the extensive and varied electrical interests in Minneapolis and St. Paul furnish excellent illustration. The University electric light and power plant, which is in the same building, affords opportunity to observe commercial conditions at close range.

All engineering students are strongly advised to spend their vacations in factories, repair shops, electric light and railway stations, etc., in order to obtain commercial experience, and that they may better appreciate the relations of their technical training and actual work.

It is the aim to train the students to be independent and efficient workers, and to adopt the methods of professional engineers. Students are required to verify the formulas used in various calculations, and are encouraged to derive their own formulas for simplifying work in special cases. At the same time they are expected to use logarithms, slide rule, tables, curves, charts and all legitimate means for obtaining accurate results with least amount of drudgery.

The regular instructing force is supplemented by competent non-resident lecturers. The regular monthly meetings of the Minnesota members of the American Institute of Electrical Engineers are held in the Electrical building at the University, and are open to the advanced students in electrical engineering.

*Laboratory work.* In the more advanced work students are encouraged to determine for themselves as independent workers the best methods and conditions for accurate results. While the laboratory work is classified, the students are treated individually and are advanced as rapidly as their attainments warrant.

In fitting up the laboratory, care is taken to secure representative types of apparatus of commercial style and size, in order to acquaint the students with actual practice. In putting up new lines and in setting up apparatus, the students are required to work in accordance with standard practice. Each student is given a certain amount of practice in the construction of electrical apparatus.

*Design.* The electrical engineers have drawing and design in common with the mechanical engineers in the first three years. A large number of numerical problems are given during the course. During the junior and senior years, electro-magnets and mechanisms, dynamos and motors, lines, switches, switchboards and plants are designed. Complete working drawings and specifications for some special problems are elaborated. A file of about 600 blueprints and drawings in the department library in addition to those in other departments is available to the students.

#### LIBRARIES AND READING ROOMS.

The reference libraries of the several departments are well supplied with technical literature. In the engineering building is a library consisting chiefly of books devoted to civil and mechanical engineering, com-

prising over one thousand volumes; the library of the department of engineering and mechanics numbers eighteen hundred volumes of choice mathematical and scientific works; the departments of electrical engineering and physics together have an excellent collection of standard works which numbers over fourteen hundred volumes; the chemistry library contains over five hundred technical works; a choice collection of between one and two hundred volumes relating to drawing, art and design. The above number, upwards of four thousand volumes, comprising many works which are the private property of professors, are accessible to the students.

In addition to the above are the libraries of the University, the City of Minneapolis, the City of St. Paul and others, containing many works of value to the engineering profession. Standard works bearing on special subjects are secured as they appear and the more important scientific and technical periodicals are secured and placed in the reading rooms maintained in connection with the several departments of the college.

Journal clubs are organized, in most of the departments, for the discussion of current technical literature, relating to the best modern practice. Thus students are kept in touch with the developments along engineering lines and are taught how to use the technical press.

In addition to the foregoing the college has many periodicals donated by the societies publishing them, and others loaned by members of the faculty, who at all times place their periodical list and entire professional libraries at the disposition of the students.

#### COURSE IN SCIENCE AND TECHNOLOGY.

It is very desirable that engineering students taking one of the courses leading to the professional degree, civil engineer, mechanical engineer, or electrical engineer, should have a more liberal education than can now be obtained in the regular four years' course. This has led to the establishment of a five years' course in science in technology in which a student in the college of engineering may obtain more English and general culture studies, as well as more extended work in the technical sciences, than has been offered heretofore. This course does not diminish in any way the regular courses in engineering—the work is merely distributed over a more extended period. Every subject now included in any one of the regular engineering courses is also included in the corresponding five years' course, and in addition to these there is the equivalent of one's year's work in more general subjects.

At the end of the fourth year the degree, bachelor of science in engineering, is conferred. The professional degree, civil engineer, mechanical engineer, or electrical engineer, is granted upon the completion of the fifth year, provided the choice of electives throughout the course has satisfied the requirements of the proposed engineering degree.

## COURSES IN SCIENCE AND TECHNOLOGY.

## FRESHMAN YEAR.

- (1½Mj) 5 Mathematics, I, II, III, IV.  
 (1½Mj) 4 English, I.  
 (Mj or 1½ Mj) 3 or 5 French or German.  
 (1½Mj or Mj) 4 Chemistry or 3 History.  
 (Mj) 3 Military drill, I.

## SOPHOMORE YEAR.

- (1½Mj) 5 Mathematics, V, VI, VII.  
 (Mj) 3 History or Chemistry (one year of Chemistry is required).  
 (2Mj) 6 Physics, Ia, Ib.  
 (1½Mj, 1½Mj) 4, 5 Engineering drawing, Ia, Ib, Ic.  
 (Mj) 3 Military drill, II.

## JUNIOR YEAR.

## CIVIL ENGINEERING.

*First Semester*

- (1½Mj) 5 Mechanics, I.  
 (Mj) 3 Physics, II.  
 (Mj) 3 Engineering dr'w'g, II, III.  
 (Mj) 3 Technological chem. II.  
 (1½Mj) 4½ Topography, XVI, XVII.

*Second Semester*

- (1½Mj) 5 Mechanics, II.  
 (½Mj) 2 Engin'g dr'w'g, II, III.  
 (1½Mj) 4½ Topography, XVIII, XIX.  
 (½Mj) 2 Highways, VIII.  
 (½Mj) 2 Practical astronomy, I.

## MECHANICAL ENGINEERING.

*First Semester*

- (1½Mj) 5 Mechanics, I.  
 (Mj) 3 Physics, II.  
 (Mj) 3 Engin'g dr'w'g, II, III.  
 (Mj) 3 Technological chem. II.  
 (1½Mj) 4½ Shop practice.  
 (Mj) 3 Stresses, IX.

*Second Semester*

- (1½Mj) 5 Mechanics, II.  
 (½Mj) 2 Engin'g dr'w'g, II, III.  
 (2½Mj) 7 Shop practice.  
 (Mj) 3 Mechanism, IX.  
 (½Mj) 2 Kinematic drawing, X.

## ELECTRICAL ENGINEERING.

*First Semester*

- (1½Mj) 5 Mechanics, I.  
 (Mj) 3 Physics, II.  
 (Mj) 3 Engin'g dr'w'g, II, III.  
 (Mj) 3 Technological chemistry.  
 Applied electricity, I, II.  
 (Mj) 3 Stresses.

*Second Semester*

- (1½Mj) 5 Mechanics, II.  
 (½Mj) 2 Engin'g dr'w'g, II, III.  
 (1½Mj) 4 Dynamos & Motors, II.  
 (Mj) 3 Electrical lab., XIV.  
 (Mj) 3 Mechanism, IX.  
 (½Mj) 2 Kinematic drawing, X.

## SENIOR YEAR.

## CIVIL ENGINEERING.

*First Semester*

- (½Mj) 2 Water Supply.  
 (½Mj) 2 Curves and earthworks.  
 (½Mj) 2 Machine design.  
 (Mj) 3 Stresses.  
 (½Mj) 2 Least squares.  
 (½Mj) 2 Mechanical laboratory.  
 (½Mj) 3 Electric power.

*Second Semester*

- (Mj) 3 Stresses.  
 (Mj) 3 Structural details.  
 (Mj) 3 Railway work.  
 (Mj) 3 Sanitary engineering.  
 (Mj) 3 Geology.  
 (1½Mj) 4 Elective.

MECHANICAL ENGINEERING.

First Semester

- (Mj) 3 Thermodynamics, XX.
- (1½ Mj) 4 Machine design, X.
- (¾ Mj) 2 Mechanical laboratory, XXV
- (2 Mj) 6 Shop practice.
- (1½ Mj) 4 Electric power, XX.
- (¾ Mj) 1 Steam boilers, XVII.

Second Semester

- (Mj) 3 Steam engines, XVIII.
- (¾ Mj) 2 Mech. lab., XXVI, XXVII.
- (1½ Mj) 4 Machine design, XI, XII.
- (¾ Mj) 2 Thermodynamics, XXI.
- (3½ Mj) 10 Shop practice.

ELECTRICAL ENGINEERING.

First Semester

- (Mj) 3 Thermodynamics, XX.
- (Mj) 3 Alternating currents, III.
- (1½ Mj) 4 Machine design, XI.
- (¾ Mj) 2 Mech. lab., XXVI, XXVII.
- (3½ Mj) 10 Shop practice.
- (¾ Mj) 1 Steam boiler, XVII.

Second Semester

- (Mj) 3 Steam engines, XVIII.
- (¾ Mj) 2 Mech. lab., XXVI, XXVII.
- (¾ Mj) 2 Machine design, XI.
- (¾ Mj) 2 Electrical design, XIII.
- (Mj) 3 Alternating currents, III.
- (3½ Mj) 10 Shop practice.

POST SENIOR YEAR.

CIVIL ENGINEERING.

First Semester

- (Mj) 3 Masonry.
- (1½ Mj) 5 Structural design.
- (¾ Mj) 2 Experimental laboratory.
- (¾ Mj) 2 Railway commts.
- (¾ Mj) 2 Political science.
- (2 Mj) 6 Elective.

Second Semester

- (1½ Mj) 5 Structural design.
- (¾ Mj) 2 Arches.
- (Mj) 3 Geodesy.
- (¾ Mj) 2 Political science.
- (¾ Mj) 2 Elective.
- (¾ Mj) 2 Contracts & specifications.
- (Mj) 3 Thesis.

MECHANICAL ENGINEERING.

First Semester

- (1½ Mj) 4 Mach. or railway design.
- (¾ Mj) 2 Mechanical engineering.
- (¾ Mj) 2 Mechanical laboratory.
- (¾ Mj) 2 Political science.
- (2¾ Mj) 8 Elective.
- Thesis.

Second Semester

- (¾ Mj) 2 Contracts & Specifications.
- (1½ Mj) 4 Machine or railway design.
- (1½ Mj) 4 Mechanical laboratory.
- (¾ Mj) 2 Political science.
- (1½ Mj) 4 Elective.
- (Mj) 3 Thesis.

ELECTRICAL ENGINEERING.

First Semester

- (Mj) 3 Electrical engineering.
- (¾ Mj) 2 Electrical laboratory.
- (¾ Mj) 2 Mechanical laboratory.
- (¾ Mj) 2 Political science.
- (3¾ Mj) 10 Elective.
- Thesis.

Second Semester

- (¾ Mj) 2 Contracts & specifications.
- (Mj) 3 Electrical design.
- (¾ Mj) 2 Electrical laboratory.
- (¾ Mj) 2 Electrical engineering.
- (¾ Mj) 2 Political science.
- (1½ Mj) 4 Elective.
- (Mj) 3 Thesis.

As the strictly professional courses offer little opportunity for specialization in the physical and technical sciences, and the liberal culture studies are necessarily very limited in such courses, the general course in science and technology affords an opportunity for more extended work in physics, chemistry and other sciences, together with additional studies in English, history, political science and similar subjects.

While the choice of electives in the general course in science and

technology is very liberal there is necessarily less freedom in the selection of subjects in those courses which lead to the engineering degrees.

For the first two years no electives are offered and the work is common to the general and the five years' professional courses.

While the student is allowed to make his own selection of electives in the general course, subject to known requirements, the following is suggested as a representative non-professional technical course leading to the degree, bachelor of science in engineering, at the end of four years:

#### A FOUR YEARS' GENERAL COURSE IN SCIENCE AND TECHNOLOGY.

##### FRESHMAN YEAR.

- (1 $\frac{2}{3}$ Mj) 5 Mathematics.  
 (1 $\frac{1}{3}$ Mj) 4 English.  
 (1 $\frac{1}{3}$ Mj) 4 French or German.  
 (1 $\frac{1}{3}$ Mj) 4 Chemistry or History.  
 ( $\frac{2}{3}$ Mj) 2 Military drill.

##### SOPHOMORE YEAR.

- (1 $\frac{2}{3}$ Mj) 5 Mathematics.  
 (1 $\frac{1}{3}$ Mj) 4 History, Chemistry, or Language.  
 (1 $\frac{1}{3}$ Mj) 4 Physics.  
 (1 $\frac{1}{3}$ Mj) 4 Engineering drawing.  
 ( $\frac{2}{3}$ M) 1 Rhetoric.  
 ( $\frac{2}{3}$ Mj) 2 Military drill.

##### JUNIOR YEAR.

###### *First Semester*

- (1 $\frac{2}{3}$ Mj) 5 Mechanics.  
 (Mj) 3 Physics.  
 (1 $\frac{1}{3}$ Mj) 4 Engineering drawing.  
 ( $\frac{2}{3}$ Mj) 2 Technological chemistry.  
 (1 $\frac{1}{3}$ Mj) 4 *Chemistry*.

###### *Second Semester*

- (1 $\frac{2}{3}$ Mj) 5 Mechanics.  
 (Mj) 3 Physics.  
 (1 $\frac{1}{3}$ Mj) 4 Engineering drawing.  
 (Mj) 3 Mechanism, or  
 (Mj) 3 Surveying.  
 (1 $\frac{1}{3}$ Mj) 4 *Chemistry*.  
 ( $\frac{2}{3}$ Mj) 2 Mechanical laboratory

##### SENIOR YEAR.

- (Mj) 3 Thermodynamics, or  
 (1 $\frac{1}{3}$ Mj) 4 Mineralogy.  
 (Mj) 3 Industrial electricity, or  
 (1 $\frac{1}{3}$ Mj) 4 Political science.  
 (1 $\frac{1}{3}$ Mj) 4 Elective.

- (Mj) 3 Dynamos and motors.  
 (Mj) 3 Thermodynamics, or  
 (1 $\frac{1}{3}$ Mj) 4 Geology.  
 ( $\frac{2}{3}$ Mj) 2 Steam engines, or  
 ( $\frac{2}{3}$ Mj) 2 Highways.  
 (1 $\frac{1}{3}$ Mj) 4 *Physics*.  
 (1 $\frac{1}{3}$ Mj) 4 Political science.  
 (1 $\frac{1}{3}$ Mj) 4 Elective.

The required subjects are printed in Roman type; the electives, printed in italics, may be replaced by others selected from the general list.



THE SCHOOL *of* MINES

# The School of Mines

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## OFFICERS

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PETER CHRISTIANSON, B. S., E. M., *Assistant Professor of Assaying*

BENJAMIN F. GROAT, B. S., *Professor of Mechanics and Mathematics*

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WILLIAM H. KAVANAUGH, M. E., *Assistant Professor of Mechanical Engineering*

### OFFICERS OF OTHER DEPARTMENTS GIVING INSTRUCTION

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WILLIAM H. KIRCHNER, B. S., *Assistant Professor of Drawing*

JOHN ZELENY, B. S., B. A. Res.-Ph. D., *Associate Professor of Physics*

## ADMISSION

Examinations for admission will be held at the beginning of the year. See calendar and program of examinations.

No student will be registered for first semester's work after September 29th, 1906, and second semester's work after February 16th, 1907.

All applicants should present themselves to the registrar who will furnish them with application blanks and directions covering examinations and registration.

Women will not be admitted to any course offered in the School of Mines.

## GENERAL REGULATIONS GOVERNING ADMISSION

- I. Students will be admitted to the freshman class on *passing the regular entrance examinations.*
- II. No student will be admitted *if conditioned in more than three half-year subjects, or their equivalent.*
- III. Graduates of any Minnesota State high school will be admitted *without examination, provided—*
  - (1) That the school maintain a *full four-year course* of high school work.
  - (2) That the applicant present to the registrar the principal's certificate showing the satisfactory completion *of all the studies required for admission* to the desired University course.
- IV. Graduates of Minnesota State high schools who are deficient in *not more than three half-year subjects* or their equivalent, *may be excused* from entrance examinations *in such subjects as the enrollment committee may decide*; such candidates should present themselves to that committee *not later than Tuesday of examination week.*
- V. Graduates of Minnesota State high schools whose principal's certificate shows them to be deficient in *more than three half-year subjects* or their equivalent, even though they have made such additional preparation as they deem necessary, must take, nevertheless, the regular entrance examination in all subjects, as provided in sections I and II, unless excused by vote of the faculty; and persons wishing to present reasons for such excuse *should report to the enrollment committee not later than Tuesday of examination week.*
- VI. Graduates of the *advanced courses of Minnesota normal schools* will be admitted upon the same terms as graduates of State high schools.

- VII. Any Minnesota high school or academy *not under supervision of the State High School Board*, but requiring for graduation a *four-years' course*, exclusive of the common school branches, conforming *essentially in distribution of time* to the entrance requirements of at least one of the University courses, will, upon application, be inspected by a committee, and, after favorable recommendation, *may be accredited by the faculty* in all respects as are the State high schools, *provided—*
- (1) That the school be *open to inspection* at any time by the University;
  - (2) That it take such *supplementary examinations as may be prescribed* from time to time.
- VIII. *Graduates from schools in other states*, whose diplomas admit to *reputable colleges* in the state in which the *school is located*, will be received subject to the regulations that apply to graduates of Minnesota State high schools.
- IX. Applicants from schools not coming within any of the above classes *must take the regular entrance examinations* or present State High School Board certificates.

*In all cases the faculty reserves the right to require a student to take supplementary examinations if he does not sustain himself creditably in his course.*

*The enrollment committee will meet every day during the week commencing September 11th, in School of Mines Building, room 25, at 9 o'clock a. m.*

## REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS

*N B.—Time element, as indicated with each subject, is essential:—*

*English*, four years, including

(a) Classics. (b) Principles of composition

(c) Practice in written expression

*Algebra*, elementary, one year

*Algebra*, higher, one-half year

*Geometry*, plane, one year

*Geometry*, solid, one-half year

*In addition to the above named required subjects, for which no substitutes will be accepted, the student shall present evidence of having completed work in any of the following subjects, entitling him to eight year-credits:*

*Astronomy*

*Bookkeeping*

*Botany*

*Chemistry*

*Civics*

*Drawing*

*French*

Grammar

Literature

*Geology*

*German*

Grammar

Literature

*Greek*

Grammar

Anabasis

*History*

Ancient, to Charlemagne, one year.

Modern, from Charlemagne, one year.

England, one-half year.

Senior American, one-half year.

*Latin*

Grammar

Cæsar

Cicero

Virgil

*Physics*

*Physiography*

*Political Economy*

*Shopwork*

*Zoology*

## SYLLABI

The following statements indicate, in a general way, the ground expected to be covered in the study of the various subjects accepted for admission.

### *English (four years).*

In order to secure a definite plan of study and unity of method on the part of preparatory schools, the entrance requirement in English is outlined below somewhat in detail. To satisfy this requirement a four years' course of not less than four hours per week must be pursued. The headings under which instruction will naturally fall are:

- (a) English Classics
- (b) The Principles of Rhetoric
- (c) Practice in Written Expression

(a) English classics should include a critical reading, in class, of English masterpieces. The following are suggested as well adapted for such study: Shakespere's "Macbeth," Milton's "Paradise Lost," books one and two; Burke's "Conciliation with America"; Carlyle's essay on "Burns." In the study of these works the student should come to know the leading facts connected with the author and his time; he should become familiar with the subject-matter of the work and thoroughly at home with the story, and should have a clear idea of the form and structure of the work as a whole.

A less critical knowledge of other standard or classic works, which may perhaps be read by the student at home, with written reports and brief oral discussions in class, is desirable. The following works are noted as indicative of the minimum amount of work expected: at least two of Shakespere's plays, beside the one read in class, one of Irving's works, one of Hawthorne's novels, one of Stevenson's novels, one of Webster's orations.

(b) The work in the Principles of Composition should include the principles and technical terms of ordinary texts upon the subject, whether acquired by the direct study of such texts or mainly by the study of selected English masterpieces. It should not be forgotten that this is not an end in itself, but simply a means of teaching the student the correct use of English.

(c) Not less than one hour each week throughout the four years of the high school course should be devoted to practice in written expression. The instructor may choose such topics as local conditions may require or make most profitable; but whatever line of work is pursued, the student should be taught to use language correctly and forcibly and learn to express himself clearly and logically in writing.

### *Elementary Algebra (one year)*

Addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, simple equations (with one, two, and several unknown quantities) followed by problems, theory of exponents, involution (including the binomial theorem for positive integral exponents), evolution, radicals, inequalities, ratio, proportion, progression, and quadratic equations, with problems.

### *Higher Algebra, First Part (one-half year)*

While this subject does not include any topics not named under Elementary Algebra, a much fuller treatment of those topics is expected in this work. Principles as well as processes should be learned, theorems and rules should be rigorously demonstrated, the exercises and problems should be more difficult, and students should be drilled in short methods and rapid work. Unless candidates have a good knowledge of the fundamental topics named below, they are not prepared to pursue successfully at the University the second part of Higher Algebra.

The topics are addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, theory of exponents, involution, evolution, surds, imaginaries and simple equations with problems.

*The School of Mines***Plane Geometry** (one year)

Any of the standard texts on this subject will furnish the necessary preparation. Isoperimetry, symmetry and maxima and minima of figures are not required. The exercises requiring solutions and demonstrations should not be omitted.

**Solid Geometry** (one-half year)

Any of the standard texts on this subject will furnish the necessary preparation. The exercises requiring solutions and demonstrations should not be omitted.

*Advanced Standing*—The University accepts records from all reputable colleges for credit to advanced standing. Such records are accepted as far as they are equivalent to the work done in the University.

Records from institutions whose entrance requirements are not essentially equivalent to the requirements of the University will not be accepted unquestioned. The credit allowed will be decided in individual cases by the enrollment committee.

#### DAILY ROUTINE

The morning session begins at 8:30 o'clock; a general assembly of the faculty and students is held each day at 10:25 o'clock, at which there are brief and simple religious exercises.

#### EXAMINATIONS

*Students failing to receive a yearly average of 75 per cent on any subject shall have the privilege of a supplementary examination before the opening of the following year provided their general average for the year is 60 per cent.*

*The faculty will exclude students from attending classes in any subject upon recommendation of the department concerned.*

*Students failing to pass supplementary examinations must register the next year for those subjects in which they have failed. They may take in addition other subjects appearing in courses of instruction, pages 35 to 39, with the exception of Mining 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.*

Each student must obtain from the Registrar his yearly average in all subjects and present himself for supplementary examinations according to the following program:

Tuesday, September 11

8:00-12:00 Mathematics and Mechanics

1:00- 5:00 Mining Engineering subjects

Wednesday, September 12

8:00-10:30 Chemistry

10:45- 1:15 Drawing and Descriptive Geometry

Thursday, September 13

8:00-12:00 Metallurgical subjects

10:45- 1:15 Mechanical Engineering subjects

2:30- 5:00 Physics

Friday, September 14

8:00-12:00 Electrical Engineering subjects

2:30- 5:00 Geology and Mineralogy



All students must report in time to make suitable arrangements with departments concerned in case of conflicts in program.

No other supplementary examinations will be given. Students failing to report for supplementary examinations will be compelled to take work over in class as in case of failures.

Students failing to present themselves for final examination at the end of the first or second semester will be given zero on the examinations.

Students whose absences in either semester exceed four weeks in the aggregate are not permitted to take examinations without special permission of the faculty.

#### UNCLASSED STUDENTS

No unclassified students will be admitted to the School of Mines.

#### 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, examinations in any subject. If such person pass in all the studies and exercises of a course, he is entitled to the appropriate degree, *provided*, that at least one 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.

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## Special Statements

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In the School of Mines there are two regular courses of study, viz.: Mining Engineering and Metallurgy, leading to the degree of Engineer of Mines (E. M.), and Metallurgical Engineer (Met. E.) respectively.

The degree of Met. E. may be conferred upon a candidate who received the degree of E. M. in four years, and vice versa, provided such a candidate completes an additional year's work at the school and presents a suitable thesis.

All theses must be completed not later than April 1st. The accepted thesis must be bound according to the adopted style and deposited with the department offering the degree desired.

Candidates for advanced standing must pass a satisfactory examination for admission and also upon those studies which have been pursued by the class they propose to enter.

Students from other institutions will be admitted to the standing to which their credentials or the examinations taken under the direction of the faculty of this school may entitle them.

Students in the college of science, literature and the arts, in the college of engineering and mechanic arts, and school of technical and applied chem-

istry, 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.

FEEES

A registration fee of fifteen dollars is required at the beginning of each semester from residents of the state, and thirty dollars from non-residents.

The various laboratory fees are as follows:

Chemical laboratory .....	Per semester	\$5.00
Mineralogical Laboratory .....	"	3.00
Assaying laboratory .....	"	15.00
Mechanical laboratory .....	"	6.00
Electrical laboratory .....	"	5.00
Ore testing laboratory .....	"	10.00

The trip to the mines made by the junior class costs the student from one hundred to one hundred and seventy-five dollars.

Books costs about as follows:

Freshman year .....	\$12.00 to	\$15.00
Sophomore year .....	5.00 to	8.00
Junior year .....	18.00 to	25.00
Senior year .....	10.00 to	30.00

A number of books are recommended to the student, but the purchase of them is optional. The lower estimates given will cover the cost of books that must be purchased.

Each member of the freshman class must be provided with a set of draughting instruments. The necessary instruments will cost about fifteen dollars.

SUMMARY OF EXPENSES

FRESHMAN YEAR

Incidental fee .....	\$30.00
Chemical laboratory fee.....	10.00
Mineralogical laboratory fee.....	6.00
Assaying laboratory fee.....	15.00
Books .....	13.00
Draughting instruments .....	15.00
Note book and supplies.....	6.00
	<hr/>
	\$95.00

SOPHOMORE YEAR

Incidental fee .....	\$30.00
Chemical laboratory fee.....	14.00
Books .....	8.00
Note books and supplies.....	2.00
	<hr/>
	\$54.00

JUNIOR YEAR	
Incidental fee .....	\$30.00
Trip to the mines.....	\$100.00 to 175.00
Books .....	20.00
Note books and supplies.....	2.00
	\$152 to \$227.00

SENIOR YEAR	
Incidental fee .....	\$30.00
Chemical laboratory fee.....	10.00
Electrical laboratory fee.....	5.00
Ore testing laboratory fee.....	10.00
Mechanical laboratory fee.....	6.00
Books .....	20.00
Note book and supplies.....	2.00
	\$83.00

For non-residents the incidental fee is \$60 per year.

Good board can be obtained at a cost varying from \$2.50 to \$4.00 per week. Room rent varies from \$5.00 to \$10.00 per month. With two occupying one room, the rent per student would be considerably lower.

#### ORGANIZATION

The organization of the School of Mines dates back to 1889, when the general faculty of the University recommended to the board of regents its establishment. In 1891 the Legislature of the State of Minnesota voted an appropriation for establishing and equipping the school. Two annual appropriations have since been made for its support. The legislature of 1901 appropriated \$47,500 for a new School of Mines Building. In 1903 the legislature appropriated \$25,000 for completing and equipping the School of Mines Building, and in 1905 an additional sum was provided for equipment.

#### SCHOOL OF MINES BUILDING

The School of Mines building is now completed and equipped. The building is designed to accommodate only the technical work of the School of Mines, as adequate building accommodations have already been furnished for chemistry, geology, mineralogy, drawing and mechanical and electrical engineering. The new building is 150 feet long by 65 feet wide. It is a brick building, three stories high. The lower floor is occupied by the assaying and metallurgical laboratories; the second floor contains offices, two large lecture rooms, departmental library, and a museum; the third floor provides two quiz rooms, a large, well lighted draughting room, thesis room and a dark room and a blue print room. This building makes possible the development of the work already begun and offers facilities for more extended work along technical lines.

## LOCATION

The University of Minnesota is located in the city of Minneapolis, on the east bank of the Mississippi river. The School of Mines has its buildings and laboratories on the same ground. Students of the School of Mines have, therefore, all the opportunities afforded by a large university.

Minneapolis is surrounded by and is in direct communication with several important mining and smelting districts. As the city is a railroad center, transportation at special rates is readily obtained.

## FIELD WORK

Field work is conducted at the iron mines in the northern part of this state, in the copper and iron regions of Michigan, in the mines and smelters of Montana, Colorado, Utah and California, and in the coal mines of Pennsylvania.

At least one of these districts will be visited by each class, affording splendid opportunities for study and observation.

The field work in mining and metallurgy consists of one trip at the close of the Junior year. Not less than three weeks and not more than four weeks shall be devoted to actual work, exclusive of traveling.

Students must deposit with *Accountant*, at least *two weeks* before time set for the departure of class, a sum sufficient to cover following expense items:

- 1st. All transportation
- 2nd. Sleeping car fare
- 3rd. Board and lodging
- 4th. Necessary mine supplies

Incidental expenses are not included in the above items and must be met individually.

A statement of expenditures will be rendered at the close of the work and any balance existing will be refunded.

The amount of deposit required will vary, according to the locality visited, from \$100.00 to \$175.00, and will be announced each year when arrangements for trip are completed.

## THE ELLIOT SCHOLARSHIP LOAN FUND

To fulfill the wish of the late Dr. A. F. Elliot to aid young men who find their efforts to obtain a practical education embarrassed through lack of means, the sum of \$5,000 was placed in the hands of the Board of Regents as a scholarship fund. The income from this fund is loaned students in the School of Mines on the following conditions:

The financial needs of the applicant, his scholarship, moral character, enthusiasm shown in his work and promise of usefulness in his profession. When money is available it may be loaned to pay expenses of worthy students during sickness. The loans are to be repaid, without interest, at the earliest convenience of the recipients.

## LIBRARY

The library consists of about two thousand volumes. This number represents only those works that treat directly of mining and metallurgical subjects.

The school has a complete set of the leading mining and metallurgical journals, and other similar books of reference. The leading periodicals are accessible to all. Constant references in lectures compel the student to keep himself well informed as to the latest methods, machinery and changes in practice going on in his special line of work.

In addition to the above, many thousand volumes on chemistry, mineralogy and geology complete a most valuable working and reference library. A card index is kept of all articles of value and interest appearing in the leading periodicals.

## PHOTOGRAPHY

Photographs of surface and underground appliances, metallurgical plants, copies of drawings and other photographs are indispensable to the study of mining and metallurgy. With the report of his field work every student is expected to present photographs, as well as sketches, of various objects under consideration. There is also a very complete set of lantern slides illustrating the principal methods of underground workings and metallurgical plants, at home and abroad. Several hundred slides have been made in the department's laboratory which bear directly on the work done in Minnesota and the neighboring northwest. Many valuable photographs are constantly being made. Blue prints of these are given students as illustrations. Much time is thus saved usually spent in making sketches and diagrams.

## CLASSIFICATION OF SUBJECTS

The work falls under the following subdivisions, supplemented by thorough courses in mathematics, physics, chemistry, mineralogy and geology:

(a) *Assaying*—to determine if ore has value for treatment. (b) *Mining engineering*—to furnish material for treatment. (c) *Ore testing*—To determine best method of treatment. (d) *Ore dressing*—furnishing products for metallurgical treatment. (e) *Metallurgy*—smelting and refining of ores and ore dressing products; reduction to metals.

## DEPARTMENT OF MINING ENGINEERING

Mining engineering extends through sophomore, junior and senior years. The subjects given together with the sequence necessary, are treated in the accompanying outline of the course.

Until the second term of the junior year, the course consists of lectures

and recitations only. In the subsequent work, text-books are used in connection with the lectures.

In the senior year, problems in hoisting, hauling, pumping, ventilation and similar subjects become an important part of the work.

*Field work in Mining* At the close of the junior year the students are required to spend four weeks in some mining district studying underground work and metallurgical operations. A part of the time is devoted to the making of mine and geological surveys.

A complete type-written report must be submitted before the student may register for the following year's work.

This report must cover the work done on the trip and must be fully illustrated with sketches drawn to scale. Reports will not be accepted after September 25th.

All field work must be taken at the time specified.

*Designs and specifications* The student makes in connection with his thesis work working drawings of mine cars, skips and other parts of mine equipment that are usually designed and made on the ground.

*Mine surveying* The work in surveying is designed solely for mining engineers. In the sophomore year, second semester, the work consists of the elements of plane surveying with special reference to the computations necessary.

*Field work in surveying—Course VIII.* The month of August, preceding the opening of the junior year, is spent in the practice of plane surveying. About an hour per day is given to lectures or recitations and the remainder of the day to field work.

The students are divided into squads of two or four, and each is required to complete the following exercises and surveys:

1. Chaining
2. Compass reading
3. Adjustment of hand levels and practice in leveling
4. Adjustment and use of wye levels
5. Adjustment of mining transit
6. Reading angles
7. Traverse with steel tape
8. Azimuth traverse with stadia
9. Survey of mining claim according to the regulations of the U. S. Government
10. Measurement of earthwork
11. Laying out railroad tangents, curves and crossings

Each squad must provide itself with a 6-foot steel tape, graduated to hundredths.

This course is open only to those who have taken Course VII, or its equivalent, and is part of the work of junior year.

During the second semester of the junior year the higher theoretical work in plane and mine surveying and mine mapping is studied. While visiting the mines in junior year a survey of a mine, or some part of a mine is actually made and the survey platted.

Surveying instruments of the latest and best makes are furnished students for this work.

*Ore dressing* The lectures and recitations in ore dressing extend through the first semester of junior year, and comprise the detailed study of ore dressing and concentrating machinery, together with the study of typical combinations of dressing machines as found in the several mining districts of the United States.

In connection with the theoretical work, the ore dressing and testing plant of the school is utilized for practical illustrations.

During the coming year, experimental work in ore concentration will be conducted.

## COURSE IN MINING ENGINEERING FRESHMAN YEAR

### FIRST SEMESTER

*Chemistry* (Chemistry I)—4½ hours, Professor Nicholson

*Drawing* (Drawing I)—4½ hours, Professor Kirchner

*Mathematics* (Mathematics I)—5 hours, Professor Groat

*Mineralogy* (Geology and Mineralogy, Mineralogy I)—4½ hours, Professor Hall and Mr. Parsons

### SECOND SEMESTER

*Assaying* (Metallurgy I)—4 hours, Professor Appleby

*Assaying Laboratory* (Metallurgy I)—4½ hours, Professor Appleby, Professor Christianson and Mr. Pease

*Chemistry* (Chemistry II)—4½ hours, Professor Nicholson

*Drawing* (Drawing I)—2½ and 2 hours, Professor Kirchner

*Mathematics* (Mathematics II)—5 hours, Professor Groat

*Mineralogy* (Geology and Mineralogy, Mineralogy I)—4½ hours, Professor Hall and Mr. Parsons.

## SOPHOMORE YEAR

### FIRST SEMESTER

*Chemistry* (Chemistry III)—4½ hours, Professor Sidener

*Drawing* (Drawing II)—4½ hours, Professor Kirchner

*Mathematics* (Mathematics III)—5 hours, Professor Groat

*Metallurgy* (Metallurgy III)—3 hours, Professor Appleby

*Physics* (Physics I)—4 hours, Professor Jones

SECOND SEMESTER

- Chemistry* (Chemistry V)—4½ hours, Professor Sidener  
*Drawing* (Drawing III)—2½ hours, Professor Kirchner  
*Mathematics* (Mathematics IV)—5 hours, Professor Groat  
*Metallurgy* (Metallurgy IV)—3 hours, Professor Appleby  
*Mining* (Mining I)—4 hours, Professor McCarty  
*Plane Surveying* (Mining VII)—3 hours, Professor McCarty.  
*Physics* (Physics I)—4 hours, Professor Jones

SUMMER WORK—MONTH OF AUGUST

- Mine Surveying* (Mining VIII)—4 weeks, Professor van Barneveld and Professor McCarty.

JUNIOR YEAR

FIRST SEMESTER

- Geology* (Geology and Mineralogy, Geology I)—2 hours, Professor Hall  
*Mechanics* (Mechanics I)—5 hours, Professor Groat  
*Mechanical Laboratory* (Mechanical Engineering XXIII)—2½ hours, Professor Kavanaugh  
*Metallurgy* (Metallurgy V)—4 hours, Professor Appleby  
*Mine Mapping* (Mining X)—2½ hours, Professor McCarty  
*Mining* (Mining II)—5 hours, Professor van Barneveld  
*Petrography* (Geology and Mineralogy, Geology III)—2½ hours, Mr. Parsons  
*Ore Dressing* (Mining V)—4 hours, Professor McCarty

SECOND SEMESTER

- Mechanics* (Mechanics II)—5 hours, Professor Groat  
*Mechanical Laboratory* (Mechanical Engineering XXIV)—2½ hours, Professor Kavanaugh  
*Metallurgy* (Metallurgy VI)—4 hours, Professor Appleby  
*Mine Surveying* (Mining IX)—3 hours, Professor van Barneveld  
*Mining* (Mining II)—5 hours, Professor van Barneveld  
*Petrography* (Geology and Mineralogy, Geology VI)—2½ hours, Mr. Parsons  
*Steam Engines* (Mechanical Engineering XVII)—2 hours, Professor Flather

FIELD WORK—MONTH OF MAY

- |   |          |                |          |   |
|---|----------|----------------|----------|---|
| <p><i>Mining</i> (Mining III)<br/> <i>Metallurgy</i><br/>         (Metallurgy VIII)</p> | <p>{</p> | <p>4 weeks</p> | <p>}</p> | <p>Professor van Barneveld.<br/>         Professor Appleby.<br/>         Professor Christianson.<br/>         Professor McCarty, Mr. Pease.</p> |
|---|----------|----------------|----------|---|



## SENIOR YEAR

## FIRST SEMESTER

- Chemistry* (Chemistry XVI)—42 hours, Dr. Frankforter  
*Electric Power* (Electrical Engineering V)—32 hours, Professor Springer  
*Geology* (Ore Deposits—Geology and Mineralogy, Geology IX)—4 hours,  
 Professor Hall  
*Mechanics* (Mechanics III)—4 hours, Professor Groat  
*Mining and Mining Engineering* (Mining IV)—5 hours, Professor van  
 Barneveld  
*Ore Testing* (Metallurgy II)—2 hours, Professor Appleby  
*Ore Testing Laboratory* (Metallurgy II)—42 hours, Professor Appleby,  
 Professor Christianson and Mr. Pease  
*Thesis*—4 hours

## SECOND SEMESTER

- Chemistry* (Chemistry XX)—42 hours, Dr. Frankforter  
*Designs and Specifications* (Mining VI)—42 hours, Professor van Barne-  
 veld  
*Geology* (Special Problems—Geology and Mineralogy, Geology X)—22  
 hours, Professor Hall  
*Mechanical Laboratory* (Mechanical Engineering XXVIII)—22 hours,  
 Professor Kavanaugh  
*Mining and Mining Engineering* (Mining IV)—5 hours, Professor van  
 Barneveld  
*Thesis*—4 hours

## DEPARTMENT OF METALLURGY

This subject is well illustrated with representative ores of all the most important metals, drawings of furnaces, 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 three 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 are shown, and instruction is given as to nature and quantity 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 ore, furnace and mill products; different charges are tried and practical conclusions drawn. Assays of bullion for fineness.

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 dimension 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 reports in detail. This work is offered to students completing the necessary courses in mineralogy and chemistry.

*The Assay Laboratories* are located in the new School of Mines Building and consist of:

1st. Preparation room. This room is 62 feet long by 36 feet wide and accommodates 66 students. Here samples and reagents are weighed preparatory to assaying. Each student is furnished with a complete set of apparatus, including a pulp balance for individual use. All operations are therefore conducted with the greatest economy of time and entirely apart from the furnace room. The separation of the preparation room from the furnace room is of greatest importance. Nearly all ores are crushed and pulverized by suitable machines run by electric motors. Students are compelled to pulverize by hand a minimum number of samples, thereby saving much time for extended and advanced work in special lines.

2nd. Furnace room. This room is 60 feet long by 42 feet wide. The high ceiling and special ventilation provided for this room make it a most comfortable assay furnace room. It provides for the accommodation of twelve (12) double-decked muffle furnaces, twenty-four (24) crucible furnaces and twelve gasoline furnaces. After the sample has been placed in a suitable vessel for fusion, it is taken to the furnace room, which communicates directly with the preparation room.

3rd. Balance room. This room is 31 feet long by 16 feet wide. In this room are various types of balances for accurately weighing gold and silver beads and bullion. The room is specially lighted by electric cove lights from the ceiling. The balances are placed on heavy brick piers which are independent of the walls of the building.

## ORE TESTING

The lectures treat of the use and purposes of all the machinery connected with the subject, supplemented with detail drawings.

There are complete testing works connected with the department where the student may see the working of, and handle for himself, crushers, rolls, Huntington mill, concentrating machinery, such as vanners, buddles, jigs, pan for amalgamation, settlers, reverberatory furnaces for oxidizing and oxidizing-chloridizing roasts, leaching and chlorination plants, as well as sizing apparatus and hydraulic separators. Sufficiently large amounts of ore are given to make the necessary tests upon the different machines, and the students report the best method of treatment. The first semester of senior year is devoted to instruction and laboratory work, and is required of students both in mining and metallurgy.

The ore testing works meet educational as well as commercial needs.

*Educational.* The ore testing plant acquaints the student with the construction and manipulation of the principle typical machines used in the leading ore dressing establishments of the country. It is here that students in mining and metallurgical engineering get the requisite practical experience. They handle all machines and operate on sufficiently large amounts of material to determine the methods best suited to a given ore to extract the largest amount of metal with the least possible loss.

*Commercial.* Ore testing works are an important factor in mining and metallurgical projects. The commercial object is to determine the best method of treating a given ore so as to yield the largest percentage of the metal it contains at the least possible cost. Samples varying from 500 pounds to car load lots can be treated by various methods.

The ore testing works are located on the east bank of the Mississippi, between the Great Northern and Northern Pacific railroads. Located at this point on the University campus, it offers the very best facilities for both educational and commercial purposes.

As the funds appropriated for the erection of such a plant were sufficient to purchase only the necessary machinery, the business men of Minneapolis generously provided a suitable building. This building, 94x66 feet, is built of brick and stone.

*Machinery.* The plant contains all the machinery necessary to illustrate the various processes of ore testing, viz.: A Bridgman mechanical sampler, size B; a link belt bucket elevator; a pulley feeder complete; a pair of 12½ x12 geared rolls complete; a four compartment spitzkasten; a three compartment Hartz jig; a Collum jig complete with cone for driving; a three and a half foot Huntington mill complete; a three stamp mill, 275-pound stamps; a five stamp mill, 850-pound stamps; a Challenge automatic feeder for five-stamp battery; a suspended Challenge feeder for three-stamp battery; a Tulloch feeder for Huntington mill; a single deck buddle, twelve

feet in diameter; a four-foot plain belt Frue vanner; a Cammett concentrator; a Hooper pneumatic concentrator; a Century drop motion jig; a three-foot amalgamating pan; a five foot settler; a Bruckner roasting furnace, with fire-box on wheels; a chlorination barrel; a battery tightener; a two-horse power vertical boiler; a steam drying pan; three trommels, with driving arrangement and gears; a one thousand-pound Reedy elevator, complete with worm gear; two overhead crawls, each with eighty-foot track; one-ton pulley block; a quarter-ton pulley block; a scoop car, with flat wheels; two twenty-horse power electric motors; three MacDermott automatic samplers, etc.

## COURSE IN METALLURGY

### FRESHMAN YEAR

#### FIRST SEMESTER

*Chemistry* (Chemistry I) 42 hours, Professor Nicholson  
*Drawing* (Drawing I) 42 hours, Professor Kirchner  
*Mathematics* (Mathematics I)—5 hours, Professor Groat  
*Mineralogy* (Geology and Mineralogy, Mineralogy I)—42 hours, Professor Hall and Mr. Parsons

#### SECOND SEMESTER

*Assaying* (Metallurgy I)—4 hours, Professor Appleby  
*Assaying laboratory* (Metallurgy I)—42 hours, Professor Appleby, Professor Christianson and Mr. Pease.  
*Chemistry* (Chemistry II)—42 hours, Professor Nicholson  
*Drawing* (Drawing I)—22 and 2 hours, Professor Kirchner  
*Mathematics* (Mathematics II)—5 hours, Professor Groat  
*Mineralogy* (Geology and Mineralogy, Mineralogy II)—2 hours, Professor Hall and Mr. Parsons

### SOPHOMORE YEAR

#### FIRST SEMESTER

*Chemistry* (Chemistry III)—42 hours, Professor Sidener  
*Drawing* (Drawing II)—42 hours, Professor Kirchner  
*Mathematics* (Mathematics III)—5 hours, Professor Groat  
*Metallurgy* (Metallurgy III)—3 hours, Professor Appleby  
*Physics* (Physics I)—4 hours, Professor Jones

#### SECOND SEMESTER

*Chemistry* (Chemistry V)—42 hours, Professor Sidener  
*Drawing* (Drawing III)—22 hours, Professor Kirchner

*Mathematics* (Mathematics IV)—5 hours, Professor Groat  
*Metallurgy* (Metallurgy IV)—3 hours, Professor Appleby  
*Mining* (Mining I)—4 hours, Professor McCarty  
*Plane Surveying* (Mining VII)—3 hours, Professor McCarty  
*Physics* (Physics I)—4 hours, Professor Jones

## SUMMER WORK—MONTH OF AUGUST

*Mine Surveying* (Mining VIII)—4 weeks, Professor van Barneveld and Professor McCarty

## JUNIOR YEAR

## FIRST SEMESTER

*Geology* (Geology and Mineralogy, Geology I)—2 hours, Professor Hall  
*Mechanics* (Mechanics I)—5 hours, Professor Groat  
*Mechanical Laboratory* (Mechanical Engineering XXIII)—22 hours, Professor Kavanaugh  
*Metallurgy* (Metallurgy V)—4 hours, Professor Appleby  
*Mine Mapping* (Mining X)—22 hours, Professor McCarty  
*Mining* (Mining II)—5 hours, Professor van Barneveld  
*Petrography* (Geology and Mineralogy, Geology III)—22 hours, Mr. Parsons  
*Ore Dressing* (Mining VI)—4 hours, Professor McCarty

## SECOND SEMESTER

*Mechanics* (Mechanics II)—5 hours, Professor Groat  
*Mechanical Laboratory* (Mechanical Engineering XXIV)—22 hours, Professor Kavanaugh  
*Metallurgy* (Metallurgy VI)—4 hours, Professor Appleby  
*Mine Surveying* (Mining IX)—3 hours, Professor van Barneveld  
*Mining* (Mining II)—5 hours, Professor van Barneveld  
*Petrography* (Geology and Mineralogy, Geology VI)—2 hours, Mr. Parsons  
*Steam Engines* (Mechanical Engineering XVII)—2 hours, Professor Fla-ther

## FIELD WORK—MONTH OF MAY

<i>Metallurgy</i>	} 4 weeks {	Professor van Barneveld Professor Appleby, Professor Christianson Professor McCarty and Mr. Pease
(Metallurgy VIII)		
<i>Mining</i> (Mining III)		

SENIOR YEAR

FIRST SEMESTER

- Chemistry* (Chemistry XVI)—4½ hours, Dr. Frankforter  
*Electric Power* (Electrical Engineering V)—3½ hours, Professor Springer  
*Geology* (Ore Deposits—Geology and Mineralogy, Geology IX)—4 hours,  
Professor Hall  
*Mechanics* (Mechanics III)—4 hours, Professor Groat  
*Mining and Mining Engineering* (Mining IV)—5 hours, Professor van  
Barneveld  
*Ore Testing* (Metallurgy II)—2 hours, Professor Appleby  
*Ore Testing Laboratory* (Metallurgy II)—4½ hours, Professor Appleby,  
Professor Christianson and Mr. Pease  
*Thesis*—4 hours

SECOND SEMESTER

- Chemistry* (Chemistry XX)—4½ hours, Professor Nicholson  
*Designs and Specifications* (Mining VI)—4½ hours, Professor van Barne-  
veld  
*Electro-Chemistry* (Chemistry XVII)—3½ hours, Dr. Frankforter  
*Electro-Metallurgy* (Metallurgy VII)—3 hours, Professor Christianson.  
*Mechanical Laboratory* (Mechanical Engineering XXVIII)—2½ hours,  
Professor Kavanaugh  
*Mining and Mining Engineering* (Mining IV)—5 hours, Professor van  
Barneveld  
*Thesis*—4 hours

# Courses of Instruction

## COURSES IN CHEMISTRY

- Course I. General and qualitative analysis* Freshman, first semester  
Lectures and laboratory work. The course includes special general chemistry and the reactions of the metals as applied to their separation and identification.
- Course II. Qualitative analysis* Freshman, second semester  
Lectures and laboratory work. The work in this course will include an examination of alloys, minerals, slags and other compounds. Open to those who have completed course I. Four times a week. 136 hours.
- Course III. Quantitative analysis* Sophomore, first semester  
Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis. Open to those who have completed course II. Four times a week. 136 hours.
- Course V. Volumetric analysis* Sophomore, second semester  
Lectures and laboratory work. The course includes an introduction to volumetric determinations with a discussion of standard solutions and the necessary stoichiometric calculations. Open to those who have completed course III. Four times a week. 136 hours.
- Course XVI. Special problems* Senior, first semester  
Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems, with work on ores of base metals, limestone, slags, etc. Open to those who have completed course V. Four times a week. 136 hours.
- Course XVII. Electro-chemical analysis* Senior, second semester  
Lectures and laboratory work. The course includes the qualitative and quantitative separation of metals by electrolysis. Open to those who have completed course XVI. Three times a week. 102 hours.
- Course XX. Iron and steel analysis* Senior, second semester  
Lectures and laboratory work. The course includes the rapid determination of iron by the various methods, as well as the determination of associated elements, sulphur, phosphorus, silicon, manganese, carbon and others. Open to those who have completed course V. Four times a week. 136 hours.

## COURSES IN DRAWING

- Course I. (a) Frechand* Freshman, first semester  
Lettering, geometric forms and engineering details in outline, including working sketches, translations and the elements of perspective. Twice a week, 68 hours.
- (b) *Mechanical* Freshman, first and second semester  
Conventional methods, lettering, machine and structural details and standard sizes and shapes. Four times a week. 136 hours.

- (c) *Descriptive geometry—Applications* Freshman, second semester  
Problems relating to points, lines, planes, solids, interpenetrations, surfaces of revolution, tangents and developments, including the constructive geometry involved. Recitations and lectures. Twice a week. 34 hours.
- Course II. Descriptive geometry* Sophomore, first semester  
Orthographic, isometric, horizontal, topographic, oblique and perspective projections, shades and shadows, line shading and brush tinting. Sketches pertaining to mining and metallurgical plants. Open to students who have completed course 1. Twice a week. 34 hours.
- Course III. Working drawings* Sophomore, first and second semester  
Engineering details, assembly drawings, mechanical movements, tracing and blue printing. Study of shop methods and drafting room systems. Details are obtained from actual machines and structures as far as possible. Mining machinery. Four times a week. 68 hours.

## COURSE IN ELECTRICAL ENGINEERING

- Course V. Electric power* Senior, first semester  
Elements of theory and practice of electrical measurements, wiring, dynamos, motors and electric lighting. 36 lectures and 48 hours laboratory. Preparation required: Physics, course 1. Three and six hours per week.

## COURSES IN GEOLOGY AND MINERALOGY

## MINERALOGY

- Course I. General mineralogy* Freshman, first semester  
The physical and chemical characters of minerals; a study of the native elements and the ores of the common metals; the occurrence and association of economic minerals. Descriptive mineralogy and classification; rock-forming minerals; genetic relationships and distribution. Laboratory work consists of tests illustrating the range of minerals and the application of chemical and blowpipe analyses to the determination of species; and introduction to the methods of quantitative blowpipe analysis; special topics; reference reading and discussions. Eight hours a week.
- Course II. Physical mineralogy* Freshman, second semester  
An introduction to crystallography; physical characters of greatest service in rapid determination. Hand specimen practice preparatory to rock study. Lectures and field work. Two hours a week.
- Course III. Optical mineralogy* Junior, second semester  
A study of the structure of crystals and crystal grains. An application of the methods of determination by optical properties; the use of the petrographer's microscope, embracing the elements of lithology. Lectures and laboratory work. Four hours a week.

## GEOLOGY

- Course I. Physical geology* Junior, first semester  
1. Geodynamics, discussing the atmosphere, water, terrestrial heat, plants and animals as geological agents. 2. Structural geology, explaining stratification, displacements, dislocations, fractures, induced rock-structures and mineral veins in their relation to the arrangement of materials in the earth. 3. Physiographic geology, pointing out the more prominent earth features and discussing their origin, significance and the agencies affecting them. Field excursions are required. Scott's Introduction. Two hours a week.
- Course III. Petrographical geology* Junior, first semester  
General consideration of the origin and occurrence of rocks, i. e., Petrogenesis. The structure and texture of rocks. Preliminary studies of the mineral, physical and chemical constitution of the



crystalline rocks with a view to their general description. Kemp's Handbook of Rocks. Reference reading and demonstrations. Four hours a week.

*Course VI. Petrography* Junior, second semester

An investigation of the megascopic and microscopic characters of crystalline rocks; a discussion of their crystalline habit, mineral composition and genetic relations. The course extends into an examination of some Minnesota groups of crystalline rocks. Practically a continuance of course III of mineralogy. Laboratory, with lecture, and reference reading. Four hours a week.

*Course IX. Ore deposits* Senior, first semester

History of mineral discovery and development in the Americas; a discussion of the origin and distribution of ore deposits, embracing the chemical processes involved in their formation and subsequent alterations. A description of the geology and mineralogy of ore bodies, particularly those yielding gold, silver, copper, iron, lead and zinc. Kemp's Ore Deposits. Four times a week.

*Course X. Special problems* Senior, second semester

The investigation by individual students of particular problems, involving the field work of an investigation of some particular formation and the laboratory investigation and reading incident to the study of the material collected. The methods of systematically recording and interpreting geological and mineralogical data as observed in the field; keeping of notebook, preparation of geological maps, profiles and sections will be taught. Four times a week.

#### COURSES IN MATHEMATICS

*Course I. Algebra and plane trigonometry* Freshman, first semester

Rational integral functions, factors and roots of general quadratic, factor and remainder theorems, factors and values of  $f(x)$ , graphs, cube roots of unity and factors of  $(a^3+b^3+c^3-3abc)$ , progressions and notation, development of  $f(x)$  and undetermined coefficients, convergence, divergence, equivalence, exponential theorems, logarithmic series and logarithms, summation of series, derived functions, theory of equations, trigonometric ratios, right triangles, general definitions of functions, analytic relations, trigonometric equations, oblique triangles. Five hours per week.

*Course II. Algebra, analytic geometry and spherical trigonometry*

Freshman, first semester  
Spherical formulæ and solution of spherical triangles, permutations and combinations, determinants, systems of co-ordinates, loci, straight line, transformation, equations of the conics, limits, areas and limits of sums, differentiation and integration of elementary forms, probabilities. Four hours per week. Preparation, course I.

*Course III. Analytic geometry and infinitesimal analysis*

Sophomore, first semester  
Properties of the conics, equation of 2d degree, higher plane curves, co-ordinates in space, point, plane, straight line, quadric surfaces, review of nature of differentiation and integration, elementary forms, geometric applications, successive derivatives, expansion of functions, indeterminate forms, rates, partial derivatives, maxima and minima, change of variable, applications to analytic geometry. Five hours per week. Preparation, course II.

*Course IV. Differential and integral calculus*

Sophomore, second semester  
Applications continued, rational fractions, rationalization, formulæ of reduction, multiple integration, various systems of co-ordinates, approximate integration, some differential equations of mechanics, least squares. Five hours per week. Preparation, course III.

#### COURSES IN MECHANICS

*Course I. Statics and mechanics of materials* Junior, first semester

Mathematical conditions of equilibrium, frames, theory of elasticity, design for beams, shafts, boiler plates, etc. Five hours per week. Preparation, mathematics IV and physics.

- Course II. Kinetics and hydraulics.* Junior, second semester  
Motion of rigid bodies; numerous problems in work, power, energy, friction and hydraulics. Five hours per week. Preparation, course I.
- Course III. Thermodynamics and prime movers* Senior, first semester  
Properties of steam, perfect gases, heat engines, water power, theory of turbines. Four hours. Preparation, course II.

## COURSES IN MECHANICAL ENGINEERING

- Course XVII. Steam engine* Junior, second semester. 36 hours.  
Mechanics of the steam engine. Work in cylinder; effect of reciprocating parts; steam distribution. Mechanism of steam engines. A study of the details of modern steam engines. Valve and valve gears. A study of the slide valve, link motions and other reversing gear; automatic cut-off gears and the Zeuner diagram. The steam engine indicator. Principles and operation of the instruments, indicator rigging; indicator cards; compounding. Preparation, course I in applied mechanics. Two hours a week.
- Course XXIII. Strength of materials* Junior, first semester. 72 hours  
Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams, brick and stone. Preparation, course I applied mechanics. Four hours a week.
- Course XXIV. Mechanical laboratory* Junior, second semester. 72 hours  
Continuation of course XXI; also exercises in valve setting, indicator practice, calibration of steam gauges, efficiency of screws and hoists. Preparation, course XVI. Four hours a week.
- Course XXVIII. Mechanical laboratory* Senior, second semester. 72 hours  
Hydraulic measurements. Calibration of weirs, nozzles, meters and other hydraulic apparatus; calorimetry; tests of pumps, engines and boilers. Open to students who have completed course XXIV. Four hours a week.

## COURSES IN METALLURGY

- Course I. Assaying* Freshman, second semester  
Determination of values of the ores. Lectures, recitations and laboratory work. Open to those who take course I chemistry, and have completed course I mineralogy.
- Course II. Ore testing* Senior, first semester  
Determination of methods of ore treatment. Lectures and practical work. Open to those who have completed course I and mining course V.
- Course III. General metallurgy and metallurgy of iron.* Sophomore, first semester  
Including the subjects of combustion, fuels, refractory material and furnaces. Lectures and recitations on metallurgy of iron. Open to those who have completed course I.
- Course IV. Metallurgy of wrought iron and steel* Sophomore, second semester  
Lectures and recitations. Open to those who have completed course III.
- Course V. Metallurgy of the precious metals.* Junior, first semester  
Gold, silver and platinum. Lectures and recitations. Open to those who have completed course IV.
- Course VI. Metallurgy of the base metals* Junior, second semester  
Associated with precious metals, including lead, copper, etc. Lectures and recitations. Open to those who have completed course V.
- Course VII. Electro-metallurgy* Senior, second semester  
Lectures and recitations. Open to those who have completed course VI.

- Course VIII. Field work in metallurgy* Junior, first semester  
Conference and reports. Last four weeks of semester. Open to  
those who have completed course VI.
- Course IX. Designs and specifications* Senior, second semester  
Supplementing thesis.

## COURSES IN MINING

- Course I. Explosives, blasting, air compressors and quarrying.* Sophomore, second semester  
Four hours a week.
- Course II. Mining* Junior, first and second semesters  
Mode of occurrence of ore bodies; prospecting, shaft-sinking, tun-  
neling, drifting, stoping, timbering. Methods of metal mining.  
Methods of coal mining. Hydraulic mining. Open to those  
who have completed course I. Five hours a week.
- Course III. Field work* Junior, second semester  
Practice in mine surveying and field geology, studying in mines.  
Open to those who have completed courses I, II. Last four weeks  
of the semester.
- Course IV. Mining and mining engineering* Senior, first and second semester  
Mine management. The examination of a mining property. Samp-  
ling ore reserves, etc. Mine accounts. Mine accidents. Min-  
ing law. Mining machinery, underground transportation, hoist-  
ing, pumping and ventilation. Electricity applied to mining.  
Open to those who have completed course III. Five hours a week.
- Course V. Ore dressing* Junior, first semester  
Mechanical preparation of ore for the market, for metallurgical  
treatment, etc. Four hours a week.
- Course VI. Designs and specifications* Senior, second semester  
Designs of mine cars, skips, head-frames, etc., in connection with  
thesis work. Open to those who have completed senior I. Eight  
hours a week.
- Course VII. Plane surveying* Sophomore, second semester  
Computation, platting, with special reference to mine surveying.  
Three times a week.
- Course VIII. Field work* Junior  
Practice in plane surveying during the month of August, with spe-  
cial reference to mine surveying. Open to those who have com-  
pleted course VII.
- Course IX. Mine surveying* Junior, second semester  
Computations, methods, etc. Open to those who have taken  
courses VII and VIII. Three times a week.
- Course X. Mine mapping* Junior, first semester  
Four hours a week.

## COURSE IN PHYSICS

- Course I. General physics* Sophomore, first and second semesters  
Experimental lectures. Four times a week.

THE SCHOOL *of* CHEMISTRY

# The School of Chemistry

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## OFFICERS

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EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry.*

EVERHART P. HARDING, Ph. D., *Assistant Professor of Chemistry*

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A. D. WILHOIT, M. S., *Instructor in Chemistry*

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## OFFICERS OF THE DEPARTMENT OF DRAWING

WILLIAM KIRCHNER, *Assistant Professor of Drawing*J. H. QUENSE, *Instructor in Drawing*

## Regulations Governing Admission

## ADMISSION.

Entrance examinations are held only at the beginning of the college year. Students prevented from entering at the beginning of the year may be admitted at a subsequent date when the circumstances are such as to justify the action. Such students are, however, at a great disadvantage and all students expecting to enter the University are urged to be present at the beginning of the year.

All applicants should present themselves to the registrar who will furnish them with application blanks and directions how to proceed with their examinations and registration.

## GENERAL REGULATIONS.

Students bringing records from accredited schools are required to present them on the blank form provided for the purpose by the University. Blank forms may be obtained from the registrar. No other form of certificate will be accepted. Students who do not bring their certificates on the proper form of blank will not be allowed to register until they have secured the certificate on the required form.

- I. Students will be admitted to the freshman class on *passing the regular entrance examinations.*
- II. No student will be admitted *if conditioned in more than three half-year subjects, or their equivalent.*
- III. Graduates of any Minnesota State high school will be admitted *without examination, provided—*
  - (1) That the school maintain a *full four-year high school course.*
  - (2) That the applicant present to the registrar the principal's certificate showing the satisfactory completion of *all the studies required for admission* to the desired University course.
- IV. Graduates of Minnesota State high schools who are deficient in *not more than three half-year subjects* or their equivalent, *may be excused from entrance examinations in such subjects as the enrollment committee may decide*; such candidates should present themselves to that committee *not later than Tuesday of examination week.*
- V. Graduates of Minnesota State high schools whose principal's certificate shows them to be deficient in *more than three half-year subjects* or their equivalent, even though they have made such additional preparation as they deem necessary, must take, nevertheless, the regular entrance examination in all subjects, as provided in sections I and II, unless excused by vote of the faculty; and persons

wishing to present reasons for such excuse *should report to the enrollment committee not later than Tuesday of examination week.*

- VI. Graduates of the *advanced courses of Minnesota normal schools* will be admitted upon the same terms as graduates of State high schools.
- VII. Any Minnesota high school or academy *not under supervision of the State High School Board*, but requiring for graduation a *four-years' course*, exclusive of the common school branches, **conforming essentially in distribution of time** to the entrance requirements of at least one of the University courses, will, upon application, be inspected by a committee, and, after favorable recommendation, *may be accredited by the faculty* in all respects as are the state high schools, *provided*—
- (1) That the school be *open to inspection* at any time by the University;
  - (2) That it take such *supplementary examinations as may be prescribed* from time to time.
- VIII. *Graduates from schools in other states*, whose diplomas admit to *reputable colleges* in the states in which the schools are located, will be received subject to the regulations that apply to graduates of Minnesota State high schools.
- IX. Applicants from schools not coming within any of the above classes *must take the regular entrance examinations* or present State High School Board certificates.

High School Board certificates will be accepted in lieu of an examination in the subjects which they represent.

*In all cases the faculty reserves the right to require a student to take supplementary examinations if he does not sustain himself creditably in his course.*

*N. B.—The time element specified with each subject is essential.*

*English*, four years, including

- (a) Classics.
- (b) Principles of composition.
- (c) Practice in written expression.

*Algebra*, elementary, one year.

*Geometry*, plane, one year.

In addition to the above named subjects which are required and for which substitutes cannot be accepted, applicants shall present evidence of preparation in *nine* year-credits, or their equivalent, to be chosen from the following list:

Note—It is provided that if any language is offered from the list of elective subjects, at least two years of that language shall be offered, save in the case of Latin Grammar, which will be accepted as the equivalent of one year of English.



*The School of Chemistry*

*Mathematics* (one year).

*Algebra*, higher, one-half year.

*Geometry*, solid, one-half year.

*Latin* (four years).

Grammar, one year.

Cicero, six orations, one year.

Caesar, four books, one year.

Virgil, six books, one year.

*Greek* (two years).

Grammar, one year.

Anabasis, four books, one year.

*German* (two years).

Grammar, one year.

Literature, one year.

*French* (two years).

Grammar, one year.

Literature, one year.

*Spanish* (two years).

Grammar, one year.

Literature, one year.

*History*, Ancient, to Charlemange, one year.

Modern, from Charlemange, one year.

England, one-half year.

Senior American, one-half year.

Until the opening of the University year 1907-08, half-year credits will be accepted in ancient, medieval and modern history.

*Civics*, one-half year.

*Political Economy*, one-half year.

*Physics*, one year.

*Chemistry*, one year. One-half year credit will be accepted until the opening of the year 1907-08.

*Botany*, one-half or one year.

*Zoology*, one-half or one year.

*Astronomy*, one-half year.

*Geology*, one-half year.

*Physiography*, one-half year.

*Commercial Geography*, one-half or one year.

## ADVANCED STANDING.

*Advanced Standing*—*The University accepts records from all reputable colleges for credit to advanced standing.* Such records are accepted as far as they are equivalent to the work done in this University. In bringing records from other institutions, the certificate must be on the official blank of the institution granting the certificate, and should show:

1. The subjects studied; if a language, the work read, etc.
2. The time spent upon each subject.
3. Ground covered in laboratory work in case of laboratory subjects.
4. The result—it is sufficient to state that the subject was creditably completed.

Records from institutions whose entrance requirements are not essentially equivalent to the requirement of the University, will not be accepted unquestioned; the credit to be allowed will be decided in individual cases by the enrollment committee.

## DAILY ROUTINE.

The morning session begins at 8:30 o'clock; a general assembly of the faculty and students is held each day at 10:25 o'clock, at which there are brief and simple religious exercises. Work extends through six days of the week.

At the close of each semester, examinations are held in the studies of that semester.

Students are reported as "excellent," "good," "passed," "incomplete," "conditioned," or "failed."

An "incomplete" must be removed within one month from the opening of the following semester or it becomes a condition.

A "condition" not made up before the subject is offered again becomes a "failure," subject to rules governing failures.

"Failures" must be pursued again in class.

A student who at any time is deficient in more than half a year's work, loses his class rank and is regarded as a member of the next lower class.

Students whose absences in any term exceed four weeks in the aggregate, are not permitted to take the term examinations without special permission of the faculty.

## FAILURE TO KEEP UP WITH THE CLASS.

Any student receiving conditions or failures in 60 per cent of the work of the first semester shall be dropped from the rolls, and shall not be allowed to re-enter the University until the opening of the following year.

Any student failing to pass in one-half of the work of any year shall

not be allowed to register until reinstated by action of the faculty upon recommendation of the committee on students' work.

#### FEEES.

All students in the college, who are residents of the state, are charged an incidental fee of fifteen dollars a semester. Non-residents are charged double the fee required of residents of the state, or thirty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. Save in the case of the first registration, the incidental fee is increased 25 cents for each day's delay in registration, beginning with the day set for recitations to begin. In addition to this fee, students who take work in laboratories are charged a sum sufficient to cover the cost of material and breakage.

# The School of Chemistry

## GENERAL STATEMENT.

The two four year courses in chemistry are designed for those who wish to become teachers of chemistry, analysts, investigators, manufacturing and applied chemists. The course in analytical chemistry is arranged especially for teachers, analysts and general scientists. The course in engineering chemistry is intended for those who would become manufacturing and applied chemists and chemical technologists. The courses here presented include general, organic, analytical, technical, theoretical and applied chemistry. Besides chemistry, extended work is offered in physics, mathematics, metallurgy, mineralogy, crystallography, geology, engineering, botany, language and drawing.

Electives are offered in the senior year in order to give the students an opportunity of selecting subjects of special importance to them, but which are not included in the regular courses.

## EQUIPMENT.

*Laboratories.* The building formerly known as Science Hall has been completely remodeled to meet the needs of the department of chemistry. The building is 198 by 78 feet, and consists of several large laboratories well equipped for a wide range of chemical work. The general laboratory is located on the first floor and is large enough to accommodate 350 students. The laboratory tables are arranged with cupboards, drawers and locks, and supplied with gas and water. Connected with this laboratory by means of sliding windows, is a preparation room which is directly joined to the general store room. The remaining part of this floor is given to cloak rooms, furnace and motor rooms and a large lecture room with a gallery designed to comfortably seat 350 students. The qualitative laboratory, located on the second floor, is arranged with tables similar to those of the general laboratory and will accommodate 250 students. The library and three technical laboratories are likewise on this floor. The third floor contains the quantitative laboratory large enough to accommodate 120 students. Directly connected with this laboratory are the balance, preparation, evaporation and drying rooms. There are also on this floor, six special laboratories, an organic laboratory, a physical laboratory, a lecture room and a museum. There is a suite of rooms on the fourth floor entirely given to photography.

*Library.* The chemical library contains complete sets of many of the important journals. It contains besides these special sets, a well repre-

sented list of analytical and technical works, as well as many rare old works of great historical value. Most of the important journals are taken, thus enabling the student to keep abreast of the times. All books are easily accessible, with only the necessary restrictions to guard against injury and loss.

#### INDUSTRIAL MUSEUM.

Considerable space is given to a collection in industrial, technical and applied chemistry. There is a large collection of chemicals, with specimens of each in the various stages of preparation and purification; a collection of nearly all the elements, with most of their important salts; a large number of mining and metallurgical specimens, including most of the important ores, together with many rare specimens in crystallography. The collections of coals and petroleums are especially valuable for lecture and technical work. There is a large collection of dyes, organic and inorganic, mordants, textiles, and other materials used in dyeing and bleaching, with a rapidly increasing collection of clays and materials used in making of glass, earthenware, porcelain and brick. A collection of furnace products, models and series of charts, blue prints and photographs illustrating a wide range of technical and chemical processes is being added.

#### FIVE YEAR COURSE IN ARTS AND CHEMISTRY LEADING TO THE DEGREES BACHELOR OF ARTS AND ANALYTICAL CHEMIST.

The degree bachelor of arts will be conferred upon any student who completes the work prescribed in the first four years of the following course, provided that at least one *long course* shall be chosen from each of the following groups.

- (a) English, French, German, Greek, Latin, Rhetoric.
- (b) Animal Biology, Astronomy, Botany, Chemistry, Mineralogy, Physics.
- (c) History, Philosophy, Political Science and Sociology.

A *long course* means an amount of work equivalent to not less than six hours per week in one department for one year.

The degree analytical chemist will be conferred upon the completion of the fifth year of the course.

# Courses of Study

## Analytical Chemistry

### FRESHMAN YEAR.

#### FIRST SEMESTER.

Mathematics [3]  
Chemistry (qualitative) 3[  
Mineralogy [3]  
Drawing [4]  
Rhetoric [3]  
Military drill [3]  
Gymnasium [1]

#### SECOND SEMESTER.

Mathematics [3]  
Chemistry (qualitative) [3]  
Assaying [3]  
Laboratory [4]  
Drawing [4]  
Rhetoric [3]  
Military drill [3]  
Gymnasium [1]

### SOPHOMORE YEAR.

Chemistry (organic) [3]  
Chemistry (quantitative) [3]  
German, French or Spanish [3 or 5]  
Botany [3]  
Inorganic preparations [2]  
Rhetorical work [1]  
Military drill [3]

Chemistry (organic) [3]  
Chemistry (quantitative) [3]  
German, French or Spanish [3 or 5]  
Botany [3]  
Military drill [3]  
Rhetorical work [1]

### JUNIOR YEAR.

#### FIRST SEMESTER.

Physical chemistry [3]  
Special problems [2]  
Geology [3]  
Physics [6]  
Metallurgy [3]

#### SECOND SEMESTER.

History of chemistry [2]  
Theoretical chemistry [2]  
Iron and steel analysis [3]  
Physics [6]  
Metallurgy [3]  
Mineral analysis [2]

### SENIOR YEAR.

Chemistry of carbohydrates [2]  
Gas analysis [2]  
Colloquium [2]  
Metallurgy [4]  
Water analysis [2]  
Wine and beer analysis [2]  
Crystallography [3]  
Thesis

Photographic chemistry [2]  
Industrial chemistry [2]  
Colloquium [2]  
Electro chemistry [2]  
Metallurgy [4]  
Food adulterations [2]  
Micro chemistry [2]  
Thesis

## Applied Chemistry

### FRESHMAN YEAR.

#### FIRST SEMESTER.

Chemistry (qualitative) [3]  
Mathematics [3]  
German, French or Spanish [3 or 5]  
Drawing [4]  
Shop work [4½]  
Rhetoric [3]  
Military drill [3]

#### SECOND SEMESTER.

Chemistry (qualitative) [3]  
Mathematics [3]  
German, French or Spanish [3 or 5]  
Drawing [4]  
Shop work [4½]  
Rhetoric [3]  
Military drill [3]

### SOPHOMORE YEAR.

Chemistry (quantitative) [3]  
Mathematics [5]  
Physics [6]  
Drawing [2]  
Rhetorical work [1]  
Military drill [3]

Chemistry (quantitative) [3]  
Mathematics [5]  
Physics [6]  
Drawing [2]  
Rhetorical work [1]  
Military drill [3]

## The School of Chemistry

### JUNIOR YEAR.

Chemistry (organic) [3]  
Mechanics [5]  
Physics [3]  
Mechanical laboratory [4]  
Machine design [2]  
Industrial electricity [3]

Chemistry (organic) [3]  
Mechanics [5]  
Electrical laboratory [3]  
Mechanical laboratory [4]  
Machine design [2]  
Dynamos and motors [3]

### SENIOR YEAR.

Chemistry (industrial) [4]  
Gas analysis [2]  
Water analysis [2]  
Metallurgy [3]  
Political science [2]  
Electives [4]  
Thesis

Chemistry (industrial) [4]  
Chemistry (applied) [4]  
Metallurgy [3]  
Political science [2]  
Electives [4]  
Thesis

## Five Year Course in Arts and Chemistry

### FIRST YEAR.

#### FIRST SEMESTER.

Mathematics [3]  
Chemistry (qualitative) [3]  
Mineralogy [3]  
Drawing [4]  
Rhetoric [3]  
Drill [2]  
Gymnasium [1]

#### SECOND SEMESTER.

Mathematics [3]  
Chemistry (qualitative) [3]  
Assaying [3]  
Laboratory [4]  
Drawing [4]  
Rhetoric [3]  
Drill [2]  
Gymnasium [1]

### SECOND YEAR.

Chemistry (organic) [3]  
Chemistry (quantitative) [3]  
German, French or Spanish [3 or 5]  
Botany [3]  
Drill [3]  
Rhetorical work [1]

Chemistry (organic) [3]  
Chemistry (quantitative) [3]  
German, French or Spanish [3 or 5]  
Botany [3]  
Drill [3]  
Rhetorical work [1]

### THIRD YEAR.

#### FIRST SEMESTER.

Theoretical chemistry [3]  
Physics [6]  
Electives in College of Science, Literature and the Arts [8 or 9]

#### SECOND SEMESTER.

History of chemistry [3]  
Physics [6]  
Electives in college of Science, Literature and the Arts [8 or 9]

### FOURTH YEAR.

Physical chemistry [3]  
Special problems [2]  
Geology [2]  
Metallurgy [3]  
Electives in College of Science, Literature and Arts [8 or 9]

Iron and steel analysis [3]  
Optical mineralogy [3]  
Metallurgy [3]  
Mineral analysis [2]  
Electives in College of Science, Literature and Arts [8 or 9]

### FIFTH YEAR.

Chemistry of carbohydrates [2]  
Gas analysis [2]  
Colloquium [2]  
Metallurgy [4]  
Water analysis [2]  
Wine and beer analysis [2]  
Crystallography [3]  
Thesis

Photographic chemistry [2]  
Industrial chemistry [2]  
Colloquium [2]  
Electro chemistry [2]  
Metallurgy [4]  
Food adulterations [2]  
Micro chemistry [2]  
Thesis

# Courses in Chemistry

## FOR UNDERGRADUATES.

- I. *General Chemistry*. [1:2<sub>2</sub>] Freshman I, II. *Miss Cohen*.  
Recitations and laboratory work. The course includes a study of the chemical properties of the metallic and non-metallic elements, with a brief introduction to organic chemistry. No prerequisite.
- II. *Advanced general chemistry*. [2:1<sub>2</sub>] Freshman I, II. *Professor Frankforter and Assistants*.  
The course includes besides descriptive and metallurgical chemistry, an introduction to physical and organic chemistry. Open to those who have had elementary chemistry.
- III. *Qualitative analysis*. Freshman I, II. *Assistant Professor Nicholson*.  
Lectures and laboratory work. The course includes the general reactions of the metals and acids with their qualitative separation. Besides this mechanical work, the Ionic Theory and the Law of Mass Action are discussed with special reference to common qualitative reactions.
- IV. *Quantitative analysis*. Sophomore I. *Professor Sidener*.  
Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis.
- V. *Volumetric analysis*. Sophomore II. *Professor Sidener*.  
Lectures and laboratory work. The course includes an introduction to volumetric analysis with a discussion of standard solutions and the necessary stoichiometric calculations.
- VI. *Organic chemistry*. Junior I. *Professor Frankforter*.  
Lectures and laboratory work. This course includes the aliphatic series with a preparation of the more important compounds supplemented by Levy's *Anleitung zur Darstellung Organischer Präparate*.
- VII. *Organic chemistry*. Junior II. *Professor Frankforter*.  
Lectures and laboratory work. The course includes the aromatic series with a preparation of some of the more important compounds supplemented by Fischer's *Organischer Präparate*.
- VIII. *Theoretical chemistry*. [2] Junior I. *Assistant Professor Harding*.  
Lectures and readings. The course includes a study of Lothar Meyer's *Moderne Theorien der Chemie*, Oswald's *Grundriss der Allgemeinen Chemie* and Remsen's *Theoretical Chemistry*.
- IX. *History of chemistry*. [2] Junior II. *Professor Frankforter*.  
Lectures and reading. This course includes a full historical discussion of alchemy and chemistry.
- X. *Water analysis*. [2] Senior I. *Professor Frankforter*.  
Lectures and laboratory work. The course includes an exhaustive discussion of the chemical and sanitary properties of water.
- XI. *Gas analysis*. [2] Senior I. *Assistant Professor Harding*.  
Lectures and laboratory work. The work includes an exhaustive chemical examination of the common gases, with a determination of light and heat efficiency of combustible gases.
- XII. *The chemistry of carbohydrates*. [2] Senior I. *Assistant Professor Nicholson*.  
Lectures and laboratory work. The course includes a discussion of the carbohydrate group with the important methods of analysis.
- XIII. *Industrial chemistry*. [2] Senior II. *Professor Sidener*.  
Laboratory work and reading. The course includes the analysis of various commercial products.
- XIV. *Wine and beer analysis*. Senior. *ASSISTANT PROFESSOR HARDING*.  
Lectures and laboratory work. The course includes the determination of alcohol and other constituents in wine and beer, with a special study of fermentation.
- XV. *Special problems*. Junior I. *PROFESSOR SIDENER*.  
Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems.



- XVI. Photographic chemistry.** Senior II. PROFESSOR FRANKFORTER  
Lectures and laboratory work. The course includes a study of the compounds affected by the chemical rays of light, and a discussion of developers and fixers, photo-engraving, photo-reliefs and color photography.
- XVI. Electro-chemistry.** Senior II. PROFESSOR FRANKFORTER  
Lectures and laboratory work. The course includes the qualitative and quantitative separations of the metals by electrolysis.
- XVIII. Micro-chemical analysis.** Senior II. ASSISTANT PROFESSOR HARDING  
Lectures and laboratory work. The course includes the methods for the determination of minute quantities of substance by means of the microscope.
- XIX. Food adulterations.** Senior II., ASSISTANT PROFESSOR HARDING  
An examination of common food products for adulterants.
- XX. Iron and steel analysis.** Junior II. PROFESSOR SIDENER  
Lectures and laboratory work. The course includes the rapid determination of iron by the various methods as well as the determination of the associated elements, sulphur, phosphorus, silicon, manganese and carbon.
- XXI. Mineral analysis.** [2] Junior II. Professor Sidener.  
The course includes the analysis of building stones and some of the most important minerals.
- XXII. Inorganic preparations.** [2] Sophomore I. Assistant Professor Harding.  
The preparation of inorganic salts, supplemented by Bender's Anorganische Preparatkunde.
- XXIII. Colloquium.** [2] Senior I. Professor Sidener.  
A thorough quiz in general inorganic chemistry.
- XXIV. Colloquium.** Senior II. Professor Frankforter.  
A thorough quiz in general organic chemistry.
- XXV. Special problems.** [2] Junior I. Professor Sidener.  
This course includes work on ores of base metals, limestones, slags, etc.
- XXVI. Physical chemistry.** Junior I. Professor Frankforter.  
Lectures and laboratory work. The laboratory work will include that laid down by Jones and Walker with such references as Nernst and Ostwald.
- XXVII. Teachers' course.** [2] Senior II. Professor Frankforter.  
The course is offered to those who are interested in the teaching of chemistry. No regular laboratory work will be offered, but certain experiments illustrating the difference between good and poor work may be given. Open to those who have taken course I, II and III.

## COURSES FOR GRADUATE STUDENTS.

1. Special inorganic chemistry.
2. Electro-chemistry.
3. Organic chemistry.
4. The alkaloids.
5. Analytical chemistry.

## COURSES IN GEOLOGY AND MINERALOGY.

## MINERALOGY.

- I. Elements of mineralogy.** Sophomore I. Professor Hall and Mr. Parsons.  
The physical and chemical characters of minerals: a study of the native elements and the ores of the common metals: the occurrence and association of economic minerals.  
Descriptive mineralogy and classification: rock-forming minerals: genetic relationships and distribution.  
Laboratory work consists of tests illustrating the range of minerals and the application of chemical and blowpipe analyses to the determination of species: an introduction to the methods of quantitative blowpipe analyses: special topics: reference reading and discussions. Six hours a week.
- IV. Optical mineralogy.** Junior II. Mr. Parsons.  
A study of the structure of crystals and crystal grains. An application of the methods of determination by optical properties: the use of the petrographer's microscope, embracing the elements of lithology. Lectures and laboratory work. Three times a week.

- V. *The morphology of minerals.* Junior or senior I. *Mr. Parsons.*  
A study of crystallography, embracing projection and the geometric relations of crystal planes. The identification of minerals from crystal measurement and mathematical calculation. Crystal nomenclature.
- VI. *Physico-chemical methods with their applications.* Senior II. *Mr. Parsons.*  
The method of micro-chemical analysis described and demonstrated; the leading elements found in minerals are determined through the aid of crystalline precipitates of known compounds. Special attention is given to the study and determination of the rock-making minerals.

## GEOLOGY.

- I. *General geology.* Junior I. *Professor Hall.*  
1. Geodynamics, discussing the atmosphere, water, terrestrial heat, plants and animals, as geological agents. 2. Structural geology explaining stratification, displacements, dislocations, fractures, induced rock-structures and mineral veins in their relation to the arrangement of materials in the earth. 3. Physiographic geology, pointing out the more prominent earth features and discussing their origin, significance and the agencies affecting them. Field excursions are required. Scott's Introduction. Twice a week.
- IX. *Elements of Rock Study.* Junior I. *Mr. Parsons.*  
General consideration of the origin and occurrence of rocks, i. e., Petrogenesis. The structure and texture of rocks. Preliminary studies of the mineral, physical and chemical constitution of the crystalline rocks with a view to their general description. Kemp's Handbook of Rocks. Reference reading and demonstrations. Twice a week.
- X. *Petrography.* Junior II. *Mr. Parsons.*  
An investigation of the megascopic and microscopic characters of crystalline rocks; a discussion of their crystalline habit, mineral composition and genetic relations. The course extends into an examination of some Minnesota groups of crystalline rocks. Practically a continuance of course III of mineralogy. Laboratory, with lectures and reference reading. Elective with optical mineralogy.

## COURSES IN BOTANY.

- I. *General botany.* I, II. *Mr. Lyon.*  
This course comprises a general survey of the plant kingdom with laboratory work on the cell, on algae, lichens, fungi, mosses and ferns, gymnosperms and flowering plants. Lectures and laboratory.
- II. *General plant morphology.* First year. *Miss Tilden.*  
This course comprises a thorough laboratory discipline in algae, fungi and lichens and is the introductory course for students specializing in botany. Lectures, laboratory work and collateral reading throughout the year.

## COURSES IN MECHANICAL ENGINEERING.

- I. *Carpentry and pattern making.* Freshman I.  
Wood working, use of tools; lathe and bench work. Patterns for moulding, core boxes. Lectures and practice.
- II. *Foundry practice and pattern making.* Freshman II.  
Patterns and practice. Moulding, casting, mixing metals, brass work and core making. Shop practice, recitations and lectures.
- XI. *Machine design.* Junior I and II.  
Calculation and design of such machine parts as fastenings, bearings, rotating pieces, belt and tooth gearing. Recitations, lectures and drawing-room practice. Preparation, course V, mathematics, and course I physics.
- XXV. *Strength of materials.* Junior I, 72 hours.  
Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams. Open only to students pursuing course I in mechanics.

- XXVI. Mechanical laboratory.** Junior II. 72 hours.  
Continuation of course XXV; also exercises in valve setting, indicator practice, calibration of steam gauges, calorimetry, efficiency of screws and hoists. Preparation: course XVIII.
- XVIII. Steam engine.** Junior II. 72 hours.  
Mechanics of the steam engine. Work in the cylinder; effect of reciprocating parts; steam distribution. Mechanism of the steam engine. A study of the details of modern steam engines. Valves and valve gears. A study of the slide valve, link motions and other reversing gear; automatic cut-off gears and the Zeuner diagram. The steam engine indicator. Principles and operation of the instrument, indicator rigging; indicator cards; compounding. Preparation, course I, in applied mechanics.

## COURSES IN METALLURGY.

- I. Assaying.** Sophomore II.  
Determination of values of the ores. Lectures, recitations and laboratory work. Open to those who take courses I, II, III, chemistry, and have completed course I, mineralogy.
- III. General metallurgy and metallurgy of iron.** Sophomore I.  
Including the subjects of combustion, fuels, refractory material and furnaces. Lectures and recitations on metallurgy of iron. Open to those who have completed course I.
- IV. Metallurgy of wrought iron and steel.** Sophomore II.  
Lectures and recitations. Open to those who have completed course II.
- V. Metallurgy of the precious metals.** Senior I.  
Gold, silver and platinum. Lectures and recitations. Open to those who have completed course VI.
- VI. Metallurgy of the base metals.** Senior II.  
Associated with precious metals, including lead, copper, etc. Lectures and recitations. Open to those who have completed course V.

## COURSES IN GERMAN.

## FOR UNDERGRADUATES.

- I. German, beginning.** [5]  
*Professor Schlenker, Assistant Professor Wilkin, Mr. Juergensen, Mr. Burkhard and Mr. Williams.*  
Pronunciation, grammar, selections in prose and verse. German conversation and composition (Bernhardt); short stories.
- III. Scientific Prose, intermediate.** I, II. *Mr. Juergensen.*  
First semester.—Hodge's German Science Reader. (or equivalent). Second semester.—Brandt and Day's German Scientific Reading. This course aims to give the student a reading knowledge of German for use in scientific studies. Open to students who have completed course I.
- IV. Classic Prose and Poetry.** I, II. *Professor Moore, Assistant Professor Wilkin, Mr. Burkhard and Mr. Williams.*  
First semester.—Meissner's Aus deutschen Landen; Goethe's *Gedichte*. Review of German grammar. (Etymology.) Second semester.—Heine's *Prosa*; Buch der Lieder. Review of German grammar (Syntax). Open to students who have presented German for admission.
- VII. Advanced Scientific Reading.** I, II. *Mr. Juergensen.*  
Reading of monographs and periodicals. Open to students who have completed courses III or IV.

## MATHEMATICS.

- III. Second Part Higher Algebra.** Freshman and Sophomore I.  
*Assistant Professor Bauer, Dr. Manchester, Dr. Dunkel, Mr. Shumway.*  
For those having a credit in course I. Variation, quadratic equations, special higher equations, simultaneous equations of the second degree, maxima and minima of algebraic functions, differentiation of algebraic functions, development of functions, logarithms, theory of equations and solution of numerical higher equations.
- IV. Trigonometry.** Freshman and Sophomore II.  
*Assistant Professor Bauer, Dr. Manchester, Dr. Dunkel, Mr. Shumway.*

For those having credits in courses I and II. Text, tables, and numerous applications.

#### COURSES IN PHYSICS.

- I. **Mechanics, Properties of Matter, Heat, Sound.** [6] Sophomore I.  
*Professor Jones and Assistants.*  
 Experimental Lectures, Recitations and Laboratory Work.  
 Open to those who have completed Algebra and Trigonometry of Courses III and IV.
- II. **Light, Electricity and Magnetism.** [6] Sophomore II.  
*Professor Jones and Assistants.*  
 Experimental Lectures, Recitations and Laboratory Work.  
 Open to those who have completed Course I.
- III. **Electrical Measurements.** [3] Junior and senior I.  
*Assistant Professor A. Zeleny.*  
 Lectures and Laboratory Work.  
 Open to those who have completed Course II.
- IV. **Physical Manipulations and Laboratory Technique.** [3] Junior and senior II.  
*Professor J. Zeleny.*  
 Open to those who have completed Courses I and II.

#### COURSES IN DRAWING.

- I. Freshman I, II.
  - (a) *Freehand.*  
 Lettering, geometric forms and engineering details in outline, including working sketches, translations and the elements of perspective.
  - (b) *Mechanical.*  
 Conventional methods, lettering, machine and structural details and standard sizes and shapes.
  - (c) *Descriptive geometry.*  
 Problems relating to points, lines, planes, solids, interpenetrations, surface of revolution, tangents and developments, including the constructive geometry involved. Recitations and lectures.
- II. Sophomore I, II.
  - (a) *Descriptive geometry.*  
 Orthographic, isometric, horizontal, topographic, oblique, and perspective projections, shades and shadows, line shading and brush tinting. Open to students who have completed course I.
  - (b) *Working drawings.*  
 Engineering details, assembly drawings, mechanical movements, tracing and blue printing. Study of shop methods and drafting room systems. Details are obtained from actual machines and structures as far as possible.

#### COURSES IN ELECTRICAL ENGINEERING.

- I. **Industrial electricity.** 3 hours per week, first half first semester.  
 Outline of industrial uses of electricity; application of Ohm's law; methods and calculation of wiring. Preparation required: physics, course I.
- II. (a) **Dynamos and motors.** 3 hours per week, second half first semester and through second semester.  
 Theory of electro-magnet and direct current dynamo and motor; methods of regulation, construction and operation of dynamos and motors; methods of testing. Preparation required: electrical engineering, course I; physics, courses I and II (a); differential and integral calculus.

- v. *Analytical Geometry.* [3 and 2] Sophomore I.  
*Professor Downey and Dr. Dunkel.*  
 The conic sections, both by rectilinear and polar co-ordinates, producing equations of loci whose law of development is known, constructing and discussing such equations, transformation of co-ordinates, properties of loci by means of their equations.
- vi. *Differential Calculus.* [3 and 2] Sophomore II.  
*Professor Downey and Dr. Dunkel.*  
 Differentiation of algebraic and transcendental functions, development of functions, indeterminate forms, maxima and minima, treatment of tangents, subtangents, normals, subnormals, asymptotes, direction and rate of curvature, evolutes, envelopes and singular points.

## COURSES IN POLITICAL SCIENCE.

- VI. *Introduction to political science.* Senior I. *Dr. Schaper.*  
 A study of the state, its growth, forms and people. Lectures and reading.
- IX. *Transportation.* Senior. *Professor Folwell.*  
 The evolution of transportation in the United States, and by railroads in particular.  
 Economic aspect and public policy of railroads.

## SOCIOLOGY.

## FOR UNDERGRADUATES AND GRADUATES.

- I. *Elements of sociology.* I. *Professor Smith.*  
 Giving field, methods, and important results of social science, the attempt being to prepare the student for any special investigations he may wish to make.
- II. *Social pathology.* I. *Professor Smith.*  
 Dealing with problems of poverty, crime, insanity, social degeneration, and a discussion of the child problem and methods of social amelioration.
- III. *Social theory.* I. *Professor Smith.*  
 This course includes a study of the leading American, English, French and German writers to discover their methods of approach to the science, and the leading results they have secured. Open to those who have completed course I.
- IV. *Anthropology.* I. *Professor Smith.*  
 The work in anthropology will include researches in primitive culture, the problem of races, and the results of anthropometrics in pathological inquiries. Open to those who have completed course I.
- V. *Social groups.* I. *Professor Smith.*  
 An examination of the clan and the village in primitive life, a study of demography to discover the effect of environment upon social organization, and a comparison with the nature of the reasons for the modern city.
- VI. *The study of institutions.* I. *Professor Smith.*  
 The genesis of custom and the beginnings of law with the geographical and race influences in the growth of states, will be studied, as well as the various forms of the family and their relation to forms of civilization.

THE COLLEGE *of* EDUCATION

# The College of Education

## FACULTY

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- CYRUS NORTROP, LL. D., *President*.  
GEORGE F. JAMES, Ph. D., *Dean and Professor of Education*.  
A. W. RANKIN, B. A., *Associate Professor of Education*.  
JOHN F. DOWNEY, M. A., C. E., *Professor of Mathematics*.  
JOHN G. MOORE, B. A., *Professor of German*.  
CHRISTOPHER W. HALL, M. A., *Professor of Geology and Mineralogy*.  
JOHN C. HUTCHINSON, B. A., *Professor of Greek*.  
MARIA L. SANFORD, *Professor of Rhetoric and Elocution*.  
CHARLES W. BENTON, M. A., Litt. D., *Professor of French*.  
HENRY F. NACHTRIEB, B. S., *Professor of Animal Biology*.  
FREDERICK S. JONES, M. A., *Professor of Physics*.  
WILLIS M. WEST, M. A., *Professor of History*.  
J. J. FLATHER, Ph. B., M. M. E., *Professor of Mechanical Engineering*.  
GEORGE F. FRANKFORTER, Ph. D., *Professor of Chemistry*.  
FRANCIS P. LEAVENWORTH, M. A., *Professor of Astronomy*.  
JOSEPH BROWN PIKE, M. A., *Professor of Latin*.  
FRANK L. McVEY, Ph. D., *Professor of Political Economy*.  
SAMUEL G. SMITH, Ph. D., LL. D., *Professor of Sociology*.  
NORMAN WILDE, Ph. D., *Professor of Philosophy and Psychology*.  
WILLIAM A. SCHAPER, Ph. D., *Professor of Political Science*.  
LOUIS J. COOKE, M. D., *Director of Gymnasium*.  
HAROLD L. LYON, Ph. D., *Assistant Professor of Botany*.  
FRANCIS B. POTTER, M. A., *Assistant Professor of English*.  
JAMES BURT MINER, Ph. D., *Assistant Professor of Psychology*.  
D. D. MAYNE, *Principal of the School of Agriculture*.  
CARLYLE M. SCOTT, *Assistant Professor of Music*.

## INSTRUCTORS.

- MARGARET BLAIR, *Domestic Art*.  
ANNA M. BUTNER, *Physical Culture*.  
HENRIETTA CLOPATH, *Drawing*.  
CHARLES M. HOLT, *Education*.  
WILLIAM H. MERRIMAN, *Machine Work*.

JUNIATA SUEPPERD, *Domestic Science.*

JAMES M. TATE, *Sloyd and Woodwork.*

LECTURERS.

GEORGE B. AITON, *Inspector of the State High Schools, Minnesota.*

E. W. BOHANNON, *President of the State Normal School, Duluth.*

S. A. CHALLMAN, *Inspector of the State Graded Schools, Minnesota.*

CHARLES H. COOPER, *President of the State Normal School, Mankato.*

R. E. DENFIELD, *Superintendent of Schools, Duluth.*

S. L. HEETER, *Superintendent of Schools, St. Paul.*

CHARLES M. JORDAN, *Superintendent of Schools, Minneapolis.*

GUY E. MAXWELL, *President of the State Normal School, Winona.*

JOHN W. OLSEN, *Superintendent of Public Instruction, Minnesota.*

C. G. SCHULZ, *Assistant Superintendent of Public Instruction, Minnesota.*

W. A. SHOEMAKER, *President of the State Normal School, St. Cloud.*

FRANK A. WELD, *President of the State Normal School, Moorhead.*



## THE COLLEGE OF EDUCATION

The College of Education is authorized by special enactment of the Legislature of Minnesota and established by the Regents of the University. It offers a practical and theoretical training for high school teachers and principals, for principals of elementary schools, for supervisors of special studies and for superintendents of school systems. This bulletin is issued as a preliminary announcement of the college and describes the courses arranged for the first year.

### ADMISSION.

Entrance examinations are held only at the beginning of the college year. Students prevented from entering at that time may be admitted later if the circumstances justify this action. Such students are however at a great disadvantage and all students expecting to enter the college are urged to be present at the beginning of the year.

All applicants should present themselves to the Registrar, who will furnish them with application blanks and directions how to proceed with their examinations and registration. Before filling out the blanks obtained from him, applicants are advised to consult with the Dean of the College of Education in regard to their work.

### CONDITIONS OF ADMISSION.

Students who have completed with credit at least two full years of college work will be admitted to the College of Education. During these two years they should have pursued one or more of the subjects which they expect to teach and in addition at least one course in general psychology. Students in the College of Literature, Science and the Arts of the University of Minnesota, who plan to enter the College of Education are advised to consult with the Dean in regard to their courses of studies as early as the first semester of the sophomore year.

### ADMISSION TO ADVANCED STANDING.

#### I. *From other colleges.*

This college accepts records from all colleges of equal rank for credit to advanced standing. All candidates for graduation must however meet the conditions established by this college as indicated in a succeeding paragraph.

## II. *From Minnesota Normal Schools.*

Graduates of the "advanced graduate course" of a Minnesota State Normal School, who have received one year's credit in the College of Science, Literature and the Arts, and who have completed, in addition, a full year of the work required of these graduates by that college, will be admitted to the College of Education, but will not be permitted to elect either Course V, or Course VII in education. Individual graduates of either of the five-year courses of a Minnesota State Normal School will be admitted under the same regulations.

### UNCLASSED STUDENTS.

Applicants who present satisfactory reasons for not taking the regular course may be admitted as unclassified students upon proof of fitness to profit by the work. The same general attainments are expected of these students as are required of those who enter the regular course. Unclassified students must take the same number of hours as regular students, except that men and women actually engaged in teaching may be allowed to enter certain classes as hearers.

### EXAMINATIONS.

At the close of each semester examinations are held and students are reported as "excellent", "good", "conditioned", "passed", "incomplete", or "failed". An "incomplete" must be removed within one month from the opening of the following semester, or it becomes a "condition."

A "condition" not made up before the subject is offered again becomes a "failure," subject to rules governing failures. "Failures" must be pursued again in class. A student who at any time is deficient in more than half a year's work loses his class rank and is regarded as a member of the next lower class. Students whose absences in any term exceed four weeks in the aggregate, are not permitted to take the term examinations without special permission of the faculty.

### FAILURE TO KEEP UP WITH THE CLASS.

Any student receiving conditions or failures in 60 per cent of the work the first semester shall be dropped from the rolls and shall not be allowed to re-enter the University until the opening of the following year.

Any student failing to pass in one-half of the work of any year shall not be allowed to register until reinstated by action of the faculty upon recommendation of the committee on students' work.

### FEES.

All students in the college, who are residents of the state, are charged an incidental fee of ten dollars a semester. Non-residents are charged double the fee required of residents of the state, or twenty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. Save in the case of the first registration, the incidental fee is increased by twenty-five cents for each day's delay in registration beginning with the first day set for recitations. The usual fees for shop work are required of students in manual training.

### COURSE OF STUDY.

The College of Education offers a three-year course of study. At the end of the second year, students may receive the degree of Bachelor of Arts and the University Teachers' Certificate. The third year will be given to advanced studies in education and on the completion of this work the candidates will receive the degree of Master of Arts. The course of study will be theoretical and practical, and, after the first year, will include observation and practice teaching, in both the elementary and the secondary schools.

### THE DEGREE OF BACHELOR OF ARTS.

The degree of Bachelor of Arts will be granted by the College of Education to candidates on the following conditions.

a. The completion of college courses amounting to one hundred and twenty-six (126) credits, in addition to required exercises in Drill, Gymnasium and Physical Culture. Of these credits not less than sixty and not more than seventy-two shall be elected within the College of Education. A credit is one hour per week through one semester.

b. At least fifteen credits in Education, including courses I and II, which are specified for the Teachers' Certificate.

c. An amount of work in at least three other departments sufficient to secure one "major" and two "minor" recommendations. Each "minor" recommendation will require not less than twelve credits or more at the discretion of the department concerned, and each "major" will require the completion of from eighteen to twenty-four credits.

### THE UNIVERSITY TEACHERS' CERTIFICATE.

The University Teachers' Certificate will be granted to all graduates of the College of Education, who have maintained a good average of

scholarship through four years of college work. Graduates of the College of Literature, Science and the Arts, who have maintained a good average of scholarship through four years, will receive the certificate, if they secure one "major" recommendation and have completed one course in general psychology, and three courses in education, including courses I and II.

#### THE DEGREE OF MASTER OF ARTS.

Graduates of the University of Minnesota, and of other institutions of equal rank, will be admitted to work leading after one year of study to the degree of Master of Arts, upon the usual conditions attaching to that degree. They will be expected, however, to have given considerable attention in their collegiate work to psychology and to the history, the theory and the practice of teaching. This graduate year is planned for college students who desire further academic and professional training, before entering upon the work of teaching, and for experienced teachers, who wish to prepare for the work of principals, superintendents and supervisors.

#### SPECIAL LECTURES.

In addition to the courses announced for the College of Education, special lectures will be given from time to time, open to all students, by men closely identified with public education in Minnesota. Educational organization, ideals and methods, will be treated from the point of view of those concerned with the state department of public instruction, the inspection of state graded and high schools, the state normal schools, city schools systems, and with the conduct of schools in smaller communities.

Public lectures will be given also by men familiar with the educational conditions, experiments, and tendencies in other states.

#### THE EDUCATIONAL CLUB.

This organization is made up of those giving instruction in the College of Education and of students registered for advanced work. Meetings are held from time to time during the college year for the discussion of current questions in education and for reports and discussions upon recent educational literature, books, magazines and journals.

## Courses of Instruction

Unless otherwise specified, all courses are three credit-hour courses.

In the following outline of courses of instruction, the work offered in the history, the theory and the practice of education, is first mentioned. Then follows the outline of the courses offered in various subjects, which fall within the secondary curriculum. In each case there is indication of the work which a student of the College of Education should advisedly have taken in the first two years of collegiate study. The distinction between work naturally preceding matriculation in the College of Education and that which falls within the course of study of this college is not absolute. A student, for example, who desires a "major" recommendation in history, English, Latin or German should pursue this work from the beginning of his freshman year. A student who desires a similar recommendation in zoology or botany may possibly secure this by beginning work in the department in the sophomore year, while a "minor" credit in some subject may be secured by two years' work within the College of Education.

Fuller descriptions of some of the courses offered may be found in the Bulletins of the College of Literature, Science and the Arts, the College of Engineering, the School of Chemistry and the College of Agriculture.

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### EDUCATION.

#### *I. The History of Education to the Renaissance.*

I. DEAN JAMES AND MR. HOLT.

An introductory study of early educational history, conducted by means of lectures, assigned readings, reports and discussions. The purpose of the course is to arouse an interest in educational problems, to secure some perspective for use in current investigation, with some command of the facts and some ease in the methods of educational history and study. An attempt is made to bring out education as one phase of civilization, and to show the connection of schools with other social institutions.

#### *II. The History of Modern Education.* II. DEAN JAMES AND MR. HOLT.

A continuation of Course I with a somewhat intensive study of certain men, periods and systems in the history of modern education. This course is a direct preparation for an understanding of the educational systems, theories and practices of the present.

*III. Educational Psychology.*

I, OR II. DR. MINER.

The study of mental development in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education. Open only to those who have completed Course I in Psychology. This course is announced also as Course II in Philosophy.

*IV. Secondary Education.*

I. DEAN JAMES.

This course is a study of secondary education in the United States, with such references to secondary schools of other countries as will lead to a clearer understanding of the place and function of the high school, its curriculum, the problems of present-day importance, and the relation of the high school to other parts of the system of public instruction. The course will be conducted by lectures, reports and discussions.

*V. Practice of Elementary Teaching.*

I. PROFESSOR RANKIN.

This course includes a consideration of the principles of teaching, which underlie the best methods of instruction, and is both theoretical and practical. It is conducted by means of lectures, assigned readings, discussions and reports, accompanied by either observation or practice in the elementary schools under the direction of the instructor. It is planned for all students who expect to teach in the high schools or to be principals or superintendents. No credit is given in this course to graduates of normal schools, receiving one year's credit at the University.

Prerequisite: Course I in Philosophy.

*VI. Practice of Secondary Teaching.*

II. PROFESSOR RANKIN.

This course includes lectures on the general methods of secondary teaching, assigned readings, reports and discussions, with either observation or practice of secondary teaching under the charge of the instructor. It is planned more particularly for those who expect to teach in high schools.

Prerequisite: Course IV in Education.

*VII. The Theory of Education.*

II. DEAN JAMES.

This is an introductory course in educational theory and includes a somewhat detailed study of the principles which underlie a scientific theory of education. No credit is given in this course to graduates of normal schools, receiving one year's credit at the University.

Prerequisite: Course I in Philosophy.

*VIII. School Administration.*

I, OR II. PROFESSOR RANKIN.

An introductory study of school administration, conducted by lectures, reports and discussions; the organization of school systems—the work of school boards, superintendents, principals and teachers—school buildings, and hygiene. This course is planned especially for students, without any teaching experience, who hope later to do work in supervision.

*IX. School Supervision.*

II. PROFESSOR RANKIN.

An advanced course, treating of the duties of school principals and superintendents, intended, primarily, for graduates with experience in teaching. (Credit will not be given both for course VIII and for course IX.)

X. *Comparative Study of School Systems.* I. DEAN JAMES.

This course deals with the school systems of Germany, France, England and the United States, different phases receiving attention in alternate years. The course is conducted partly by lectures and partly by assigned readings, reports and discussions.

XI. *Modern Educational Theories.* II. DEAN JAMES.

An advanced course in educational theories, dealing particularly with the contributions of Rousseau, Froebel and Herbart.

Prerequisite. Course III in Education.

XII. *Current Problems in Elementary Education.* I. PROFESSOR RANKIN.

A seminar course for senior and graduate students.

XIII. *Current Problems in Secondary Education.* II. DEAN JAMES.

A seminar course for senior and graduate students.

### AGRICULTURE.

I. *Elements of Agriculture.* I. PRINCIPAL MAYNE.

This course is planned to meet the increasing demand for a knowledge of the elements, at least, of agriculture on the part of graded school principals, rural school teachers, county superintendents of schools and others concerned with education in the agricultural sections of the state. The course is given at the School of Agriculture, on Tuesday and Saturday afternoons, and carries with it three credits.

II. *Elements of Agriculture (continued).*

II. PRINCIPAL MAYNE AND OTHERS.

This is a continuation of course I and is planned to give the student some familiarity with the underlying principles and the simple processes connected with various forms of agricultural work. Tuesday and Saturday afternoons, three credits. Mr. Mayne will have the cooperation of others connected with this branch of the University. Students who are interested are advised to read the Bulletin of the School of Agriculture and to note the various opportunities which are there afforded, for all of these, will be made available to some extent in connection with these courses.

### ANIMAL BIOLOGY.

*Preliminary—I. General Zoology.*

I, II. PROFESSOR SIGERFOOS, ASSISTANT PROFESSOR  
OESTLUND AND ASSISTANTS.

Textbooks, quizzes, lectures and laboratory work.

This course at least should be taken in the first or second college year by all who expect to teach the subject.

II. *Zoology. Extension of Course I.*

I, II. PROFESSOR SIGERFOOS AND ASSISTANT  
PROFESSOR OESTLUND.

Those who wish a "major" credit in zoology should take this course during the sophomore year.

III. *Histology.* I, II. PROFESSOR NACHTRIEB AND  
MR. DOWNEY.

VI. *Comparative Anatomy of Vertebrates.*  
I, II. MR. BROWN.

Courses III or VI may also be taken during the second college year, to be followed in the College of Education by one or more of the courses hereafter named.

IV. *Embryology of Vertebrates.* I, II. PROFESSOR NACHTRIEB.

V. *Embryology of Invertebrates.* I, II. PROFESSOR SIGERFOOS.

VIII. *Physiology.* I. PROFESSOR SIGERFOOS.

IX. *Nature Study.* II. PROFESSOR SIGERFOOS AND ASSISTANTS.

Courses VIII and IX alternate, only one being given in each college year. Courses VIII will be given in 1906-7.

X. *TEACHER'S COURSE.* (1) I. PROFESSOR NACHTRIEB.

This course consists of one lecture and discussion each week during the first semester on the ends to be attained through courses in general zoology and the methods and means by which such ends may be gained.

Additional courses in Animal Biology announced in the Bulletin of the College of Science, Literature and the Arts will be accepted also for credit in the College of Education.

#### ASTRONOMY.

I. *General Astronomy.* I, II. PROFESSOR LEAVENWORTH.  
Open to those who have completed trigonometry.

II. *Practical Astronomy.* (3 or 6). I, II. PROFESSOR LEAVENWORTH.

#### BOTANY.

Preliminary—I. *General Botany.* I, II. ASSISTANT PROFESSOR LYON.

II. *General Plant Morphology.* First year.  
I, II. ASSISTANT PROFESSOR TILDEN.

III. *General Plant Morphology.* Second year.  
I, II. PROFESSOR MACMILLAN AND ASSISTANT  
PROFESSOR ROSENDAHL.

Course I, or Courses II and III, may be taken during the Freshman and Sophomore years by those who expect to teach Botany, to be followed in the College of Education by the courses mentioned hereafter.

IV. *Taxonomy.* I, II. ASSISTANT PROFESSOR ROSENDAHL.

V. *Cytology.* I, II. PROFESSOR MACMILLAN AND ASSISTANT  
PROFESSOR LYON.



## XII. TEACHERS' COURSE.

II. ASSISTANT PROFESSOR LYON.

This course consists of one lecture and one discussion a week during the second semester, on the objects to be secured through the high school teaching of Botany and on the methods by presentation.

Additional courses in Botany announced in the Bulletin of the College of Science, Literature and the Arts will be accepted also for credit in the College of Education.

## CHEMISTRY.

Preliminary—I (a) *General Chemistry*. I, II. MISS COHEN.  
(b) *Advanced General Chemistry*.

I, II. PROFESSOR FRANKFORTER.

II. *Qualitative Analysis*.

I. ASSISTANT PROFESSOR NICHOLSON.

III. *Identification of the Acids*.

II. ASSISTANT PROFESSOR NICHOLSON.

During the first two college years I (a) or I (b) should be taken by all who expect to teach Chemistry and those who desire a "major" credit should take also courses II and III. The following courses are suggested for students in the College of Education:

IV. *Quantitative Analysis* (gravimetric). I. PROFESSOR SIDENER.

V. *Quantitative Analysis* (volumetric). II. PROFESSOR SIDENER.

VI. *Organic Chemistry*. I, II. PROFESSOR FRANKFORTER.

VII. *TEACHER'S COURSE*. (I) II. PROFESSOR FRANKFORTER.

This course is arranged especially for the students in the College of Education. The course will be largely didactic with experimental work necessary to a thorough understanding of the new methods and theories. For technical courses, see catalogue of the School of Chemistry.

## DRAWING.

Preliminary—Students who expect to teach Drawing should take in the first two college years, course I, II, and III, as announced in the Bulletin of the College of Science, Literature and the Arts. In the College of Education selection may be made from the following:

IV. *Historical design*. I, II. MISS CLOPATH.

V. *Drawing as Related to Education*. II. MISS CLOPATH.

Exercises in all the different kinds of art work used in the schools. Advanced work in black and white and in color.

VI. *The Teaching of Drawing*. I. MISS CLOPATH.

This course is conducted by lectures and collateral reading on the methods and educational value of drawing, as revealed through a study of the instincts and mental processes of the child.

## DOMESTIC SCIENCE AND DOMESTIC ART.

These courses cover specifically the science and the art of the home. In the reactionary movement, away from the theoretical, and toward the practical in education, the need of teachers of scientific and artistic home-making has become marked. To meet this demand the following courses have been organized:

## DOMESTIC ART.

Domestic art has to do with the very beginning of home-making, the selection of a site, the adaptation of architecture to the needs of the family, the choice of materials, colors, etc. and their relation to the surroundings, the interior of the home, its furniture and keeping. All of these topics are viewed in both their economic and their social aspect. In addition a full course is offered in needle-work in all its branches.

I. *A Study in Textiles.*

I. MRS. BLAIR.

Animal and vegetable fibers, weaves and dyes, testing fabrics for household use and personal wear, the hygienic values of various fabrics, harmony of color. This course is designed especially to assist the teaching of sewing in graded schools, and includes the preparation, explanation and making of models suited to grade work in the public schools. This course will be given upon Monday and Thursday afternoons, at the School of Agriculture; three credits.

II. *Design and Garment Drafting.*

II. MRS. BLAIR.

This course is in the design and drafting of children's and adults' garments and includes also a series of lectures upon the home. This course will be given upon Monday and Thursday afternoons at the School of Agriculture; three credits.

## DOMESTIC SCIENCE.

Domestic science has to do with the chemistry of the table, the science of cooking, and the house-wifely care of the kitchen and dining-room; household accounts, and the administration of the home upon an economical basis, are discussed in their various relations in these courses and the effort is toward system, economy and effectiveness in home management. Students who look forward to teaching are trained to assist in the teaching or supervision of this work in city schools or to have the entire charge of the work, in connection with other teaching, in the smaller high schools.

I. *Laundrying and Food Economics.*

I. MISS SHEPPERD.

In this course the subject of domestic and commercial laundrying and cleaning is first considered, with a study of removing stains, dyeing, setting colors, cleaning delicate fabrics, the use of cleaning agents, starches and bluing. By far the larger part of the semester is given to a study of food economics, with a consideration of all phases of the selection of food materials and the preparation of food. The course is conducted by means of lectures, readings, with the

writing of a thesis and by full individual practical experience in all parts of the work.

The course is given on Wednesday and Friday afternoons at the School of Agriculture; three credits.

II. *Management of Kitchen and Dining Room.* II. MISS SHEPPERD.

- (a) The kitchen, equipment, sanitation, labor saving devices, etc.
- (b) The dining room, equipment, furniture, decorations, management, etc.
- (c) Household inventories, bills of fare, fancy cookery, etc.

The above course is made, as far as possible, both practical and scientific. It requires three hours of work on each of two afternoons, and students who successfully complete it receive three credits. Students who are interested in this line are advised to read a fuller description, which will be found in the Bulletin of the School of Agriculture.

E C O N O M I C S.

Students expecting to give instruction in Economics should take the following courses as a minimum requirement for thorough preparation.

I. *Elements of Economics.* I, or II. PROFESSOR McVEY.

A thorough course in the elements of economics. The aim is to inculcate accepted doctrine, and show the nature and bearing of economic theory on present day problems. Textbook, problems, lectures and discussions.

III. *Money and Banking.* II. PROFESSOR McVEY.

A course in the elements of money and banking; deals with the principles of both, illustrating them by reference to monetary legislation and experience. Textbook, lectures, papers and discussions.

IV. *Modern Industrial Problems.* II. PROFESSOR McVEY.

A course based upon McVey's *Modern Industrialism*. This course deals with the problems and legislation arising from industrial conditions such as labor questions, trusts, monopolies, etc. Assigned topics, lectures and collateral reading.

VIII. *Advanced Economics.* I. PROFESSOR McVEY.

In this course further consideration is given to selected topics from elementary economics. Carver's *Distribution of Wealth* is used as a text, supplemented by reading and problems. Lectures, papers and discussions.

XII. *Methods of Investigation.* (1). II. PROFESSOR McVEY.

A course in methods of using libraries, collecting and organizing material, followed by the actual investigation of important questions. Attention is given to graphic methods of presenting economic facts and theories.

For other courses in Economics, see the Bulletin of the College of Science, Literature and the Arts.

## ENGLISH LANGUAGE AND LITERATURE.

- Preliminary I. Chaucer.* I. MISS PECK AND MR. FIRKINS.  
 II. *Spenser.* II. PROFESSOR KLAEBER, MISS PECK AND MR. FIRKINS.  
 III. *Early English,* I. II. PROFESSOR KLAEBER.  
 IV. *Sixteenth and Seventeenth Century Lyric.* II. MISS PECK.  
 V. *Shakespeare's Predecessors.* I. MISS PECK.  
 VI. *Milton.* I. ASSISTANT PROFESSOR POTTER.  
 VII. *The Lake Poets.* II. ASSISTANT PROFESSOR POTTER.  
 During the first two college years students who expect to teach English should take three or more of the above courses. In the College of Education selection may be made from the following courses;  
 VIII. *Construction and Development of Modern Drama.* I. MISS PECK.  
 IX. *Late Nineteenth Century Drama.* II. MISS PECK.  
 X. *Early Nineteenth Century Poetry.* I. ASSISTANT PROFESSOR POTTER.  
 XI. *Late Nineteenth Century Poetry.* II. ASSISTANT PROFESSOR POTTER.  
 XIII. *TEACHERS COURSE: The English Critics. (2)* I. II. ASSISTANT PROFESSOR POTTER.  
 XIV. *Introduction to Middle English Language and Literature.* I. PROFESSOR KLAEBER.  
 XV. *Piers the Plowman. (2)* I. PROFESSOR KLAEBER.  
 Courses XIV and XV will be given in alternate years.  
 XVI. *English Prose.* II. PROFESSOR BURTON.  
 XVII. *Literary Criticism.* I. PROFESSOR BURTON.  
 XVIII. *Browning.* II. PROFESSOR BURTON.  
 XIX. *Tennyson.* II. PROFESSOR BURTON.  
 XX. *Nineteenth Century Essays.* II. MR. FIRKINS
- The above courses are merely suggested for the consideration of students. Those who desire either a "major" or a "minor" credit should consult with the head of the department. All students who seek a "major" credit in English literature should have also, at least, a "minor" credit in rhetoric.

## FRENCH.

- Preliminary I. French, beginning (5)*  
 MR. FRELIN, MADAME BERTIN, MR. MELOM.

II. *French, second year's work.*

I, II. MR. FRELIN AND MADAME BERTIN.

IV. *Conversation. (2)*

PROFESSOR BENTON AND MADAME BERTON.

The three courses above should be taken in the first two college years by students who begin work here. The following two courses are for those who entered with two years of French.

III. *Advanced Grammar and Composition.*

MR. FRELIN.

VI. *Advanced Conversation. (2)*

PROFESSOR BENTON AND MR. FRELIN.

V. *Classical French Writers.*

PROFESSOR BENTON.

This course is conducted by lectures and conversations, with some reading of modern authors, for the purpose of comparison.

VII. *Nineteenth Century Literature.*

I, II. PROFESSOR BENTON.

This course is conducted by lectures in French.

Courses V, VI and VII are required for a "major" credit, in addition to the elementary courses, and courses I, II and IV, or III and IV, for a "minor" credit.

## GEOLOGY.

I. *General Geology.*

I. PROFESSOR HALL.

II. *The Essentials of Physical Geography.*

I. PROFESSOR HALL.

A discussion of the principles of earth structure and description of the structural features of continents, with special reference to the earth's movements and the commercial activities of mankind.

III. *Industrial Geography.*

II. PROFESSOR HALL.

(a) Influence of the physical structure of North America upon its resources and development.

(b) The industrial development of the countries of North America, and its relation to geographical conditions and environment.

(c) A study of industries, products and the growth of industrial countries. With excursions.

Open to those who have taken course I or II.

IV. *Geography and Geology of Minnesota.*

II. PROFESSOR HALL.

(a) A review of the salient features of the geography of the state, embracing its climate, surface features, rivers, and lakes, with industrial conditions under development.

(b) An historical survey of the facts and principles of pre-Cambrian geology as exemplified in the geological features of the Lake Superior region and of Northern and Eastern Minnesota.

(c) A discussion of the geology and mineral resources of the state, particularly with reference to its deposits of clay, building stones and ores.

Open to all who have taken course I.

Students who desire either a "major" or a "minor" credit in Geology should confer with the head of the department. Other courses in Geology and courses in Mineralogy are announced in the Bulletin of the College of Science, Literature and the Arts.

### GERMAN LANGUAGE AND LITERATURE.

The introductory courses in German are announced in the Bulletin of the College of Science, Literature and the Arts.

#### VIII. *Advanced Conversation, Grammar and Composition.* (2)

I, II. PROFESSOR SCHLENKER AND ASSISTANT PROFESSOR WILKIN.

Essays on assigned subjects; letter writing; oral exercises in German by means of discussions on every day subjects; debates, narration and the like. This course is intended as a preparation for Course XVI and is open to students who have taken or are taking course VI. It is recommended that students shall have taken course V.

#### IX. *German Literature of the Classic Period.*

I, II. PROFESSOR MOORE.

First semester.—Goethe's Faust; its genesis; Faust legend; its treatment in literature before and since Goethe's time. Plan of Goethe's Faust; change in the order of the scenes; solution of the Faust problem in Part II. Lectures and collateral reading; essays by the class. Schiller's ballads and other representative poems of this period. German versification.

Second semester.—Reading and discussion of Lessing's more important critiques; the Laocoon and Dramaturgie. Open to those who have completed course VI or VII.

#### X. *Modern Authors. German Literature of the Nineteenth Century.*

I, II. PROFESSOR MOORE.

First semester.—Romantic school and Junge Deutschland.

Second semester.—German literature since 1848.

#### XVI. *TEACHERS' COURSE.* (2)

I, II. PROFESSOR MOORE.

This course is especially designed for students who intend to become teachers in the high schools.

A "minor" in German is given to students who complete courses VIII and IX; a "major" to those who complete, in addition, courses XI and XVI.

### G R E E K.

In addition to the preliminary courses students who expect to teach Greek in the high school should take at least the following:—

IV. *Oratory.* I. ASSISTANT PROFESSOR SAVAGE.

V. *Philosophy. Plato.* II. ASSISTANT PROFESSOR SAVAGE.

VII. *Poetry. Tragedy. Aeschylus or Sophocles.*

II. PROFESSOR BROOKS.

X. *Poetry, Epic (advanced course)* II. PROFESSOR HUTCHINSON.

XIV. *Greek Composition, (advanced course)* [1]

I. II. PROFESSOR HUTCHINSON.

All of the above courses are expected of candidates for teaching although in exceptional cases one or two might be omitted. A list of additional courses in Greek will be found in the Bulletin of the College of Science, Literature and the Arts.

## HISTORY.

*Preliminary II. English Constitutional History, to the Accession of Geo. I.* I, II. ASSISTANT PROFESSOR WHITE AND MISS JUDSON.

V. *Constitutional History of the United States to 1840*

I. II. PROFESSOR WEST.

As to courses in history for the College of Education, students are urged to consult early with the head of the department as to the best choice among the various sequences offered. Students who desire a "major" credit should take at least four year-courses, one of which must be an intensive course, (see list below) and students who desire a "minor" credit should take at least three year-courses, in addition to the "Teachers' Course." The following are intensive courses;

VII. *The Making of the Constitution of the United States.*

I. II. PROFESSOR WEST.

VIII. *American History since 1789.*

PROFESSOR WEST.

IX. *Studies in American Biography.*

I. PROFESSOR ANDERSON.

X. *A Critical Study of Historical Masterpieces.*

II. PROFESSOR ANDERSON.

XI. *The History of American Diplomacy.*

I. PROFESSOR ANDERSON.

XII. *The History of European Diplomacy since 1789.*

II. PROFESSOR ANDERSON.

XIII. *Colonial Expansion and Administration.* II. PROFESSOR WEST.

XIV. *A Critical Study of Authorities of early New England History.*

(2) I. II. PROFESSOR WEST.

XV. *Historical Method and Bibliography.* (2)

II. ASSISTANT PROFESSOR WHITE.

XXII. *An Intensive Course in a Special Field of Greek or Roman History.* II. ASSISTANT PROFESSOR WESTERMANN.

XVI. *A "TEACHERS' COURSE" (1)*

I, II. PROFESSOR WEST.

Designed for those who intend to teach history in the high schools. Other courses in History are announced in the Bulletin of the College of Science, Literature and the Arts.

## LATIN.

Students who expect to teach Latin are required to take courses I, II, III and IV, during the first two college years.

V. *Teacher's Course in Caesar.*

I. PROFESSOR PIKE.

A review and teacher's drill upon Books I-IV of the Gallic War. A review of grammar and elementary Latin Composition; a discussion of various problems connected with the teaching of Latin.

VI. *Teacher's Course in Virgil.*

II. PROFESSOR PIKE.

A review and drill upon Books I-VI of the Aeneid, a review of prosody and practice in the quantitative method of pronouncing Latin verse.

The above courses are required for a credit in Latin and students are advised to take also the following.

VII. *Advanced Latin Composition. (2)*

II. PROFESSOR PIKE.

X. *Correspondence of Cicero. (2)*

I. PROFESSOR CLARK.

Additional courses in Latin are announced in the Bulletin of the College of Science, Literature and the Arts.

## MANUAL TRAINING.

PROFESSOR FLATHER.

These courses have been established for the benefit of teachers and others who desire to obtain instruction in the various lines of manual training.

For the work in Sloyd and manual training in woodwork, a carefully graded series of models has been chosen and will be taken up systematically. In the selection of these exercises the utilitarian idea has been prominent, and the construction of the models illustrates primarily fundamental principles and processes rather than mere exercises.

The aim of the course is to teach the proper use of the various tools and appliances. While facility of execution is gained by the use of the tools, the main object is to prepare the teacher for carrying out similar lines of work in his own school.

A course is also offered in ironwork in order to meet the requirements of those who wish to fit themselves to teach this subject, and also to provide instruction for teachers desiring to broaden their knowledge of the subject or to perfect themselves along special lines.

For those who choose to pursue any of the special lines of work indicated in the schedule, the course will be extended beyond the scope of the work given to the class, in so far as the qualifications of the student and the equipment will permit.

## MANUAL TRAINING IN WOODWORK.

I. *Carpentry.*

I. MR. TATE.

Wood working tools; a systematic course in the use of the saw, plane, gauge, paring chisel and kindred tools.



- II. Sloyd.* II. MR. TATE.  
Training in the use of carving tools in Sloyd, geometrical and chip carving.
- III. Wood Turning.* I. MR. TATE.  
Exercises in lathe work; use of gouge, chisel and other turning tools. Chuck work, ornamental turning.
- IV. Pattern-making.* II. MR. TATE.  
Construction of patterns, core prints, core boxes. Lectures and practice. Preparation required courses I, and III.

## MANUAL TRAINING IN IRONWORK.

- V. Bench and Lathe Work.* I. MR. MERRIMAN.  
This embraces practice in wrought and cast iron with the hammer, chisel and file at the vise; also training in the use of file and scraper on wearing surfaces. Practice on the engine lathe, in connection with which are taught the elementary features of boring, turning and screw cutting. Lectures and practice.
- VI. Machine Construction.* II. MR. MERRIMAN.  
Construction of machine parts, use of planer, shaper, drill press and milling machines, gear cutting. Lectures and practice. Preparation required, course IV.  
Each course in Manual Training calls for four double periods each week and carries four credits.  
A description of the equipment and fees for this work will be found in the Bulletin of the College of Engineering.

## MATHEMATICS.

- Preliminary-III. Second Part Higher Algebra.*  
I. ASSISTANT PROFESSOR BAUER, DR MANCHESTER, DR DUNKEL AND MR. SHUMWAY.
- IV. Trigonometry.*  
II. ASSISTANT PROFESSOR BAUER, DR MANCHESTER, DR DUNKEL AND MR. SHUMWAY.
- V. Analytical Geometry. (3 and 2)* I. DR. DUNKEL.
- VI. Differential Calculus. (3 and 2)*  
II. PROFESSOR DOWNEY AND DR. DUNKEL.

The above courses should be taken in the first two college years by those who desire a "major" credit in mathematics. In addition they should take the following.

- VII. Integral Calculus.* I. PROFESSOR DOWNEY AND DR. DUNKEL.
- XII. MATHEMATICAL PEDAGOGY. (1)*  
I. ASSISTANT PROFESSOR BAUER.  
Students who desire a "major" credit will do well to elect also course XI in the Theory of Equations. Students who desire a

"minor" credit in Mathematics will take courses III, IV, and XII. Other courses in Mathematics will be found announced in the Bulletin of the College of Science, Literature and the Arts.

### MUSIC.

- I. *Theory of Music-Harmony (thorough bass)* (2)  
I, II. ASSISTANT PROFESSOR SCOTT.
- II. *Advanced Musical Theory-Counterpoint* (2)  
I, II. PROFESSOR OBERHOFFER OR ASSISTANT PROFESSOR SCOTT.
- III. *Choral culture* (2) I, II. PROFESSOR OBERHOFFER.
- IV. *Pianaforte (advanced)*  
I, II. PROFESSOR OBERHOFFER AND ASSISTANT PROFESSOR SCOTT.
- V. *TEACHERS' COURSE. (elementary)* [I]  
I, II. ASSISTANT PROFESSOR SCOTT.

A full description of the above courses, with a statement of fees, will be found in the Bulletin of the College of Science, Literature and the Arts.

This is an elementary course open to all students possessing a fair voice and a good ear and is given as a partial preparation for teaching music in the public schools. It includes the fundamentals of music and will aid students in their preparation to teach music in the advanced grammar grades and in the high schools. Especial attention will be given to chorus direction. One hour each week is given to this work and the course is planned to continue through three semesters, two in elementary music and the third a semester of harmony such as is announced in course I. The fee for this work will be four dollars for each semester; three credits for the complete course.

### PHILOSOPHY AND PSYCHOLOGY.

All students who expect to teach are advised to take the course in the Elements of Psychology during the second college year. The course in Educational Psychology, announced also under the head of Education, is commended to all future teachers. In addition attention is called to the following courses:

- III. *Analytic Psychology.* II. MR. SWENSON.
- IV. *Outline of Experimental Psychology.* II. DR. MINER.
- V. *Experimental Psychology—the Senses.* I. DR. MINER.
- VI. *Experimental Psychology—Higher Mental Processes.* II. DR. MINER.
- VII. *Psychological Interpretations.* I. DR. MINER.

All of the above courses have direct bearing upon the problems of

education. The attention of future teachers is directed also to the courses in Logic, Ethics and the History of Philosophy, a full description of which will be found in the Bulletin of the College of Science, Literature and the Arts.

## PHYSICS.

*Preliminary-I. Mechanics. Properties of Matter, Heat, Sound.* (6)

I. PROFESSOR JONES AND ASSISTANTS.

*II. Light, Electricity and Magnetism.* (6)

II. PROFESSOR JONES AND ASSISTANTS.

The above courses are required of all students who expect a "minor" credit in physics.

*III. Electrical Measurements.* I. ASSISTANT PROFESSOR A. ZELENY.

*VI. Advanced Laboratory Work.* I. PROFESSOR J. ZELENY.

*XVII. TEACHERS' COURSE* [1] II. PROFESSOR JONES.

The above courses also are required of students who want a "major" credit in physics. Additional courses in this department will be found in the Bulletin of the College of Science, Literature and the Arts.

## PHYSICAL CULTURE.

### FOR WOMEN.

*Miss Butner and Miss Barbour.*

*Preliminary*—The course in Physical Culture is offered to the women of the University as a regular part of their work in the freshman year, and may be taken in any of the following years. The work consists of systematic exercises for the development of all parts of the body. Women pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and bloomers, with the regulation gymnasium shoes. All suits must be of black material.

It is a common observation that students often enter the University with an imperfect physical development because of an excessive use of some muscles, while others are weakened through disease. This occasions attitudes and movements that are unseemly in appearance and unhealthful in their general effect.

The purpose of this course is to develop a strong and symmetrical physique with a graceful and easy carriage.

A physical examination is made of each student and physical measurements are taken in the fall and again in the spring.

In addition to the regular class work, "sports and pastimes" are open to all young women of the University. These include basket ball, battle ball and numerous other ball games, and also running games, all of which tend to cultivate the play instinct and give the nerve stimulus that comes from natural play.

### TEACHERS' COURSE.

I, II. MISS BUTNER.

Students who expect to teach should have additional work in physical culture, even if they are not called upon to give special instruction in this line. "A Teachers' Course" is accordingly offered by Miss Butner to continue through two semesters, three times a week. This course is open to all students, who have had two years of gymnasium work, and carries with it three credits, or one and one-half credits, for each of the two semesters. It will be conducted by means of lectures, readings and practice drills, bearing especially upon the calisthenic and gymnasium work of the elementary schools and the gymnasium work and games of the secondary schools.

## FOR MEN.

A well equipped Gymnasium in charge of a professional Medical Director is open for the young men. The training and exercise is under the immediate oversight and authority of the Medical Director and is wholly with a view to the healthful physical development of the whole student body.

All young men are required to be examined by the Medical Director of physical culture upon registration and during the course as often as the indications of the physical condition may require.

The decision of the Director will be either:

1. Advisory, indicating what course of hygiene and exercise will best sustain and improve the health of the student, or
2. Mandatory, requiring the students to pursue the course of hygiene and physical exercise necessary for the proper care of health and the discharge of their duties as students.

Gymnasium work is required of all men in the freshman class, one hour per week (in two half-hour periods if the director so decides) throughout the year. The required work includes a course of lectures on personal hygiene, during the first term.

## TEACHERS' COURSE

I, II. DR. COOKE.

This course is designed to meet the demand for teachers trained in accordance with methods pursued at the University.

*Elementary Physiology*:—Lectures on circulation, respiration, digestion, assimilation, excretion, nerve impulses, etc.

*Personal Hygiene*:—Lectures on diet, exercise, bathing, sleep, clothing, etc.

*Applied Anatomy*:—Lectures and demonstrations on the action of muscles and the best methods of developing them.

*First aid to the injured*:—Lectures and demonstrations.

*Physical examinations and prescriptions of exercise*:—Demonstrations and practice in taking physical measurements and strength tests, and the application of special exercises for special parts of the body.

*Testing for normal vision and hearing.*

## FLOOR WORK.

*Free movements*:—Exercises without apparatus for accelerating the circulation, stretching the muscles, and correct carriage of the body.

*Calisthenics*:—Exercises with dumb-bells, Indian clubs, wands, barbells.

*Apparatus work*:—Class drills, buck, horse, parallel bars, horizontal bar—high and low, flying rings, mat work.

Exercises for the prevention and treatment of common deformities of school children.

Class evolutions and gymnastic games.

Suggestions on conducting a Gymnastic Exhibition.

## ATHLETICS.

Track and field events, both indoor and outdoor.

Suggestions on conducting an Athletic meet.

This course is given on Monday, Wednesday, and Friday, through two semesters, open to those who have completed all required gymnasium work and students who successfully complete it, will receive three credits, one and one-half for each semester. An increasing demand for men competent to direct athletics in state high schools in connection with other teaching, makes this course of interest to young men who expect to teach.

## POLITICS.

- I. *Elements of American Government.* I, OR II. PROFESSOR SCHAPER.  
An elementary course on American Government intended as a preparation for an advanced course in Politics, and for teaching in secondary schools.
- II. *Comparative Government.* I. PROFESSOR SCHAPER.  
Open to all students who have taken course I.
- VII. *Municipal Administration.* I. PROFESSOR SCHAPER.  
A comparative study in modern city charters and the methods of administration.
- VIII. *Theory of the State.* II. PROFESSOR SCHAPER.  
Open to students who have taken course I.  
For a "minor" credit students should take courses I and II, for a "major" all of the above named courses. A fuller description of these courses, with an announcement of additional work in Politics, will be found in the Bulletin of the College of Science, Literature and the Arts.

## RHETORIC AND ELOCUTION.

## RHETORIC.

- Preliminary-I. Rhetoric.* I, II.  
This course should be taken in the first college year, or for it should be substituted, with the approval of the department, course II.
- II. *Rhetoric.* I, II. ASSISTANT PROFESSOR COMSTOCK.  
This course is open to sophomores of whom at entrance Rhetoric was not required.
- III. *Literary Criticism.* I, II. PROFESSOR SANFORD.
- IV. *Lectures upon the History of Art.* II. PROFESSOR SANFORD.
- V. *Debate.* I, II. PROFESSOR SANFORD.
- VI. *Advanced Rhetoric.* I, II. ASSISTANT PROFESSOR COMSTOCK.

## ELOCUTION.

- Preliminary—VII. Reading.* I, II. PROFESSOR SANFORD.
- VIII. *The Physical Side of Vocal Expression.*  
I. ASSISTANT PROFESSOR McDERMOTT.
- IX. *The Psychological Side of Vocal Expression.*  
II. ASSISTANT PROFESSOR McDERMOTT.
- XII. *American Oratory.* I. ASSISTANT PROFESSOR McDERMOTT.
- XIII. *British Oratory and Ancient Oratory.*  
II. ASSISTANT PROFESSOR McDERMOTT.  
Students who desire a credit in Rhetoric should take courses III and

VI. The attention of students expecting to teach English is directed, especially in the case of young men, to the courses in debate and oratory. A fuller description of these will be found in the Bulletin of the College of Science, Literature and the Arts.

### SOCIOLOGY.

Students who expect to teach will find some of these courses valuable in leading to a comprehension of the sociological phase of educational theory and organization and in supplementing their studies in general and educational psychology.

*I. Elements of Sociology.*

I. ASSISTANT PROFESSOR JENKS.

*II. Social Pathology.*

I. PROFESSOR SMITH.

*III. Social Theory.*

I. PROFESSOR SMITH.

*IV. Anthropology.*

I. ASSISTANT PROFESSOR JENKS.

*V. Social Groups.*

I. PROFESSOR SMITH

*VI. The Study of Institutions.*

I. PROFESSOR SMITH.

DEPARTMENT OF AGRICULTURE

THE COLLEGE OF AGRICULTURE

# The College of Agriculture

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## THE FACULTY.

CYRUS NORTHROP, LL. D., *President.*

WILLIAM M. LIGGETT, *Dean.*

SAMUEL B. GREEN, B. S., *Professor of Horticulture and Forestry.*

HARRY SNYDER, B. S., *Professor of Agricultural Chemistry.*

T. L. HAECKER, *Professor of Dairy Husbandry.*

M. H. REYNOLDS, M. D., V. M., *Professor of Veterinary Medicine and Surgery.*

ANDREW BOSS, *Professor of Agriculture and Animal Husbandry.*

FREDERICK L. WASHBURN, M. A., *Professor of Entomology.*

D. D. MAYNE, *Principal of School of Agriculture, Agl. Pedagogics.*

FANNIE C. BOUTELL, *Preceptress.*

## INSTRUCTORS.

J. A. VYE, *Farm Accounts.*

J. M. DREW, *Blacksmithing, Poultry.*

JUNIATA SHEPPERD, M. A., *Domestic Science.*

MARGARET BLAIR, *Domestic Art.*

JOHN A. HUMMEL, B. Agr., *Agricultural Chemistry.*

C. P. BULL, B. Agr., *Agriculture.*

WILLIAM BOSS, *Farm Structures.*

A. L. EWING, M. S., *Agricultural Physics.*

## ASSISTANT INSTRUCTORS.

A. G. RUGGLES, M. A., *Entomology.*

D. A. GAUMNITZ, M. Agr., *Animal Husbandry.*

A. D. WILSON, B. Agr., *Agriculture.*

E. C. PARKER, B. Agr., *Agriculture.*

C. C. LIPP, D. V. M., *Physiology and Veterinary Medicine.*

E. G. CHEYNEY, B. S., *Forestry.*

In the College of Agriculture, three regular courses of study are offered: A course in agriculture, a course in forestry, and a course in home economics.



REQUIREMENTS FOR ADMISSION TO ALL COURSES IN THE  
COLLEGE OF AGRICULTURE.

*Graduates of the school of agriculture*, who have completed the studies prescribed in the intermediate course, or fourth year, and graduates of approved high and normal schools, as approved by the committee on entrance requirements and course of study, are admitted to the freshman class in the courses in the college of agriculture; the former to Division "A," and the latter to Division "B."

*Students who take courses in the College of Science, Literature and the Arts*, or in other colleges of the University are required to conform to rules published in the bulletins of the respective colleges.

*Students from other colleges and universities*: Graduates from other colleges and universities may be admitted upon presentation of certificates, and will receive credit from the several professors for all work satisfactorily completed of similar character and grade to that given in this course.

*Special students*: Graduates of the school of agriculture may be admitted as special students and be allowed to pursue such studies in the course offered in the college of agriculture as are approved by the faculty.

*All students in the college of agriculture* must advise with the dean or the committee on college and graduate work concerning all electives. No student is allowed to enter any course until such course is properly entered upon the student's registration card by the registrar of the University, and no credit shall be given for subjects in which the student has not been previously registered.

## GRADUATE WORK.

Special facilities are offered to graduate students from this and other agricultural colleges who wish to become familiar with methods employed in experiment station work, and to pursue their collegiate studies further. Courses for major and minor subjects may be arranged by consulting the professors in the different divisions. Students who enter for advanced degrees register with the committee on registration of the college of agriculture and also within the graduate school and must take their major subjects in the college of agriculture, but they may take one or both of their two minor subjects in the college of science, literature and the arts or in the college of engineering and the mechanics arts. graduate students registered in the graduate school may take one or both of their minor subjects in the college of agriculture.

I. The degree of Master of Science in Agriculture will be conferred on a bachelor of this or any other agricultural college of equal grade who, not sooner than one year after graduation, if a resident graduate student at this agricultural college, shall pass an examination in certain prescribed

lines of study and present a satisfactory thesis in accordance with the requirements of the graduate school.

II. All general regulations of the graduate school governing candidates for the master's degree, method of selecting work, amount of work required, degree of proficiency expected, and the time and manner of conducting the examinations, apply to candidates for master's degrees in the college of agriculture.

III. The degree of Doctor of Science will be conferred by the graduate school for study in the college of agriculture on bachelors of this or any other agricultural college of equal grade within not less than three years after graduation therefrom under conditions prescribed by the faculty of the graduate school.

#### FEES.

All students in the college, who are residents of the state of Minnesota, are charged an incidental fee of ten dollars a semester. Non-residents are charged double the fee required of residents of the state, or twenty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. In addition to this fee, students who take work in laboratories are charged a sum sufficient to cover the cost of material and breakage.

#### REQUIREMENTS FOR GRADUATION AND DEGREES.

After the completion of the prescribed course of study, including all of the required work and the requisite amount of elective work, together with such practical experience as may be required by the committee on college course, students in the courses in agriculture will be recommended for graduation with the degree of Bachelor of Science in Agriculture; students in forestry with the degree of Bachelor of Science in Forestry; and students in the course in home economics with the degree of Bachelor of Science in Home Economics.

The elective studies designed as academic are to be chosen from the printed semester programs of work offered in the colleges of science, literature and the arts; law; medicine; and engineering; no student to take more than two semesters in either of the three last named colleges. The elective studies designated as agricultural are to be chosen from the printed program of work offered in the college of agriculture.

#### THE COURSE IN AGRICULTURE.

The course in agriculture is designed to give the student a broad education in the sciences and arts relating to agriculture and to fit him for the work of the agricultural specialist. The physical and biological sci-

ences are made prominent. The work in these subjects is begun in the first or second year and may be continued throughout the course. For the first two years, the lines of study are prescribed, the subjects being chosen with a view of giving a good foundation for the work which follows. For the last two years, the work is mostly elective and gives the student an opportunity to take work along certain lines for which he has a special aptitude and liking.

In the college of agriculture a portion of the work is taken in the college of science, literature and the arts. All academic electives and the prescribed work in higher algebra, drawing, geology, German, French, rhetoric, trigonometry, botany, zoology, psychology, English literature, logic, philosophy, pedagogy and history are taken in the college of science, literature and the arts. The agricultural electives and the prescribed subjects not mentioned above are taken at University Farm.

The classes in the college of agriculture begin with the opening of the regular University year (for which see calendar) except the Freshman class which begins Monday, Sept. 10. and closes Saturday, June 2.

## GENERAL COURSE IN AGRICULTURE

### FRESHMAN YEAR.

#### DIVISION "A."

For graduates of the School of Agriculture.

(Numbers after subjects indicate number of hours per week.)

#### FIRST SEMESTER.

Mathematics [3]  
 German [5]  
 Botany or Zoology (long) [3]  
 Geology [3]  
 Horticulture and dairy practicums  
 and debate [3]  
 Military drill [2]  
 Rhetoric [3]

#### SECOND SEMESTER.

Mathematics [1½]  
 German [5]  
 Botany or Zoology (long) [3]  
 Chemistry [1½]  
 Horticulture and dairy practicums  
 and debate [3]  
 Military drill [2]  
 Rhetoric [3]  
 Drawing [3]

### FRESHMAN YEAR.

#### DIVISION "B."

For graduates of approved high schools or others of equal standing. Students in this division take part of their work in classes of the school of agriculture. For descriptions of these courses see statement under school of agriculture.

#### First half of first semester.

Farm development [3]  
 Forestry (September) [3]  
 Dairy Chemistry (September) [3]  
 Blacksmithing (September) [3]  
 Agricultural practicums [3]  
 Farm zoology [3]

Handling grain and farm machinery [3]  
 Fruit growing [3]  
 Carpentry [3]  
 Library classification [3]  
 Field-crops [3]

## AGRICULTURAL SCHOOL YEAR.

## FIRST TERM.

Dairy husbandry [2½]  
 Breeding [2]  
 Agricultural chemistry [5]  
 Fruit growing [3]  
 Veterinary [2]  
 Entomology [5]  
 Physics [5]  
 Forestry [3]  
 Military drill [2]  
 Gymnasium [2]

## SECOND TERM.

Dairy husbandry [2½]  
 Feeding [2]  
 Soils and fertilizers [5]  
 Vegetable gardening [3]  
 Veterinary [2]  
 Study of breeds [5]  
 Plant propagation [3]  
 Military drill [2]  
 Gymnasium [2]  
 Economics [3]

## LAST HALF OF SECOND SEMESTER.

Chemistry [3]  
 Poultry [3]  
 Blacksmithing [3]  
 Farm accounts [3]  
 Dairy stock and judging [3]

Farm development [3]  
 Stock judging [3]  
 Live-stock practicums [3]  
 Field crops [3]

## SOPHOMORE YEAR.

Botany or zoology, long, (A) [3]  
 Botany or zoology, short, (A) [3]  
 Botany, short, (B) [3]  
 Zoology, short, (B) [3]  
 Scientific German or French [3]  
 Chemistry [3]  
 Agricultural physics [1½]  
 Agricultural and Animal husbandry  
 practicums and discussions [1½]  
 Rhetoric [1]  
 Military drill [3]

## JUNIOR YEAR.

## FIRST SEMESTER.

Industrial botany [3]  
 Foods [2]  
 Thremmatology [3]  
 Agricultural elective, (A) [3]  
 Taxonomy (B) [3]  
 Academic elective [3]  
 Elective [3]

## SECOND SEMESTER.

Plant pathology [3]  
 Animal feeding [3]  
 Soils and fertilizers [2]  
 Farm management [3]  
 Agricultural elective (A) [3]  
 Academic elective [3]  
 Taxonomy (B) [3]

## SENIOR YEAR.

Comparative physiology [3]  
 Field crops [3]  
 Farm structures [3]  
 Elective [3]  
 Elective [3]  
 Elective [3]

Veterinary, elective [3]  
 Stock judging [3]  
 Horticultural elective [3]  
 Elective [3]  
 Elective [3]  
 Elective [3]

## JUNIOR AND SENIOR ELECTIVES.

## AGRICULTURAL ELECTIVES.

Animal taxonomy [3]  
 Research (dairy, animal husbandry,  
 horticulture and agriculture)  
 Greenhouse management [2]  
 Taxonomic botany [3]  
 Plant ecology [3]  
 Agricultural engineering [3]  
 Chemical laboratory practice, courses  
 III, VII, VIII, [3]  
 Animal breeding [3]  
 Fruit growing [3]  
 Dairy management [2]  
 Plant breeding (horticultural) [3]  
 Plant breeding (agricultural) [3]

Agricultural chemistry, lecture  
 courses IV, V, [2]  
 Diseases of animals [2]  
 Bibliography of agricultural litera-  
 ture [3]  
 Animal parasites [2]  
 Geology [3]  
 Bacteriology [1]  
 Soiling crops [2]  
 Economic entomology [3]  
 Land surveying [3]  
 Seeds and seed judging [3]  
 Agricultural economics [3]

## ACADEMIC ELECTIVES.

Economics [3]  
 Literature [3]  
 Language [3]

Elocution [3]  
 History [3]  
 Sophomore debate [3]

## AGRICULTURE.

*Equipment:* The general equipment of University farm is available for class and special instruction and for practice work. A seed breeding laboratory furnishes facilities for special instruction in field seeds and in laboratory work in plant breeding. The plant breeding nurseries, the variety testing and the seed distribution, afford facilities for instruction and practice to students especially interested in these lines of work. The experiments and records in field management, in crop rotation and in for gaining experience. Instruments of precision make practical the incultivation experiments provide material and opportunities for study and struction in planning farms, land drainage, road making, and fence building. The farms of the vicinity serve as a basis for designing farm plans and farm business, and rural engineering problems can be worked out in nearby rural communities. Many useful samples, drawings, photographs, and references are being collected. The exhibits of machinery at the state fair grounds adjoining University farm, and those on exhibition in the warehouses of Minneapolis and St. Paul, supplement the collection in use at University farm. Students can study the merchandising of grain, the inspection and the grading of the various grain products in the twin cities. Statistics relating to the cost and profit of each staple farm crop are being gathered by special agents in three representative counties of the state.

A portion of the instruction in agriculture is in the form of lectures. The writing of papers on special subjects is made a prominent feature. Research work is arranged for in many cases, and practice work on the farm and in the laboratory is provided. The aim is to have students get experience in field agriculture, both practical and experimental, and in demonstration instruction.

(Unless otherwise specified all courses are three credit hour courses.)

*Course I. Seeds.* [One semester.]

In this course the students are made acquainted with the physical botany, the uses, identification, vitality, testing, grading and judging of all classes of field seeds. Special attention is given to the reproducing value of seeds of various grades of grains and to the importance of testing. A thesis upon some phase of the subject of seeds is required for full credit.

*Course II. Field crops.* [One semester.]

In this course are considered the botany, cultivation, and economic value of the various cereal, forage, root, fiber, sugar and miscellaneous crops. Special attention is given to the subjects of meadows, pastures, soilage crops, and to the production and preservation of all kinds of dry cured and ensilaged crops.

*Course III. Thremmatology.*

[One semester.]

Heredity, variation, laws of breeding, the art of breeding, improvement by nature and under scientific experimentation, securing foundation stocks, value of using very large numbers, immense value of the occasional individual which can transmit qualities of peculiar value, use of an ideal, use and misuse of the score card, both numerical and graphic, intrinsic qualities, fancy points and distinguishing marks, statistical methods in breeding, pedigree records of efficiency, fundamental principles underlying the arrangement of the record books, bibliography and terminology, study of the literature of breeding.

*Course IV. Plant breeding.*

[One semester.]

Botany of the reproductive organs of field crops, field crop nursery management, producing new qualities by hybridizing and by change of environment, hybridizing versus cross-breeding, in-breeding and self fertilization, originating varieties and improving standard varieties by selection and by hybridizing followed by selection, methods of disseminating new varieties, seed and plant introduction, experimentation in the theories relating to heredity, variation and practical breeding, seed growing as a farm business, seed merchandising. The breeding of each of the various field crops grown in Minnesota.

*Course V. Agricultural engineering.*

[One semester.]

Subduing prairie and timber soils, land drainage, farm land mensuration and surveying; irrigation and irrigation works; roads, their location, maintenance, laws and construction, financial support; farm fences, buildings, implements and machinery.

*Course VI. Agricultural economics.*

[One semester.]

Labor, farm finances, markets, rentals, agricultural statistics, production, exports, wages, land laws, ownership, taxes, organizations.

*Course VII. Farm management.*

[One semester.]

In this course are considered the planning of farms, crop rotation, tillage, and systems of farming. Special attention is given to revising and drafting farm plans and to arranging economic crop rotations, and application of business methods to farm operations. *Agricultural practicums.* Opportunities to gain practical experience, to acquire greater manual dexterity in doing farm work, to secure practice in conducting experiments and to get experience in teaching agricultural subjects, are offered to college and graduate students, when practicable. Students should arrange early in their course for this work, as the opportunities in plant breeding, in rural engineering, in field crops, in agricultural statistics and in assisting instructors in the various courses are available only at irregular intervals and must be arranged for in advance.

## AGRICULTURAL CHEMISTRY.

*Equipment.* A special laboratory with modern apparatus for the analysis of soils, foods and agricultural products is provided. The equipment contains an experimental mill for the production of wheat flour, a Berthelot-Atwater calorimeter for the determination of the caloric value of foods, vacuum ovens, apparatus for the chemical and physical analysis of soils, an electrical apparatus for determining the resistance of soils to soluble salts, and the necessary facilities for human and animal food investigations. Special facilities are offered in soil investigations and in the analysis and testing of wheat, flour and cereal products for commercial purposes. The laboratory is equipped with a complete experimental

flour mill for testing the milling and commercial value of different kind of wheat. Standard reference books and journals, including *Jahresbericht der Agrikultur Chemie*, *Coptes Rendus*, *Biedermann's Centralblatt*, *Annals de la Science Agronomique* and *Versuchs-Stationen* are provided for the advanced work in agricultural chemistry.

*Fees.* In all of the laboratory courses in agricultural chemistry, a fee is charged to cover the cost of material used, and breakage. The student is assigned a certain amount of apparatus and material for which he gives a receipt, and deposits \$3 with the accountant before beginning work. All apparatus returned in good condition at the close of the term is credited to the student's account upon settlement.

Two and one-half semesters of chemistry are required in the freshman and sophomore years. All other courses are elective.

*Course I. (a) General agricultural chemistry.* [One-half semester.] Freshman II. Recitations, lectures and laboratory practice. Particular attention is given to the study of the elements and compounds which are of the most importance in agriculture. The laws governing the combination of the elements by weight and volume are illustrated by numerous problems. The writing of equations, chemical nomenclature, and the periodic system of classifying the elements are prominent features of the work. In the laboratory, experiments are performed illustrating the general laws of chemistry which have a bearing upon animal and plant life.

(b) A continuation of I (a). Sophomore I. [One semester.]

*Course II. Agricultural qualitative analysis.* Sophomore II.

This course is arranged to meet the wants of agricultural students. Six hours per week are given to the laboratory work and one period to a lecture and recitation. The writing of equations and the study of principles involved in the separation of the various groups and individual compounds of elements are characteristic features of this work. It is the object of this course to familiarize the student with the processes employed in qualitative analysis so that he may be able to determine the composition of all ordinary substances, particularly of those that are of the most importance in agriculture.

*Course III. Agricultural quantitative analysis.* Junior and senior I. [One semester.]

An elementary course in quantitative analysis. The principles involved in gravimetric and volumetric analysis are studied. Three periods per week are given to laboratory work and one period to a recitation and lecture. The work includes the gravimetric and volumetric determinations of iron, acidimetry and alkalimetry, the gravimetric determination of phosphorus pentoxide, the volumetric determination of calcium oxide and determination of nitrogen and potassium oxide. The object of this course is to prepare the student for special work in agricultural chemistry, and is required of all students who elect either courses VI or VII.

*Course IV. Human and animal foods.* [One-half semester.]

Lectures. This course treats of the composition, digestibility and nutritive value of human and animal foods. The chemistry of plant growth, particularly the factors which influence their composition and nutritive value form an essential part of this course. The processes employed in the preparation of foods as the milling of wheat and other cereals, the economic uses of human and animal foods, the comparative value of foods, and the methods employed in nutrition investigations, particularly in proteld and carbohydrate metabolism and the losses of energy from the body are studied. Dietary studies, the cost of foods, and influence of different methods of preparation upon their nutritive value are

also included in the work. It is the object of this course to familiarize the student with the fundamental principles of nutrition and the use of the literature upon the subject. Special attention is given to the economic production of foods and their utilization for human and animal food purposes.  
(This course is given only in alternate years. Given during the last half of the second semester 1907.)

**Course V. Soils and fertilizers.** [One-half semester.]

**Lectures.** This course treats of the relation of soils and their fertility to the production of crops, and includes a study of the sources of plant food and the influence of tillage and manures upon the chemical and allied physical and biological changes which take place in the soil in rendering plant food available. Rock disintegration and soil production, the various types of soil formed from different kinds of rocks and their agricultural value, and the inherent fertility of soils form an essential part of the work. The control of the water in the soil, soil solutions, and leachings, the presence of injurious acid compounds, and alkaline salts, the various methods employed for the improvement of soils, soil organisms and their influence upon fertility, the organic compounds of the soil and the part which they take in soil fertility, the increase and decrease of the organic matter and the nitrogen of the soil as influenced by different methods of farming, manures, and the causes of soil exhaustion and means employed the analyses of soils, and the application and interpretation of the results, uses of commercial fertilizers, and green and farm for conservation of fertility, adaptability of crops to soils and rotation of crops as effecting the fertility of the soil are some of the topics discussed. Soil judging, rating, and scaling form a part of the work.

(This course is given in alternate years; given in the last half of the second semester 1908.)

**Course VI. (a) The analysis of foods.** [One semester.]

This work includes the determination of water, ash, starch, sugar, cellulose, pentosans, fats, proteids, and the different forms of nitrogen in food stuffs, the use of the calorimeter, and the polariscope in food analysis. Before completing the work, each student makes a complete proximate analysis of some food material. This course is planned to meet the wants of those who desire to become familiar with the methods employed in the analysis of foods and in nutrition investigations.

**(b) The analysis of dairy and animal products.** [One-half semester.]

This course includes the analysis of fodders, milk, butter, cheese, and animal feces. A special feature of the course are the determinations of volatile fatty acids, iodine absorption number, specific gravity, and the saponification equivalent of fats. The object of this course is to meet the wants of those who desire to become familiar with the methods of investigations employed in research in dairy chemistry.

**(c) The technical analysis of wheat, flour and cereals.** [One semester.]

A study of the roller process of flour production, the grading and testing of wheat for technical purposes, the testing of flour by chemical methods and the bread making value of flour as determined by comparative baking tests. Ample facilities are offered for this work as the laboratory is equipped with a complete miniature flour mill capable of producing the various grades of flour.

**Course VII. The analysis of soils and fertilizers.**

**(a) The chemical analysis of soils.** [One semester.]

Laboratory practice in the chemical analysis of soils and the study of the chemical methods employed in soil investigations. Particular attention is given to the study of the organic compounds of soil, and an opportunity is offered for the study of experimental soil work applied to field investigations.

**(b) The physical analysis of soils.** [One-half semester.]

Laboratory practice in the physical analysis of soils by means of Hilgard's eleutator, and the sedimentation methods as modified by the use of centrifugal apparatus.



Courses VII (a) and VII (b) are intended for students who desire to make a specialty of the subject of soils.

*Course VIII. Special problems.*

[One semester.]

Seminar and laboratory work in the study of special problems in Agricultural Chemistry, as the analysis of water for irrigation purposes, the adulteration of foods, dietetics, and problems in agricultural technology.

*Course IX. Chemistry of forest by-products.*

In this course a special study is made of the products of the forest other than for timber and fuel. The products studied include cellulose for the manufacture of paper, sugar, tanning materials, turpentine, tar, tar oils, resin, waxes, creosote, wood alcohol, acetic acid, acetone, essential oils, charcoal, camphor, and medicinal products. The subjects of paint and methods for the preservation of wood are also taken up.

At the beginning of the course, a short time is devoted to a review of organic chemistry, special attention being given to those compounds found in wood or closely related to it. A thesis on some subject relating to the chemistry of forest by-products is required in this course.

## ANIMAL HUSBANDRY.

Students who wish to specialize in Animal Husbandry are recommended to arrange their course in the junior and senior years as follows, and in addition elect the long course in zoology and the short course in botany.

### JUNIOR YEAR.

Botany, short, [3]  
Advanced meats and judging [3]  
Thremmatology [3]  
Elective (animal husbandry) [3]  
Elective [3]  
Elective [3]

Botany, short, [3]  
Cattle feeding [3]  
Animal breeding [3]  
Elective (animal husbandry) [3]  
Elective [3]  
Elective [3]

### SENIOR YEAR.

Animal feeding [3]  
Farm structures [3]  
Research animal husbandry [3]  
Comparative physiology [3]  
Academic elective [3]  
Elective [3]

Veterinary elective [3]  
Research animal husbandry [3]  
Nutrition studies [3]  
Academic elective [3]  
Elective [3]  
Elective [3]

### JUNIOR AND SENIOR ELECTIVES.

Anatomy [3]  
Dissection [3]  
Stock judging [3]  
Agricultural economics [3]  
Foods [2]  
Stock farm management [2]  
Crop rotation [1]  
Soiling crops [2]  
Meat studies and judging [3]  
Animal taxonomy [3]

Dairy management [2]  
Animal diseases and treatment [2]  
Animal mechanics [3]  
Stock records and compilations [3]  
Bibliography of Agricultural literature [3]  
Animal parasites [2]  
Seeds and seed judging [2]  
Animal by-products [2]  
Home dairying [2]  
Academic [3]

*Equipment.* Representatives of some of the leading breeds of cattle, sheep and swine are kept at University farm. Each year a number of experiments are under way in the feeding of these classes of animals, and breeding experiments are also undertaken with sheep and swine, and

theoretical experiments with the smaller animals. Experiments in summer feeding cattle, sheep and swine wholly or in part on pasture are carried on each year. The new live stock building just completed affords excellent accommodations for class work in stock judging. Herds of blooded stock near the institution, and the annual show of live stock at the state fair serve for extended observation of breeds and methods of management.

*Course I. Stock breeding.* [One-half semester.]

Discussion of the principles of stock breeding as affecting breed maintenance and breed formation; standards of excellence and comparison of standards of breeds; heredity and the influences affecting it; prepotency, fecundity and their relation to successful breeding; the influence of nutrition on animal growth and form and the effect of artificial conditions, early maturity, selection and pedigree.

*Course II. Feeding animals.* [One-half semester.]

The principles of nutrition and digestion as applied to economical production; feeding rations and nutritive ratios, feed stuffs and methods of feeding, feeding of breeding stock and show stock, management of animals during pasture, yard and stall feeding for the block feeding for specific production of wool or flesh, selection of animals for the feed lot, stabling suitable for the various classes of live stock.

*Course III. Stock judging.* [One-half semester.]

This course is calculated to meet the needs of students desiring to become expert stock judges and of those who wish to study animal form with a view of becoming breeders of superior animals. Score card work in combination with the presence of living specimens is a feature of this course. Students are drilled in judging from the standpoints of breed, type, form, stamina, quality, breeding capacity, suitability for feeding and for general and specific production. Special opportunities are given for judging live animals fitted for the block and in judging the dressed carcasses after slaughter, thus determining by observation the quality of animals judged.

Live stock practicums: Feeding and stable management of cattle, horses, sheep and swine, recording and calculating amounts of pasturage obtained from different forage crops, keeping herd records, writing pedigrees and recording animals, calculating feeding records and cost of production, mechanical analysis of carcasses of animals to determine total amount of meat, and proportionate amounts of fat and lean, determinations of fat and lean meat with especially designed apparatus; calculating percentages of different parts of the carcasses.

*Course IV. Stock farm management.* [One semester.]

In this course, special attention is given to the crops and rotations that fit in with live stock farming, economy of feeds and pasture production, and solution of confronting problems is made the leading feature.

*Course V. Animal nutrition studies.* [One-half semester.]

Original work in solving some special live stock problems related to meat production followed by a thesis; sufficient work must have been done to make it reliable.

*Course VI and VII. Animal husbandry research.* [One semester.]

These two courses will consist of reviewing literature upon different phases of animal husbandry production. The experiment station records and other sources of information will largely be used. This together with original work will form the basis of extended compilation of valuable material on live stock husbandry.

*Course VIII. Advanced meats and judging.* [One semester.]

This course is designed especially for studying meat making animals and their products. Under general guidance each student makes up rings of animals which he studies in detail, at every step from the live state until the different parts are cooked and tested at the table. Full records and conclusions as well as illustrations are required in thesis form.

*Course IX. Meat studies and judging.* [One semester.]

Work along this line is a continuation of that begun in course VIII. More attention is given the more important details concerning meats and a minute study of its physical and chemical composition is required.

*Course X. Stock records and compilation.* [One-half semester.]

This will consist of a thorough study of systems of keeping and compiling stock records upon stock farms and at Experiment Station. Sufficient actual practice will be required to become familiar with live stock records.

*Course XI. Animal by-products.* [One-half semester.]

Individual study of the by-products manufactured at the large packing houses will be required of each student. The value and place that each has in economic use is considered.

*Course XII. Animal mechanics.* [One-half semester.]

A study of the mechanical effects of different relationships of bone and muscle in the animal body. This applies particularly to horses. The entire feet and legs as well as the body will be studied and made clear by apparatus and original illustrations.

## DAIRY HUSBANDRY.

*Equipment.* Students in the college course have the advantages of the equipment of the dairy school. The feeding and breeding experiments in the dairy division of the experiment station serve a most useful purpose in the collegiate instruction. The cordial relations existing between the department of agriculture and the other state institutions are often advantageous to college students well advanced in dairy work.

Representatives of several breeds of cattle are kept for class use. Herds in the vicinity and those shown at the state fair are useful to students in this course.

*Course I. Dairy stock and dairy farm management.* [One semester.]

Lectures, first semester, three hours per week. Practice work one hour per week. This course is given during the first semester. The lectures cover the breeding, rearing and management of dairy stock, the points and characteristics essential in animals intended for the dairy practice work in judging dairy stock, and the management of the dairy herd.

*Course II. Feeds and feeding.* [One semester.]

This course consists of lectures covering scientific and practical questions underlying the principles of feeding. Practice work is given in formulating rations, in estimating the comparative value of food stuffs and in other problems connected with the subject.

*Course III. Factory dairying.* [One-half semester.]

This is offered during the session of the dairy school, beginning November 20. Lectures in the forenoon on dairy bacteriology, dairy chemistry, the care of milk and cream, lactic cultures, flavors, creamery milk, cream ripening and churning, working and packing butter. In the afternoon students are given two and a half

periods practice in the factory training rooms and in the dairy laboratory.

**Dairy practicums:** Students are offered training two semesters in compounding rations, feeding cows, rearing calves, milking and many other details in the management of the dairy herd; operating hand separators, and other modern farm dairy appliances, the manufacture of butter and cheese and work in the dairy laboratories.

### ENTOMOLOGY.

Students who have completed the entomology offered in the school of agriculture, or its equivalent, may elect course I or course II.

College freshmen take Zoology and Entomology with the graduating class of the School of Agriculture. This course not only treats of injurious insects but also deals with the four footed pests of agriculture, such as rabbits, gophers, squirrels, etc., as well as injurious and beneficial birds.

*Course I. General entomology.* [One semester.]

Structure and classification of insects. The dissection of type, life history and habits of leading forms. Each student is required to make a collection of at least fifty insects.

*Course II. Economic entomology.* [One semester.]

Lecture upon injurious insects of Minnesota and best methods of combating same. The use of insecticides and spraying machinery. Beneficial insects.

*Course III. Forest entomology.* [One semester.]

The students in this course must have a thorough, practical training in elementary entomology and economic entomology in order to put into practical use in field work the principles to be learned in both of these courses. He must take course I at some time during his course in forestry, which is to be followed by course II; the two, however, can be taken together if the student's time permits. The student will be directed in a special study of insects affecting the forest and will be encouraged in doing field work, in collecting, identifying, and in the life history of forest insects.

Open only to students in the forestry course.

*Course IV. Comparative anatomy and histology of insects.* [One semester.]

A detailed study of structure of representatives of different orders of insects.

Six periods of laboratory work and one lecture. Must be preceded by course I or its equivalent.

### FARM STRUCTURES.

Lectures and practicums in designing and construction of farm barns, farm houses, silos, outbuildings and conveniences; cement floors, walls, troughs; painting farm buildings; farm water systems, wells, cisterns, tanks; house heating and plumbing systems.

### VETERINARY MEDICINE AND SURGERY.

The new veterinary building gives ample facilities for laboratory and clinical work. The hospital furnishes a variety of cases for study and demonstration. The dissecting room affords material and opportunity for

studying the digestive organs and locomotor apparatus. A large and well stocked museum affords ample material for illustrations.

Instruction is given by text-book, lectures, collateral reading and by practice work in the hospital. The lectures are illustrated by means of skeletons, manikins, charts and by the living animal. Anatomy of locomotion, conformation, the digestive organs, and the higher physiology of digestion are given prominence. All the diseases studied in Course IV are discussed with especial reference to causes and prevention.

Infectious diseases of domestic animals are studied with references to causes, recognition, prevention and methods of control. Certain medicines which the intelligent stockman should understand are studied with reference to uses, doses and methods of administration. The work in this department continues through two semesters.

*Course I. Anatomy.*

[One-half semester. '06-'07.]

Comparative anatomy of the digestive organs, dissection, collateral reading and recitation.

Strangeway's Veterinary Anatomy is taken as text and guide and Chauveau is used for reference and comparison.

*Course II. Body nutrition.*

[One-half semester.]

This is an advanced study of the veterinary physiology of digestion, taking up the digestive fluids, nervous mechanism of digestion, absorption and digestion of grains and fodders. It also includes a study of body nutrition, body income and expenditures, sources of heat supply and heat loss, and metabolism. Veterinary physiology, by F. Smith, is used as a text and guide for this work but students are required to do collateral reading.

*Course III. Anatomy.*

[One-half semester '07-'08.]

This course deals with the anatomy and mechanics of locomotion and conformation. The bones, articulations and muscles involved in locomotion and conformation are studied by text book, dissection and collateral reading. Shoeing, diagnosis and treatment of common forms of lameness may be included in course III. Strangeway's Veterinary Anatomy is used as a text book and Chauveau for reference.

*Course IV. Diseases of domestic animals.*

[One-half semester '07-'08.]

Lecture and text book work on the diagnosis and treatment of common diseases; common medicines in their doses, uses, dangers and methods of administration.

## HORTICULTURE.

*Equipment.* In the college course in horticulture students are expected to avail themselves of the excellent facilities afforded by the nurseries, orchards, gardens and forest garden of University farm and the collections in the museums of the University. They will also find that the vicinity offers many especially good lessons in nursery work, landscape gardening, fruit growing, vegetable gardening and greenhouse management.

*Course I. Fruit growing.*

[One-half semester.]

Lectures. The study of the geography of fruit growing: outlook for fruit growing, planting, tilling and fertilizing of fruit lands; diseases and insects injurious to fruits, spraying, harvesting, and marketing varieties of vegetables.

- Course II. Systematic Pomology.* [One semester.]  
Lectures. A general course in the study of cultivated fruits, their cultivation and classification.
- Course III. Plant breeding.* [One-half semester.]  
Lectures and laboratory work. The fact and philosophy of variation: crossing of plants, origination of domestic varieties.
- Course IV. Nursery work.* [One-half semester.]  
Lectures and laboratory work. Seedage, layerage, cuttage, graftage, planting, pruning, thinning, storage of nursery stock, tillage of nursery lands, insects, diseases injurious to the nurseries and their prevention.
- Course V. Floriculture.* [One-half semester.]  
This course will include the work outlined in course III, but in addition instruction will be given in the growing of flowers in the open borders in summer, and practical work in this line will be required.
- Course VI. Green houses and their management.* [One-half semester.]  
Lectures and laboratory work. Greenhouse construction and management, temperature, soil, watering, benches, propagation by seeds, cuttings, layers and graftage, prevention of diseases and extermination of insects injurious to vegetables, rest and growth periods of plants, plants for greenhouse cultivation.
- Course VII. Vegetable growing.* [One-half semester.]  
Lectures. Geography of vegetable growing, tilling and fertilizing vegetable lands, irrigation and rotation of crops, seed growing and seed testing, vegetables under glass, pollination, diseases and insects injurious to vegetables and their prevention, harvesting and marketing varieties of vegetables.
- Course VIII. Landscape gardening.* [One semester.]  
A general course in the principles and practice of landscape gardening, special attention being given to the planting of small grounds.

#### EDUCATIONAL OPPORTUNITIES FOR FORESTRY.

There are many and obvious reasons why instruction in forestry is especially adapted to fit in with the courses offered in a large University. It will be noted that this course offers to students not only studies which will fit them especially for forestry, but will fit them for general service. At present there is little forestry work undertaken by the state of Minnesota except that of fire protection, but the outlook seems to warrant the statement that the next few years will see much undertaken that will need the assistance and direction of properly trained foresters. Perhaps there is no situation where a forestry school has more natural advantages than here, as this state is still one of the largest lumber producing states, and the opportunities of seeing lumbering carried on in the best manner are most excellent. The establishment of the Chippewa Forest Reserve and its management by the Bureau of Forestry give opportunities which few other sections possess to study the best methods of forest management. The Minnesota Forest Reserve Board has recently acquired twenty-one thousand acres of timber land which it proposes to develop as a state forest and game preserve. In its development, it is expected that student help will be used as far as possible. Opportunities are here of-

ferred to see, and in many cases to take part in the scaling and estimating of timber, and to work in lumber camps for good pay at practical lumbering operations.

In addition to these general facilities and all of the opportunities offered by the University, students in the forestry course have all the privileges of the collections in the arboretum and forest garden of University farm. The state fish hatchery is nearby and furnishes students excellent opportunities to become acquainted with this important subject, on which a short course of lectures will be given.

General C. C. Andrews, the Chief Fire Warden of Minnesota, will give a course of lectures on the prevention and suppression of forest fires in which work he has been eminently successful.

#### PLAN OF INSTRUCTION.

The regular course in forestry is a four years' course intended to prepare men to take charge of independent forest properties, or for the government forestry service, or for positions of teachers.

The first year in this course, for those who enter other than from the Minnesota School of Agriculture, deals with the elementary agricultural subjects with which it is important for every manager of rural properties to be familiar. The forester from the very nature of his surroundings will be largely thrown on his own resources and should be capable of advising as to the best way of managing the farms or grazing lands that are almost always included in large forest properties. The sophomore year and one-half of each of the junior and senior years are devoted to the study of the basal natural sciences underlying the practice of forestry, and to such academic and engineering studies as seem especially desirable here. While French is made optional with German, it is expected that German will be taken in most cases, as it is the most helpful language for those who are to study forestry literature. An opportunity will be afforded to take Spanish, as it may be especially desirable to those who contemplate entering the Philippine forestry service. One-half of each of the senior and junior years are devoted to the study of technical forestry, an important part of which consists of field work and excursions. Every student is required before graduation to take four weeks' work in some approved lumber camp, so as to become familiar with common lumbering operations.

Especial emphasis is laid on the value of field work and excursions. This consists in excursions to nearby forests; to lumber camps, saw mills, wood manufacturing and paper mills; to the Boom Company's works on the Mississippi river; to nearby nurseries, and it is expected that arrangements will be made which will afford an opportunity for students to visit some of the forests of Montana, Idaho and Washington at a very low

rate. Excursions are also frequently made in connection with the study of botany, geology, zoology (and nursery practice).

## OUTLINE OF COURSE IN FORESTRY.

### FRESHMAN YEAR.

Students entering the forestry course will be required to take the freshman year the same as other students of the college of agriculture.

### SOPHOMORE YEAR.

#### FIRST SEMESTER.

Botany, short, [3]  
Rhetoric [1]  
Zoology I [3]  
Forest Entomology [3]  
Scientific German [3]  
Elements of Economics [3]  
Agricultural Physics [1½]

#### SECOND SEMESTER.

Botany, short, [3]  
Rhetoric [1]  
Trigonometry [1½]  
Zoology I [3]  
Scientific German [3]  
Essentials of Physical Geog. [3]  
Agricultural Physics [1½]

### JUNIOR YEAR.

#### FIRST SEMESTER.

Taxonomy [3]  
Industrial Botany [3]  
Forest By-products [2]  
Surveying [3]  
Drawing I [2]  
Mycology [3]

#### SECOND SEMESTER.

Taxonomy [3]  
Plant Ecology [3]  
Wood Technology [3]  
Mensuration [3]  
Silvi culture [2]  
Law, Elements of Contracts [1]

### SENIOR YEAR.

#### FIRST SEMESTER.

Lumbering [3]  
Utility [2]  
Management [3]  
Protection [2]  
Economics [2]  
Landscape Gardening [3]

#### SECOND SEMESTER.

Silviculture [3]  
Utility [2]  
Seminary [3]  
Working Plans [3]  
Forest Literature [2]

*Practicums in forestry:* Four practicums are required in the course in forestry, viz.: In forest exploitation, forest working plans, forest mensuration, nursery practice. A thesis must be presented in each of the four subjects, giving the results of personal observation.

*Forest influence and utility:* Influence of forests on precipitation, surface and sub-surface run-off and on springs, on frost, on winds and wind storms.

*Forest mensuration and valuation:* Methods of determining the volume of felled and standing trees, of whole forest growths; timber estimating. Determining the rate of increase in single trees and forest areas, determining present and future money value of forests.

*Lumbering:* The harvesting of forest products, logging—including transportation, milling and preparation of the wood for market.

*Silviculture:* (a) Sylvicultural characteristics of trees, methods of regeneration, improvement cuttings, nursery practice. (b) Characteristics of the great typical forest areas of the world.



*Forest economics.* History of development of modern forestry, forest conditions here and abroad, relation of the state to forests, forest policies of foreign nations.

*Forest administration.* A working plan and rules of management for a specified forest area; state and national forest policy.

*Wood technology and diseases of wood.* Study of the characteristics of commercial woods and their uses. Impregnation of woods, fuel value of woods.

*Chemistry of forest by-products.* This course will be found outlined under the head of chemistry, course IX.

*Forest entomology.* (This course will be found outlined on page 47.)

*European forests.* Lectures on the condition in European forests.

*Forest protection.* Protection of the forest against trespass, fire, insects and diseases; method of preventing washing of soils.

### COURSE IN HOME ECONOMICS.

*Purpose and scope.* The courses in home economics offered in the college of agriculture are open to graduates from the school of agriculture who have taken the work of the intermediate year, and to graduates of approved high and normal schools. It is intended to bring to the vocation of home making the same kind of help which the course in agriculture brings to the business of farming. Aside from the universal need of education of this character there is a marked and increasing demand for trained women to fill institutional positions, not only as special teachers in the several divisions of home economics, but also in administrative positions as competent supervisors of supplies and of hygiene where large numbers are cared for in collective-house-keeping.

An especial effort is being made to train women to teach Domestic Science and Domestic Art in colleges, high schools, consolidated rural schools, and in other institutions where girls attend school.

A four year course is offered in home economics, leading to the degree of Bachelor of Science in Home Economics. In addition a short two years normal course (page 54) is offered in home economics, which includes all the special technical subjects given in the four years course, but does not include the required general cultural studies. Those who complete this course receive a certificate.

Graduates of other reputable colleges can here secure a Bachelor's degree by devoting two years to the subject of Home Economics. The major work must be done in Home Economics and one or both of two minors must be completed under the advice of the college committee, in one of the other divisions of the College of Agriculture, or in the College of Science, Literature and the Arts.

The special technical work in the course of Home Economics is given

in the Agricultural Department at St. Anthony Park. The descriptions of the general culture studies of the Home Economics course are given in the catalog of the College of Science, Literature and Arts. These courses include mathematics, languages, literature, botany, zoology, psychology, history of education, etc.

OUTLINE OF COURSE IN HOME ECONOMICS.

FRESHMAN YEAR.

Division "A" required for those who are graduates of the school of agriculture only. (Numbers after subjects indicate number of hours per week.)

FIRST SEMESTER.

Mathematics [3]  
Geology [3]  
German or French [5]  
Rhetoric [3]  
Drawing [3]  
Physical Training [2]  
Practicums [1½]

SECOND SEMESTER.

Mathematics [1½]  
Chemistry [1½]  
German or French [5]  
Rhetoric [3]  
Drawing [3]  
Physical Training [2]  
Practicums [1½]

FRESHMAN YEAR.

Division "B."

For graduates of approved high schools or others of equal standing. Students in this division take part of their work in classes of the school of agriculture. For descriptions of these courses, see statement under School of Agriculture.

SEPTEMBER.

Agriculture [3]  
Dairy chemistry [3]  
Fruit growing [3]  
Home management [2]

Cooking [4]  
Laundry work [2]  
Sewing [4]

FIRST TERM.

Dairying [2½]  
Agricultural chemistry [5]  
Fruit growing [3]  
Entomology [5]  
Physics [5]  
Forestry [3]

Physical culture [2]  
Cooking [4]  
Social culture [1]  
Sewing [4]  
Household art [1]

SECOND TERM.

Vegetable gardening [3]  
Plant propagation [3]  
Domestic chemistry [5]  
Drawing [4]  
Dairy husbandry [2]  
Economics [3]

Cooking [4]  
Home economy [1]  
Sewing [4]  
Meats [1]  
Domestic hygiene [1]

LAST HALF OF SECOND SEMESTER.

Farm accounts [4]  
Poultry [3]  
Chemistry [4]

Cooking [4]  
Sewing [4]  
Live stock [2]

SOPHOMORE YEAR.

FIRST SEMESTER.

Chemistry [3]  
German or French [3]  
English Literature [3]  
Botany, short, [3]  
Zoology, short, [3]  
Elective [3]

SECOND SEMESTER.

Chemistry [3]  
German or French [3]  
Elements of Psychology [3]  
Botany, short, [3]  
Zoology, short, [3]  
Elective [3]

## JUNIOR YEAR.

FIRST SEMESTER.  
 Domestic Economics I [3]  
 Domestic Science III [3]  
 Domestic Art I [3]  
 History of Education [3]  
 Bacteriology [1]  
 Elective [3]

SECOND SEMESTER.  
 Domestic Science I [3]  
 English Literature [3]  
 Agr. Elective [3]  
 History of Education [3]  
 Foods [2] Course IV.  
 Elective (Elements of Am. Gov.) [3]

## SENIOR YEAR.

FIRST SEMESTER.  
 Physiology [3]  
 Domestic economics II [3]  
 Science II [3]  
 Educational Psychology [3]  
 History of English Literature [3]  
 Elective [3]

SECOND SEMESTER.  
 Domestic art II [3]  
 Floriculture or other Hort. [3]  
 Practice of Secondary Teaching [3]  
 Elective [3]  
 Elective [3]

## NORMAL COURSE.

FIRST SEMESTER.  
 Domestic economics I [3]  
 " Science III [3]  
 Bacteriology [1]  
 Domestic art I [3]  
 Rhetoric [1]  
 Physiology [3]  
 Zoology [3]  
 Practice teaching [3]  
 Elements of Psychology [3]  
 Physical training [3]

SECOND SEMESTER.  
 Domestic economics II [3]  
 " science I [3]  
 Domestic art III [3]  
 Domestic art II [3]  
 Rhetoric [1]  
 Drawing [3]  
 Zoology [3]  
 Practice teaching [3]  
 Child psychology [3]  
 Physical training [3]

During the Junior or Senior years the student is required to elect Course III in chemistry.

When approved by the dean and college committee, other subjects given in the college of science, literature and the arts, or in the college of agriculture, may be substituted for the prescribed subjects in the course in home economics.

Women who are sufficiently advanced may study music or art during the junior or senior years, provided that no student may receive more than two semesters' credits in music and art together.

## EQUIPMENT.

The class rooms and laboratories of the school of agriculture, also the equipment of the state experiment station, are available for purposes of instruction and research.

The courses in physical and biological sciences, in English language and literature and in philosophy and history, which are given in the college of literature, science and the arts, are open to students taking this course, as are also the college laboratories and the courses given in agriculture.

The class room devoted to instruction in sewing, garment drafting and the judging of textile fabrics is commodious, well lighted and fur-

nished with the usual accessories, including collection of vegetable and animal fibres showing the successive stages in manufacture from the raw material to the finished fabric. The school museum of birds of Minnesota is utilized in the study of color and its combinations.

The rooms for instruction in cooking, dining room service and laundering, contain the necessary appliances for manual practice and for demonstration lectures. Specimens of manufactured foods, samples of cooking, laundering utensils and materials, dining-room and kitchen furniture, are provided. The facilities of the city markets give practice in marketing. The proximity of Minneapolis and St. Paul, in which are found large flour mills, manufactories of cereal foods, canning and pickling factories, and other establishments which prepare food stuffs, make it possible for the classes to visit many places where facts of value are learned. The large public dining-rooms with their kitchens, and the commercial laundries also offer opportunities for gaining valuable practical knowledge in these branches of household science.

The library of the college of agriculture contains a carefully selected collection of books relating to the subject of home economics.

## COURSES OF INSTRUCTION IN HOME ECONOMICS.

### CHEMISTRY.

Two and one-half semesters of chemistry are required in the freshman and sophomore years. This work is taken along with the classes in the course in agriculture, and includes courses I and II, outlined on page 328. Should the student desire, special facilities are offered for advanced elective work in the Chemistry of Foods, course IV, and the analysis of foods, course VI. Nutrition investigations, including the digestibility of foods, the chemical changes which take place in cooking, and the losses in the preparation of foods form a part of the Experiment Station work; this offers an opportunity for students to study methods of investigation relating to human food problems. Laboratory practice is also offered to advanced students in the study of household problems in which chemistry is involved. Special classes are also formed for the study of dietary problems.

### DOMESTIC ART.

A course of study is provided in those branches which are related to healthful and appropriate clothing for the body and to household decoration. The work is taken up in the junior and senior years. It is not confined to sewing or actual home adornment, but covers a number of branches of hand work connected with the home and adapted to the public schools and to industrial education. Needlework, raffia work, weav-

ing, basketry, cord work, crocheting and knitting are included. Each subject is considered in its simplest form for teaching very young children, and also in its possibilities of greater skill for more advanced grades.

Weekly lectures on related subjects are given. Historic costumes are studied in this manner, with lantern views of costumes worn during noted epochs. Their values are compared and designs selected showing possibilities of adaptation to modern dress.

Under the heading of Domestic Art is given the planning of the house and grounds. Architecture is studied in relation to the practical needs of the home and with due regard to grace and beauty therein. The course will also include the economical and tasteful arrangement of the interior of the house and its furnishings.

(Unless otherwise specified, all courses are three credit-hour courses.)

*Course I. A study in textiles.*

Animal and vegetable fibers, weaves and dyes, testing fabrics for household use and personal wear, the hygienic values of various fabrics and harmony of color. This course is designed especially to assist the teaching of sewing in graded schools, and includes the preparation, explanation and making of models suited to grade work in the public schools.

*Course II. Design and garment drafting.*

In the senior year the student is required to design and draft children's and adults' garments, and to write a thesis on some subject pertaining to domestic art.

*Course III.*

Includes lectures and practice work. It takes up the location and building of the home, its arrangement and furnishing, its decoration and all the details connected with its comfort and adornment. Pottery will be studied in its simpler forms, also color combinations and textiles.

### DOMESTIC ECONOMICS.

The lectures are intended to give breadth, strength and thoroughness to the concept of home.

*Course I. The evolution of the family.*

Lectures twice a week during the first semester of the junior year. The evolution of the family from primitive conditions, the family as a social and economic institution, the relation of the home to civic life.

*Course II. Home administration.*

Lectures twice a week during the first semester of the senior year. The organization of a home, generic lines of expenditure; domestic service, disposal of waste, the home as a place and an opportunity for the right development of the physical and spiritual natures.

*Theses.* The theses required in the junior and senior years are upon some one special branch of domestic economics—distribution of income, home sanitation, hygienic furnishing, household fabrics, food, et cetera, and are intended to familiarize the student with the best sources of information upon the subject; a bibliography of the subject treated is required.

### DOMESTIC SCIENCE.

This work is designed especially to prepare women for home-makers and teachers. It is a continuation of the instruction given in the Agri-

cultural High School, but is more elaborate and goes more into detail.

Normal students are required to study methods of teaching, and to direct some class work under an instructor. The object of such training is to have the graduates understand the principles underlying successful work in the school room, that they may be able to create for their pupils a wholesome atmosphere and foster self activity in the school room because of their own efficiency.

*Course I. Food economics.*

[One semester.]

Selection of food materials: (1) Marketing; buying by sample; cost and value; quality as to freshness, flavor, etc. (2) Storage and care of foods, care of cupboards, cellars, refrigerators. (3) Selection, preparation and serving of foods for large numbers; equipment of large kitchen, serving rooms and dining rooms. (4) Kitchen practicums, arrangements, equipment and methods of directing practice work in cooking.

Preparation of foods: (1) Meat products, as beef tea, beef powder and beef extracts; (2) Cereal products and materials made from flours and meals, methods of aerating dough, leavening agents, etc. (3) Manufactured beverages, as cocoa and koumiss, matzoon, etc. (4) Condiments and spices; (5) Confections, as candies and sweetmeats; (6) Sweets, as sugars and syrups; (7) Commercial bakery products, as breads, biscuits, crackers, wafers, etc. (8) Preserving by drying, canning, refrigerating; and with preservatives, salts, sugars, spirits, fats and acids.

A thesis with bibliography on some special topic of household science is required.

*Course II. Management of kitchen and dining room.*

[One semester.]

1. The kitchen:
  - a. Kitchen equipment.
  - b. Kitchen sanitation.
  - c. Labor saving devices.
  - d. Disposition and utilization of kitchen wastes.
2. The dining room:
  - a. Equipment, furniture, decorations, china, silver, glass-ware and linens.
  - b. Management; setting the table; garnishing and table decorations.
  - c. Table service; reception refreshments; formal dinners, etc.
3. Household inventories.
4. Bills of fare and selection of food for the dietary, in rural homes, in urban homes, in public institutions, in boarding houses, in restaurants and hotels.
5. Fancy Cookery; meat dishes, vegetable dishes, fruit dishes, pastries, ices, candies, sweetmeats, chafing dish cookery.

*Course III. Laundering.*

[One-half semester.]

Removing stains; dyeing; setting colors; cleaning delicate fabrics, as silks, laces and fine wools; the use of cleaning agents; as soaps, volatile oils, and other chemicals; starches and bluing. Commercial laundering and cleaning; power washing and ironing machinery; drying apparatus, etc.

THE SCHOOL OF AGRICULTURE

# The School of Agriculture

## FACULTY

CYRUS NORTHROP, LL.D., *President.*  
WILLIAM M. LIGGETT, *Dean.*  
DEXTER D. MAYNE, PRINCIPAL, *Practicums, Economics.*  
SAMUEL B. GREEN, B. S., *Horticulture, Forestry.*  
J. A. VYE, *Accounts.*  
HARRY SNYDER, B. S., *Agricultural Chemistry, Soils.*  
T. L. HAECKER, *Dairy Husbandry.*  
M. H. REYNOLDS, M. D., V. M., *Comparative Physiology, Veterinary Science.*  
J. M. DREW, REGISTRAR, *Blacksmithing, Poultry.*  
ANDREW BOSS, *Agriculture, Animal Husbandry.*  
WILLIAM BOSS, *Carpentry, Power Machinery.*  
JUNIATA L. SHEPPERD, M. A. *Cooking, Laundering, Home Economics.*  
MARGARET BLAIR, *Sewing, Household Art.*  
FREDERICK L. WASHBURN, M. A., *Zoology, Entomology.*  
EDITH SNELL, B. L., *Algebra, Geometry.*  
W. L. OSWALD, *Agricultural Botany.*  
KARL A. MACHETANZ, B. A. *Director of Gymnasium, History.*  
ALVAH M. BULL, *Drawing, Farm Buildings.*  
ESTELLE COOK, *English.*  
GRACE B. WHITRIDGE, *Physical Training.*  
FLOY KESSON, *Music.*  
FANNIE C. BOUTELLE, *Preceptress, English, Social Culture.*  
A. L. EWING, M. S., *Agricultural Physics.*  
D. B. HOWELL, *Mathematics.*  
EDWARD SIGERFOOS, Ph. B., *Capt. 5th U. S. Infantry, Military Science & Tactics.*

### ASSISTANT INSTRUCTORS.

JOHN A. HUMMEL, B. Agr., *Agricultural Chemistry.*  
MARY L. BULL, *Cooking, Laundering.*  
COATES P. BULL, B. Agr., *Agriculture, Rural Engineering.*  
LEROY CADY, *Horticulture.*  
A. G. RUGGLES, M. A. *Entomology.*  
C. C. LIPP, D. V. M., *Comparative Physiology.*  
D. A. GAUMNITZ, M. Agr., *Animal Husbandry.*  
A. D. WILSON, B. Agr., *Agriculture.*  
E. C. PARKER, B. Agr., *Agriculture.*  
GEO. CRAIG, *Animal Husbandry.*  
WM. A. PETERSON, *Horticulture.*  
ALICE JACKSON, B. A., *English.*  
E. G. CHEYNEY, A. B., *Forestry.*



## Committees, School of Agriculture

LIBRARY : Mayne, Reynolds, Snyder, McIntyre.

CATALOG : Vye, Snyder, Drew.

MILITARY DRILL : Sigerfoos, Green, Haecker.

ENTERTAINMENT : Mayne, Boutelle, A. Boss.

PROGRAM : Andrew Boss, Drew.

HEALTH : Reynolds, Mayne, Boutelle, Washburn.

DAIRY SCHOOL : Haecker, Wm. Boss.

SHORT COURSE FOR FARMERS : Drew, A. Boss, Green.

CO-OPERATIVE SOCIETIES : Vye, A. Boss, Snyder.

AUDITING : Snyder, Vye, A. Boss.

# School of Agriculture

## CLASSIFICATION OF STUDENTS.

No student with incomplete C or preparatory work, or more than one incomplete B subject will be classified as an A, excepting high school graduates.

No student with incomplete preparatory work, or more than one incomplete C subject, excepting high school graduates, will be classified as a B.

No student with incomplete C or preparatory work will be made a commissioned military officer.

## STUDENTS IN DORMITORIES

The Principal 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.

From 8:15 a. m. to 4:30 p. m. students not at recitations or chapel are expected to be in their rooms or the library studying or reading, also after 7 in the evening.

The rooms shall at all times be quiet, especially in the evening, so that no student may be disturbed.

The cadet officers shall make daily inspection of the boys' dormitories, under proper supervision of the instructors.

## HOLIDAYS.

On Lincoln's birthday, February 12th, the regular classes of the last two periods in the forenoon will be omitted and a suitable program substituted.

There will be no regular classes on Washington's birthday, February 22nd, but the day will be observed by appropriate exercises.

## TIME OF OPENING.

The School of Agriculture opens October 1st, 1906, and closes March

20th, 1907. The fall term closes at noon, Friday, December 21st, and the winter term begins Wednesday, January 2nd, 1907.

Instruction begins promptly at the opening of each term, and students are required to be present the first day of the term and to remain until the close of the term.

Students are advised to correspond with the registrar of the school, J. M. Drew, St. Anthony Park, St. Paul, Minnesota, prior to coming to the institution, and to make the necessary preliminary arrangements for registration. Students registered in the fall term will not be received after the second day of the winter term, unless a reasonable excuse is presented for the delay.

#### LOCATION.

The School of Agriculture is located on University Farm, St. Anthony Park, St. Paul, Minnesota, about midway between the business portions of the cities of St. Paul and Minneapolis. Directions for reaching the school are given on page 11. The School of Agriculture is a part of the University of Minnesota and is governed by the University Board of Regents.

#### PURPOSE.

The School of Agriculture was organized in 1888 with the object of giving a practical education to the young men and women who are unable to pursue the full college course in agriculture. It offers a practical course of study designed to fit young men and young women for successful farm life, and aims to give to its students the necessary preparation for useful citizenship.

#### COURSE OF STUDY.

The course of study offered covers a wide range of subjects and is largely technical in character, but provision is made for some instruction in English and mathematics. The course is briefly outlined on pages 328 and 329. Instruction is given in the work shop, laboratories, barns and fields, as well as in the class room. The course requires three winters of six months each for completion, and is co-educational. Much of the work is taken in common by the young men and the young women. Some of the subjects, such as blacksmithing, carpentry, field work, handling grain and machinery are taken by the young men, while the young women pursue cooking, sewing, laundering and household art. The methods of instruction tend to educate students toward the farm instead of away from it, and to develop in them a love for farm life by showing them its possibilities. In this respect the school has been very successful as over 80 per cent of its graduates continue agricultural pursuits.

### HOME LIFE ON THE CAMPUS.

The life of the students while attending the School of Agriculture is subject to supervision.

Students residing in the school dormitories are not allowed to leave the grounds without permission.

The home life of each student is carefully guarded, and everything done to promote a healthful moral atmosphere.

The use of tobacco on the grounds, and the use of spirituous liquors of all kinds is strictly forbidden.

Any one 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.

### HOW TO GET TO THE SCHOOL.

Check all baggage to St. Paul or Minneapolis.

Monday and Tuesday, October 1st and 2nd, members of the Y. M. C. A., wearing lettered badges, will be at the Union Station in St. Paul, and at the Union, Milwaukee, Great Western, Soo and St. Louis Stations in Minneapolis, to meet and direct new students. Take the Como-Harriet car from either St. Paul or Minneapolis and get off at Commonwealth avenue. A charge of 25 cents is made for transporting trunks at the opening of the school. No charge is made for the return of the baggage, at the close of school, provided it is ready to go on the days assigned.

### ADMISSION.

All male students are required to have had six months' farm practice before entrance.

Parents are advised not to send pupils under fifteen years of age, unless they are unusually proficient in the common branches.

Applicants for admission are examined in English grammar, arithmetic, history of the United States, geography and spelling, unless they present state certificates or approved county diplomas showing that they have completed the eighth grade work in these subjects. Students from city or village schools are not admitted until their former school records have been passed upon by the Registrar. These certificates should be presented at least three weeks prior to the opening of school. Applicants whose home schools do not afford complete instruction in these common branches may be admitted with not more than two conditions, which must be removed according to instructions given the student upon admission. State High School Board certificates are accepted for work in English, physiology, algebra, geometry and civics.

### REQUIREMENTS FOR GRADUATION.

First—The completion of the prescribed course of study with an honorable standing in department.

Second—An essay of not less than one thousand words upon a topic connected with agriculture or home economics.

Third—For young men, a practical experience in field work at the University farm or elsewhere, as shall appear in reports received from responsible sources.

### FEEES.

With the exception of an entrance fee of \$5 to residents, and \$10 to non residents, the school makes no charge.

### EXPENSES.

The school expenses for the year do not exceed \$85. This amount does not include the cost of the required military suit for the young men, traveling and personal expense.

The cost to the student for board, heat, light and laundry is the actual cost of maintaining the table and caring for the buildings. This has not exceeded \$3 per week. Each month's board is paid in advance. The buildings are all lighted by electric lights and warmed by steam. The sleeping rooms are each furnished with a bedstead, mattress, dressing-bureau, chair and table.

No deductions in charges are made for absence of less than four days. If students are compelled to be absent for that length of time they are allowed half rates if they make arrangements before leaving.

Text books are furnished at a rental of \$2 per year to students who do not desire to purchase.

Each student is required to pay for breakage of apparatus used in practical work.

A competent nurse is kept on the ground to care for the sick. To meet this expense each student pays 75 cents per term.

For the purpose of supplying, calcimining and painting the sleeping rooms, a reserve fund is created by assessing each one occupying them \$2.00.

A deposit of \$5 is required of each student, as a guaranty for the return of all books and other articles borrowed.

On entering school the student makes a payment of \$12 board; \$5 deposit; \$1 book rent and reading room; 75 cents maintaining nurse; \$5 entrance fee; \$2 reserve fund; total \$25.75.

All male students are required to provide themselves with the prescribed uniform, which consists of navy blue blouse, trousers and cap,

and is as neat and economical a dress as the student can obtain. The suit complete, to measure, is furnished under special contract for \$12.25.

Each student provides four sheets, one pair of blankets, one quilt, one bed spread, one pillow, three pillow cases, towels, napkins, comb and brushes.

An assignment of rooms will be made at 9 a. m., March 16, which will hold good until 8 p. m., the first day of the following school year. Students wishing to retain their rooms, after vacation, must be on hand when the second term opens, or pay one-half the price of board and room for the time they are late. Students arriving after the dormitories are filled are compelled to find rooms elsewhere, but are allowed a rebate of \$3 per month.

#### STUDENTS' DEBATING 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.

Each student should associate himself with one of these societies as early in his course as possible.

#### LECTURE COURSE.

During the school year, a lecture and entertainment course, consisting of six lectures and concerts, is given in the chapel at a cost of seventy-five cents for the series. These entertainments are strictly high grade, and furnish a pleasant relaxation from school work, as well as mental stimulus.

The following program, which was provided during the past year, shows the general character of the entertainments:

Music, Parland-Newhall, Bell Ringers and Quartette, October 30; David Harum, November 14, Edward P. Elliott; Footprints of the Centuries, January 8, G. A. Gearhart; Mistakes, or the Blunders of Humanity, February 5, Lou J. Beauchamp; Musicale, March 5, Eva Bartlett Macey Co.

#### STUDENTS' CHRISTIAN ASSOCIATIONS.

The Young Men's and the Young Women's Christian Associations have for their objects, social fellowship and moral and spiritual development. To this end two receptions are held each year, and Bible classes are held Sunday mornings at 8:30. A general religious service is held each Sunday at 3 p. m., and a mid-week prayer meeting each Wednesday, at 6:30 p. m. The associations are non-sectarian, so that all students may find in them an opportunity for Christian activity and mutual helpfulness.

## COURSE OF STUDY.

## FIRST (C) YEAR.

## FIRST TERM.

Agricultural botany [5]

\*Drawing [2]

Music [2]

Farm Mathematics [5]

\*Blacksmithing [2]

\*Carpentry [2]

Military drill [2]

Agriculture [3]

Gymnasium [2]

\*Practicums [2]

or

\*Cooking [2]

Physical training [2]

\*Sewing [3]

Social culture [1]

Field agriculture [3]

## SECOND TERM.

Agricultural botany [5]

English [5]

Music or literary society work [2]

Comparative physiology [5]

Study of breeds [5]

\*Carpentry [2]

\*Drawing (farm buildings) [2]

\*Blacksmithing [2]

Military drill [2]

Gymnasium [2]

\*Practicums [2]

or

\*Laundering [2]

\*Drawing (farm houses) [2]

Physical training [2]

## SECOND (B) YEAR.

## FIRST TERM.

English [2]

Agricultural physics [5]

Dairy chemistry [2]

\*Dairy husbandry [2½] { Dairy lectures  
Dairy practice  
Dairy breeds

Fruit growing [3]

Music [2]

\*Farm accounts [2½]

\*Stock judging [1]

Breeding [2]

Military drill [2]

Gymnasium [1]

or

\*Cooking [2]

Household art [1]

Physical training [2]

\*Sewing [2]

## SECOND TERM.

English [1]

Agricultural chemistry [5]

\*Dairy husbandry [2½] { Dairy stock lectures  
Dairy practice  
Dairy feeding

Music [2]

Agricultural physics [5]

Vegetable gardening [3]

Field crops [5]

Military drill [2]

Gymnasium [1]

or

\*Cooking [2]

Home management [1]

Physical training [2]

\*Sewing [2]

COURSE OF STUDY—Continued.

THIRD (A) YEAR.

FIRST TERM.

Agricultural chemistry [7]  
 Forestry [3]  
 Entomology and zoology [5]  
 Poultry [3]  
 Algebra [5] Optional

Handling grain and machinery [1]	} or {	*Cooking [2]
*Veterinary science [2½]		*Sewing [2]
Gymnasium [1]		Music [2]
Music or military drill [2]		

SECOND TERM.

Civics or geometry [4]  
 Plant propagation [3]  
 Algebra [5] Optional

Dressing and curing meats [1]	} or {	Meats [1]
*Stock judging [1]		Home economy [1]
Feeding [3]		*Cooking [3]
Soils and fertilizers [5]		Domestic chemistry [3]
*Veterinary science [2½]		Domestic hygiene [1]
		*Sewing [3]

\*Figures in brackets indicate the number of periods per week in which the subject is pursued. All work in subjects marked thus\* extends through double time in the daily program.

ASSEMBLY.

On each school day at 11:40 a. m. the students assemble in the chapel. After the opening exercises brief talks are given by the principal, members of the faculty, or invited guests.

During the year the list of speakers includes prominent 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. It has been found that this plan gives to the students an opportunity to hear men of prominence discuss a wide range of topics, many of which relate to rural and agricultural problems.

Members of the graduating class at times present essays, and discuss topics as assigned



SCHOOL OF AGRICULTURE—PROGRAM, FALL TERM, 1906.

INSTRUCTORS	8:15—9:00	9:05—9:50	9:55—10:40	10:45—11:30		1:15—2:00	2:05—2:50	2:55—3:40	3:45—4:30	4:35—5:20
Bair.....	B Household Art Sat	B Household Art Sat			ASSEMBLY	C Sewing Tu Th & Sat B Sewing Wed & Fri		C Sewing Tu Th & Sat A Sewing Wed & Fri		
Poss, A .....							B Breeding Wed & Thu		B Stock Judging Friday	
Boss, W .....						C Carpentry, Tu or Wed or Thu or Fri or Sat				
Boutelle.....			Grammar	Grammar				C Social cult Friday		
Bull, A. M.....										
Cook .....	G English	B English Tu W Th Fri	B English Tu Th	B English Tu Th			C Drawing Tu or Wed or Thu or Fri or Sat		C Drawing Tu or Wed or Thur or Fri or Sat	
Drew.....	A Poultry Tu Wed Fri									
Ewing .....	B Physics	B Physics	B Physics	B Physics						
Gaumnitz.....	C Breeds	C Breeds								
Green.....	B FruitGr'ng Tu WedThu	B FruitGr'ng TuWedThu	B FruitGr'ng TuWedThu	B FruitGr'ng Tu Wed Thu						
Haecker.....										
Howell.....	Farm Math	Farm Math	Farm Math	Farm Math						
Hummel.....						B DairyChem Fri & Sat	B DairyChem Fri & Sat			
Jackson.....			C English	C English						
Kesson.....										
Lipp.....			C Physiology	C Physiology		C Music Tu W Th Fri Sat	B Music Tu Thu Sat	A Music Tu Th Sat C Music W Fri	C Music Tu Th Sat	

Machetanz...	C Gym Sat	C Gym Saturday	C Gym. Saturday	C Gym. Saturday
Mayne.....				
Oswald.....	C Botany Tu Wed Thur Fri	C Botany Tu Wed Thur Fri	C Botany Tues Wed Thur Fri	C Botany Tu. Wed. Thur. Fri.
Parker.....			C Field Agr. Tu Th Sat	C Field Agr. Tu Thu Sat
Reynolds.....				
Shepperd.....				
Sigerfoos.....				
Snell.....	G Geom		G Algebra	A Algebra
Snyder.....		A Agr Chem	B Agr Chem	B Agr Chem
Vye.....				
Washburn.....			A Ento'logy and Zoology	A Ento'logy and Zoology
Whitridge.....	B Phys Trng Wed & Fri	B Phys Trng Wed & Fri	C Phys Trng Wed & Fri	C Phys Trng Wed & Fri
Wilson.....	C Agric'ture Tu Th Sat	C Agric'ture Tu Th Sat		

of: 11

G Hist'y Tu W Th Sat	B Gym Tu W Fri	B Gym W C Gym T Th Sat	B Gym Tu Sat C Gym W Fri
C Practicums		C Practicums	
	A Vet science T W Th Fri	A Vet science Sat	
C Cooking Tu and Wed A Cooking Fri and Sat		C Cooking Tu and Wed B Cooking Fri and Sat	
			A Drill B Drill C Drill
A Chem Lab (Girls) Tu and Th		A Chem. Lab. (Boys) W and Fri	
B Farm Accounts Fri		B Farm Accounts Tu Wed Th Sat	
A Handling Grain and Machinery Sat			

SCHOOL OF AGRICULTURE—PROGRAM, WINTER TERM, 1907.

INSTRUCTORS	8:15—9:00	9:05—9:50	9:55—10:40	10:45—11:30		11:15—2:00	2:05—2:50	2:55—3:40	3:45—4:30	4:35—5:20	
Blair .....	A Sewing Tues.		A Sewing Fri.		ASSEMBLY	B Sewing Wed & Fri		A Sewing Tu Thu & Fri			
Boss, A.....						A Feeding W Thur Sat		A, D, and C Meats Tues		A Stock Judging Tues.	Meats Wed
Boss, W.....						C Carpentry Tu or Wed or Thur or Fri or Sat					
Boutelle.....				C Gram							
Bull, A. M..						C Drawing Tu or Wed or Thu or Fri or Sat					
Bull, C. P..	B Field Crps	B Field Crps									
Cook .....	G Eng	B Eng	B Eng	B Eng							
Drew.....						C Blacksmithing Tu or Wed or Th or Fri or Sat					
Ewing.....	B Physics	B Physics	B Physics	B Physics							
Gaumnitz...	C Breeds	C Breeds									
Green .....	B Veg Gard W Thu Fri	B Veg Gard W Thur Fri	A Plnt Prop S B Veg Gard W Thurs Fri	A Plnt Prop S B Veg Gard W Thur Fri				A Plant Prop Lab Work Sat			
Haecker.....						B Dairy Lec Tues & Sat		Dairy Practice Tu or Th or Sat			
Howell .....	Farm Math	Farm Math	Farm Math	Farm Math							
Kesson.....						B Music Th		C Music Tu W Th Fri Sat		C Music Wed Fri	C Music Tu Th Sat B Music Fri
Lipp.....			C Physiology	C Physiology							
Machetanz ..		C Gym Sat Arith Tu W Thu Fri	C Gym Sat	C Gym Sat	G History Tu W Thur Sat		B Gym Tu or Thur or Fri				
Mayne .....			A Civics Tu W Thur Fri	G Economics T W Th Fri	C Practicums		C Practicums				

Oswald.....	C Botany Tu W Thur Fri	C Botany Tu W Thur Fri	C Botany Tu W Thur Fri	C Botany Tu W Thur Fri
Reynolds.....				
Shepperd.....	A Dom Hyg Wed		B Home Mang't Sat	A Home Econ'my Sat
Sigerfoos.....				
Snell.....	A Algebra	G Geom	G Algebra	A Geom Tu W Thur Fri
Snyder.....	A DomChem Th Fri Sat	A Soils and Fertilizers	B Agric'l Chem	B Agric'l Chem
Vye.....				
Whitridge....	B Phys Trn'g Wed & Fri	B Phys Trn'g Wed & Fri	C Phys Trn'g Wed & Fri	C Phys Trn'g Wed & Fri
Wilson.....	C Agric'ture Tu Thur Sat	C Agric'ture Tu Thur Sat		

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	A Vet Sci'nce Tu and Fri	A Vet Sci'nce W Thur Fri		
	A Cooking Wed h Sat		B Cooking Wed Th Sat C Laundering Tu and Fri	
				A Drill B Drill C Drill
	B Farm Accounts		B Farm Accounts	

# Courses of Instruction

## AGRICULTURAL BOTANY.

This subject is taught with special reference to its bearing upon the every day problems that present themselves to the farmer and gardener. It is profusely illustrated with plants and flowers from the greenhouses and nursery. Some instruction is given in the use of the compound microscope. Students are thus enabled to study intelligently, in an elementary way, the tissues of plants. By this means they get a clear idea of the general principles of plant structure and vegetable physiology.

## AGRICULTURAL CHEMISTRY.

In agricultural chemistry one term is given to the study of the elements and compounds which are of most importance in agriculture. This work is planned to prepare the student for intelligent study of the subject of the chemistry of foods, soils and fertilizers, and at the same time to familiarize him with the more important chemical changes which take place in every-day life. Laboratory practice forms a prominent feature of the work in agricultural chemistry. In the chemistry of foods, the composition of plant and animal bodies, the chemistry of the plant and of its food and growth, the chemistry of animal nutrition, digestibility and value of foods, and the laws governing the economic uses of foods, are some of the subjects considered. The composition and the utilization of farm crops for food purposes, and the application of the principles of chemistry to plant and animal life, form the basis of this work.

## AGRICULTURAL PHYSICS.

In this department it is the aim to enlist the student's interest in a more keen appreciation of the principles that underlie the practices of his vocation. To this end the facts with which he is already somewhat familiar are used to reach the fundamental law. For example, from his knowledge of the relation of weight to bulk in grains, soil, and water, he is led to a knowledge of volume, mass, density, weight, force, draft, specific gravity, and fluid pressure. In the laboratory he makes definite determinations along these lines. Likewise the somewhat vague and indefinite notions the young people have from their use of pulleys, eveners, and other farm machinery, form fitting stepping stones to definite mathematical results readily reached by them under proper guidance.

The varied questions of soil physics, soil formation, the movements of water and air thru soil, soil temperatures, soil grains and granules, and pore-space, are matters studied from the practical side and used as avenues to far reaching laws.

## AGRICULTURE.

It is purposed in teaching this subject to cover the elementary principles governing soils, field and farm management. The work covers the origin, formation, and cultivation of soils; the movement and control of soil moisture; selecting and planning farms; subdividing fields; drainage; irrigation; roads; fences; buildings; water supply; groves and wind breaks; farm life; the relations of sciences to agriculture; a general consideration of farming as a business; and methods of farming.

#### ALGEBRA.

Algebra is optional during the third year. This work covers Wells' New Higher Algebra through simple equations. Special attention is given to literal notation, negative numbers, the equation and factoring.

#### BLACKSMITHING.

The students are instructed in the management of the forge and fire, and in bending, shaping and welding iron and steel. They are required to make links, rings, hooks, bolts, clevises, whiffletree-irons, tongs, cold-chisels, punches, in short, to become familiar with all the operations necessary to enable them to do their own repair work when they return to the farm. Particular attention is given to rapid and accurate welding and to the shaping and tempering of steel tools. The forges used are such as any farmer can make for himself, and each student is taught to make his own tools, so that he will be able to furnish his shop with very little outlay.

#### BREEDING.

Students receive instruction in the principles that govern breeding; on the influences that affect heredity and in the care and management of breeding stock. Pedigree receives careful consideration, and each student is required to make out pedigrees of two or more pure bred animals. They are also required to become familiar with methods of keeping live stock records of all kinds.

#### CARPENTRY.

Instruction is given by means of lectures on the care and use of the common carpenter tools, such as should be found on every farm; also on methods of farm building construction, framing, laying out rafters, stairways, estimating building material, painting, etc. In the carpenter shop students are required to make such exercises as will give them some practice in using carpenter tools. They are required to make mortise joints, splices, drawing boards, hammer handles, eveners, cupboards, etc.

Each student is required to file his own saws, sharpen his planes, chisels, etc., and to lay out rafters for buildings.

#### CIVICS.

During the last term of the course students receive instruction in this science, and graduate with a good understanding of the origin, necessity, nature and various forms of government, and the machinery employed to carry on public works, establish justice, and provide for the common defense; of the organization and management of local institutions—the town, the village, the city, and the county; the manner in which states are created and the affairs administered; the three departments—legislative, judicial and executive—and the functions of each; the interdependence of the state and its citizens, as well as the powers and obligations of each, by due attention to which the state may be strengthened and the condition of its citizens ameliorated.

The relations of the state to the general government, the constitution and the power it confers, and the provisions for amendments, are taught. The more important principles of commercial law, including contracts, agency, partnership, corporations, and commercial paper, receive attention. Instruction is also given in the United States method of surveying public lands.

#### COMPARATIVE PHYSIOLOGY.

During the first year students take one term of applied physiology. This is an effort to connect technical physiology with the necessities of every day life. The work includes a study of the general plan and structure of the body and the various individual tissues of which it is composed; also sources of heat and energy, digestion, and the relation of food materials to the various tissues of the body. Considerable attention is given to diseased and innutritious foods, food adulterations, and narcotics. The circulation is studied with special reference to the relation of the blood and lymph to tissue nutrition and tissue waste.

Accidents, including poisoning, are studied for the purpose of giving a practical knowledge of what to do in emergencies. Considerable attention is given to the subject of clothing, the various materials in use being considered with reference to fitness for special purposes. Some time is also given to the study of common physiology, of the organs of circulation, digestion, respiration, nervous system, and the relations of bacteria to the common diseases, especially such diseases as consumption, typhoid fever, etc. A brief study is also given to the subject of digestion in the lower animals.

The class work is illustrated by means of large charts, skeletons, manikins, and dissections. Important points of difference between human and animal physiology are pointed out in preparation for the third year's work in the veterinary class. Matters of home and personal hygiene are interwoven with the physiology work.

#### COOKING.

Cooking extends through five terms of the curriculum. The subjects covered in each term are as stated below:

First term, C year: Furniture and equipment needed in a home kitchen; best methods of managing kitchen work, caring for kitchen and dining room utensils, furniture etc.; the place of measuring and weighing in cookery; the preparation and serving of vegetables, cereals, and bread.

First term, B year: Cooking is again taken up, the special topics being preservation of fruits and vegetables by canning, preserving, pickling, and jelly making. The selection, preparation and serving of meats of all kinds is also considered. A sufficient amount of practical work is given in each case to illustrate the principles brought out. A special study of table service is begun during this term and extends through the year, a practice dinner being given by a portion of the class in the class dining room each month.

Second term, B year: Eggs are considered as to selection, preservation, food value, different ways of cooking and serving. The preparation and serving of soups and beverages is considered together with their food value. The subject of salads is considered in a similar way.

First term, A year: This is devoted to the marketing and care of food. The preparation and serving of dairy foods and made-over dishes and dishes for invalids receive special attention.

Second term, A year: This is devoted to the preparation and serving of desserts and to the study of food rations, dietaries, bills of fare, confections, etc. A free use is made of the U. S. Bulletins during this year in the hope of arousing a greater interest in the food question.

#### DAIRY CHEMISTRY.

The chemical and allied changes which take place in the handling of milk and its manufacture into butter and cheese, and the application of these principles to the production of milk and its products form the basis of this work.

#### DAIRY HUSBANDRY.

Farm dairy lectures.—A course of lectures is given in farm dairying, giving instruction in the care of milk and utensils, explaining the principles involved in creaming milk by the gravity and centrifugal processes and giving full instruction in regard to running farm separators and the manufacture of butter and cheese in the farm dairy.

Dairy practice.—Students receive practical training in the most advanced methods of creaming milk, ripening cream, churning, working and packing butter, the manufacture of sweet curd cheese, and measuring the value of milk by the Babcock test and lactometer. This practice work begins the third week of the first term and continues through the school year.

Dairy stock.—During the last half of the first term students receive instruction in regard to characteristics of the various breeds of dairy cattle, their origin, and comparative adaptability for the dairy. Lectures are given upon the points desirable in animals intended for the dairy. The students have practice work in judging dairy stock.

Feeding.—During the second term lectures are given covering both the scientific and practical phases underlying the principles of feeding. Practice work is given in compounding rations and estimating the comparative value of food stuffs.

#### DOMESTIC CHEMISTRY.

The combination of human foods to form balanced rations, dietary studies of families, cost and value of foods, losses in the cooking and preparation of foods, cereal food products, animal food products, adulterations of foods and their detection, fuels, soaps, dye stuffs and colors, composition of common household utensils, the household water supply, preparation of home-made baking powders, bakers' chemicals, the composition, food value and characteristics of tea, coffee, chocolate, cocoa, molasses, honey, vinegar and spices, the grading and testing of wheat flour and the chemistry of bread making, form the essential parts of this work.

#### DOMESTIC HYGIENE.

Several lectures by a physician will be given upon maidenhood, maternity and infancy. These special lectures will be supplemented by the regular lectures which consider the health of the family as dependent upon pure food, pure water, personal cleanliness and proper habits as well as upon heredity. The aim is to impress the truth that a knowledge of and obedience to the laws of hygiene are essential to the preservation as well as the restoration of health.

#### DRAWING.

The student is taught the practical value of drawing for the purpose of designing and arranging buildings, machinery, etc. He makes drawings of the shop exercises, then works from his own drawings, thereby learning the application.

Designs are made for dwellings, barns, outbuildings, and machinery. As practical subjects for their designs, students are requested to bring from home data for plans of buildings needed on their farms. Estimates are made of the amount of material required and cost of construction.

#### DRESSING AND CURING MEATS.

The instruction given the boys consists of demonstration lectures on the preparation of meat for farm use. They are required in addition to take two weeks' practice in dressing, cutting and curing such meat as is likely to be used on the farm. Work is also given them in selecting and judging fat stock, and in judging dressed meats.

#### ENGLISH.

(C) The first year's work in English consists of almost daily practice in the simpler forms of composition. Applicants for admission to the C class should be familiar with the inflections of nouns, pronouns, and verbs, the definitions and classifications of phrases and clauses, and the common case constructions.

(B) Twice a week throughout the school year the members of the B class prepare short essays, and submit them for criticism.

(A) At the option of the English Department a series of literary programs will be presented in chapel by the members of the graduating class. The numbers include abstracts of leading magazine articles, biographical sketches, book reviews and selections from fiction. Special prominence is given to authors depicting American life.

#### ENTOMOLOGY AND ZOOLOGY.

The class in entomology receives instruction of a practical nature. The course is divided as follows:

Classification of insects; habits and life histories of injurious forms with special attention to insect pests found in Minnesota. The nature of different insecticides and methods of application are discussed. The student spends some time in becoming acquainted with the appearance and habits of beneficial insects. Each student must collect fifty insects representing at least twenty-five different kinds.

The four-footed pests of the farm—rabbits, gophers, squirrels, etc., as well as injurious and beneficial birds, are also studied.



**FARM ACCOUNTS.**

The work in accounts is applied to the transactions which the student meets in the various duties on the farm. He is taught to keep his accounts, that he may know at any time the profit or loss of any department of his business, and is thus enabled to plan intelligently.

**FARM ARITHMETIC.**

Instruction in this subject consists of the application of its principles to all kinds of farm problems where measurements of material, extension, capacity, etc., are required. The student is prepared also to handle with ease the mathematics of the technical courses in the school.

**FEEDING.**

The principles of feeding as applied to the production of horses, beef cattle, sheep and swine are taught. Special attention is given to the choice and preparation of food for animals during different periods of growth and during the time they are used for breeding purposes and to summer feeding and pasturage. Practice is given in compounding rations that will include in the best manner the food stuffs commonly produced on the farm. Practical lessons in feeding are given at the barns under the supervision of an experienced feeder. Each student thus learns the requirements of each class of stock.

**FIELD AGRICULTURE.**

This work consists of a study of those portions of geology relating to soil formation; effect of the glaciers on the soils of Minnesota; origin of soils in the various agricultural regions of Minnesota; classification of soils; soil moisture and soil tillage; land areas and the planning of fields and farms; the classes of field crops as grain, grass, and cultivated crops; the relation of these crops to each other in a systematic rotation and in their relation to soil fertility; the origin, distribution, and uses of cereal crops and other field crops.

**FIELD CROPS.**

Students are admitted to this subject after having finished the work of agriculture and receive instruction as follows:

Crop rotations, farm management, and planning farms under various conditions; production and care of farm manures and green manure crops; fertility as related to weeds, crop production and profits; preparation of land; planting, cultivating, harvesting, storing, and marketing of grains, roots, fiber, sugar, grass and other forage crops; meadows and pastures; treatment of field crop diseases; selecting and judging grain.

**FORESTRY.**

Includes the consideration of the formation and care of wind breaks and shelter belts; the laying out and planting of home grounds; discussion of the hardiness, habits and value of our native and introduced trees; and the methods of propagating them.

**FRUIT GROWING.**

Fruit growing is taught with reference to raising fruit for market and in the home garden.

**GEOMETRY.**

Geometry is offered in the second term of the third year as an elective in place of civics to those who wish to prepare for a college course. This work covers the first two books of Wells' Essentials of Plane Geometry.

**GYMNASIUM WORK.**

The gymnasium is a large, well lighted, two story brick building. It is well supplied with heavy apparatus for general gymnastic and athletic exercises, together with such appliances as are necessary for the development of a symmetrical body. Besides being fitted up with the finest apparatus, it possesses space and equipment for sprinting, pole vaulting, hurdling, high and broad jumping, shot putting, etc.

Class work in physical training is required of all undergraduate young men not excused on account of physical disability. Courses are offered on the heavy apparatus, in corrective work, class drills, and athletic training. In addition to the regular class drill, a certain part of which consists of training in athletic sports, the school is represented by a strong basket ball team, a track athletic team, hand ball team, and an indoor tennis team.

**HANDLING GRAINS AND MACHINERY.**

Practical suggestions for the best methods of harvesting, shocking, stacking and storing of cereal grains; adaptation of the various kinds of machinery with reference to the soil, weeds and seasons are given; adjustment with special reference to durability, convenience in manipulation, etc.

**HOME ECONOMY.**

The lectures are a study not only of the just proportion between expenditure and income, but of definite proportion in the expenditures made for existence, comfort, culture and philanthropy. A study is made of the sources of income, especially of the income from the farm in the form of house, food and luxuries; the purchase of clothing, household stores and furnishings is considered from the standpoint of the suitable. The relation of cash and credit to cost is also considered. Attention is given to savings and forms of investment, a bank account and the use of a check book. Students are required to submit an account setting forth in detail the use of a certain named income expended in the support of a family for one year, embracing not only every item of necessary home expense, but also an outlay made for travel, luxuries, accident, sickness, or other emergencies. The habit of keeping a household account is calculated to strengthen the judgment in the wise use of money.

**HOME MANAGEMENT.**

The subject includes both housekeeping and home-making, and the instruction is based on the belief that housekeeping is a business as important as it is difficult, and that home-making is the noblest form of human endeavor. The care of the house and household belongings, of the food and the clothing, as well as the ordering of family life, are considered in their relation to an adequate plan for home management. To start the student in the right way of becoming mistress of the business of housekeeping and home-making is the end sought. The practical benefit to be derived from the knowledge students gain in the cookery, sewing, dairy, laundry and other classes, is emphasized and shown in its relation to an adequate plan for the daily program for the home.

**HOUSEHOLD ART.**

Lectures upon house and grounds, noting the distinctive character of the country home; the sanitary conditions involved in the selection of the site of the house; also the influence of the outlook; an elementary study of architecture in connection with planning a house which will provide "a place for everything" required in housekeeping operations and family life; instruction in the fundamental value of color, form and design; training the taste and emphasizing the laws of hygiene that should influence the selection of materials and styles in the finishings and furnishings of the house.

**LAUNDERING.**

Second term, C. year: The aim is to give the students a knowledge of the best means of cleansing all fabrics with little injury to the cloth or color. Approved methods of cleansing by the use of chemicals, as removing grease spots, stains, etc., are given.

**LIBRARY.**

The agricultural library now contains nine thousand books and about seven thousand pamphlets, including reports and bulletins. Aside from the large number of pamphlets and other publications of the different agricultural institutions and societies, a large number of the most important technical and agricultural magazines are kept on file, bringing together all the agricultural literature of any importance.

**LITERARY SOCIETY WORK.**

Any student belonging to a recognized literary society of the school may receive credit in the course of study for the work done therein by registering at the beginning of the term, and submitting to the teacher in English all essays to be read by such student before the literary society and rehearsing to said instructor all essays, readings, or recitations with a view to correct pronunciation, expression, etc.

**MEATS.**

The instruction given to the girls in the subject of meats pertains to the selection and value of different classes of meat, and to the best methods of curing and preserving.

**MILITARY DRILL.**

Under the provisions of the Act of Congress of 1862, establishing the "Land Grant Colleges" of the United States, instruction in Military Science and Tactics is required to be given at all colleges which are its beneficiaries. For this purpose the United States Government furnishes the Department of Agriculture with the necessary arms and equipments, and details an officer of the regular army to take charge of military science and tactics.

All male students of classes B. and C., not physically unfit are required to attend military drill. For the A. Class drill is an elective.

Military instruction is intended to be so conducted as to develop a soldier-like bearing and foster a spirit of gentlemanly courtesy, soldierly honor and obedience to lawful authority, as well as to familiarize students with battalion maneuvers, guards and the theoretical and practical use of firearms.

The officers and non-commissioned officers are required to be good students in the other departments, soldier-like in the performance of their duties, exemplary in their general deportment and able to pass a creditable examination in drill regulations.

In general, the officers are selected from the "A" class; sergeants and corporals from the "B" class.

**MUSIC.**

A systematic training in music is given and all students are required to take the work unless they already have a credit in it.

Class quartets and octets are organized and trained for aiding in public entertainments in the school.

The Senior Class gives a concert at Commencement time.

**PHYSICAL TRAINING.**

The work done in this department aims at symmetry, co-ordination and control rather than mere physical strength. It is planned to improve the functional activity of the body and to counteract and correct tendencies toward incorrect development, especially those resulting from the artificial life of civilization. The work of the beginning class is free hand, based upon Swedish principles, and directed especially to deep breathing, correct carriage and posture. The work of the advanced class includes light apparatus and aesthetic movements for suppleness in action and grace. Vigorous games are given to both classes.

**PLANT PROPAGATION.**

In this subject the principles underlying the development of cultivated varieties of plants and seed testing are taught; also the propagation of plants by

seed, cuttings, grafting, and budding. The work of the class room is illustrated by the orchards, nurseries, forest plantations, gardens and greenhouses on the grounds of the experiment station, and by visits to commercial nurseries and greenhouses near by.

#### POULTRY.

The instruction in this subject will include the following topics: History and characteristics of the leading breeds of poultry; breeding, rearing and management of fowls for eggs and for the market; planning, building and arrangement of poultry houses; managing incubators and brooders. A model poultry house, containing pens of the most improved breeds, incubator cellar, work-room, etc., has been provided, where experimental work and practical instruction are carried on.

#### PRACTICUMS.

During the first year the young men spend four hours each week in a series of lessons and exercises in the barns and fields, taking up such practical lines of work as land surveying, laying tile drains, building fence, setting up farm machinery, soldering, pipe-fitting, splicing rope, making rope halters, etc.

#### SEWING.

Instruction is given in the principles and use of healthful and appropriate clothing and in the needlework of the home. The course provides for five terms' work. During the first term instruction is given in the elements of sewing, including different stitches, seams, hems and the various kinds of mending; also practical talks on the use and care of the sewing basket, touching the history of the various implements used, and upon the textiles used—cotton, wool, linen and silk.

In the second year instruction is given in cutting and making plain garments, drafting underwear, shirt waists and cotton dresses,—taught by a simple method in which only a tape line and square are used.

In the third year the more difficult work of dressmaking is taken up, pattern drafting, cutting and fitting dresses. Lectures are given on the utilitarian and art values of various textiles, and in connection with the selection of materials practical lessons in shopping are given. Attention is paid to harmony in color. A practical aid to the work in this subject is offered by a museum of exhibits. These exhibits are kept in the class rooms and include primitive and modern sewing implements, weaving processes and the various cloth fibers.

#### SOCIAL CULTURE.

A course of lectures is given on the usages of society, including manners, behavior, the voice, conversation, forms of address, invitations, etc. Suggestions are made in reference to reading, literary taste and the choice of books. Special stress is given to the thought that the family life ought to be the highest expression of good society, and that next to the power of thinking correctly is the power of approaching others with ease and speaking with tactful directness.

#### SOILS AND FERTILIZERS.

Some of the topics studied are: The formation of soils, adaptability of crops to different kinds of soils, chemical composition of soils, physical analysis of soils, interpretation of soil analysis, the judging, rating and scaling of soils, alkali soils, acid soils, humus and its relations to soil fertility, the factors governing the increase and decrease of the nitrogen of the soil, farm manures,—their composition and uses, and their action upon soils—green manures, commercial fertilizers, special purpose fertilizers and their use; the influence of different methods of cultivation upon the fertility of the soil, the food requirements of farm crops, the rotation of crops as affecting the fertility of the soil, the income and outgo of fertility from farms where different systems of farming are followed, the general principles of soil exhaustion and soil improvement and the various factors which effect the fertility of soils. The class room work is supplemented by laboratory practice.

### STOCK JUDGING.

Score cards are used to an extent sufficient to familiarize students with that method of judging, and special efforts are made to do systematic and closely critical work in the selection of animals representative of the breeds and for breeding purposes. Living specimens are used and rings made up for the student contests in stock judging. In connection with the work in dressing and curing meats, the judgment passed on live animals for the block is verified by score cards, judgment of the dressed carcasses and by actual block tests. These tests are made by the students and bring out the percentage of meat in each commercial cut of the carcass. The quality of meat is passed upon in this connection by experts, and a careful report made to ascertain the type of animals best calculated for the production of the most meat of the best quality.

### STUDY OF BREEDS.

The market classes of horses, cattle, sheep, and swine are taken up briefly to bring out the form, quality, and condition desirable and common to the different classes. This is followed in each class of stock with the most common and valuable breeds for the state. These are studied carefully as regards their characteristics, and origination and as to their adaptability to the different Minnesota conditions. The work is illustrated with stock from herds and flocks maintained at University Farm for this purpose.

### VEGETABLE GARDENING.

Vegetable gardening embraces the study of garden tillage, irrigation, and rotation of crops; transplanting; formation and care of hotbeds; study of garden insects; and the growth of various vegetable crops.

### VETERINARY SCIENCE.

During the A year the student takes up a course of study in veterinary medicine, the purpose of which is to fit him for intelligent care of his farm stock. In this course the teaching is done by means of lectures and reviews and clinical work at the hospital maintained for this purpose. Lectures are illustrated by means of stereopticon charts, manikin of horse, skeleton of horse, and various other appliances.

The work covers the following subjects: Elementary anatomy; elementary pathology; cause and prevention of diseases; diagnosis and treatment of common diseases; examination for soundness; and a final short course on common medicines; studying their effects, uses and doses. At the hospital clinics students are enabled to examine and care for a variety of cases and to learn the elements of diagnosis for the more common diseases and forms of lameness.

### STUDENTS' TRUST FUND.

The class of 1902 left with the school a fund of \$100 "to assist by temporary loans at a reasonable rate of interest, deserving students needing such help, who are not below the B class in the school of agriculture." This fund is in charge of a committee consisting of the secretary, the principal, the preceptress, and the president of the A class.

### THE LUDDEN TRUST.

The Honorable John D. Ludden, of St. Paul, gave the University of Minnesota \$5,000 to be held, invested and re-invested by the University, through its Board of Regents, and the income thereof to be collected, received and applied by said Board of Regents to the financial assistance of students of either sex in the school of agriculture. Mr. Ludden delivered into the hands of the regents for the principal sum one Northern Pacific registered prior lien railway land grant gold bond of the denomination of \$5,000, payable to the University of Minnesota and its assigns in gold coin, on the first day of January, 1997, with interest at 4 per cent per annum, payable quarter-yearly in like gold coin, the fund to remain so invested until the bond matures, unless by reason of changed conditions a re-investment shall be sooner deemed judicious by the Board of Regents for the safety, conservation or continued productiveness of the fund. The premium on the purchase of this first grade security was \$212.50, and was paid by Mr. Ludden, thus enlarging his donation by that amount.

Mr. Ludden imposes the following conditions: "The beneficiaries must be youths who are residents of the state of Minnesota; they must be and continue of unblemished moral character, and of temperate and industrious habits, and they must be such as by examination and trial shall evince and maintain a taste, habit and aptitude for study and improvement; and any student who shall fail to come, or shall cease to be, within the above conditions shall forfeit all claims to the benefit of such fund. Subject to these conditions the administration of such income is entrusted to the said board of regents, which may make such rules therefor as they may deem judicious."

This fund produces \$200 a year. Those wishing to avail themselves of its benefits should apply to the executive committee of the Board of Regents of the University of Minnesota.

Mr. Ludden has since donated another \$5,000 for a like purpose so that the income is now \$400.

## Intermediate Year

For graduates of the School of Agriculture who wish to enter the College of Agriculture.

The course of study in the School of Agriculture extends over three years, and the school year is six months long. This does not give sufficient time for preparation for college work, and it has been found necessary to supplement the course offered in the School of Agriculture by an additional year's work in general academic branches. The subjects offered in the intermediate year can be taken elsewhere in any accredited high school before entering the School of Agriculture. This intermediate year enables graduates of the School of Agriculture to enter the College of Agriculture on the same basis of preparation as students enter other departments of the University. English and mathematics are given prominence in the intermediate year.

The following prescribed course, or its equivalent, taken in some other school, is required of graduates of the School of Agriculture, who desire to gain admission to the College of Agriculture:

### FIRST TERM.

Elementary Algebra (5)  
Plane Geometry (3)  
English (5)  
General History (4)

### SECOND TERM.

Elementary Algebra (5)  
Plane Geometry (5)  
English (5)  
Economics (4)

The courses in mathematics for the intermediate year cover Wells' New Higher Algebra from simultaneous equations to logarithms; Downey's Higher Algebra, Part 1, and Wells' Essentials of Plane Geometry, beginning with Book III. The work preliminary to these courses is done by the student in the A year in the School of Agriculture.

Students who have taken the elementary algebra and completed plane geometry in the "A" year of the School of Agriculture, are admitted to the freshman class in the College of Agriculture conditioned in English; this condition must be removed during the freshman year.

The course in English extends through both terms. Two periods a week are devoted to composition, with Scott & Denny's Composition-Rhetoric as a text-book, and three to the study of literature, which will also be made the basis of considerable written work. The characteristic works of the following authors will be studied: Shakespeare, Bacon, Milton, Addison, Gray, Goldsmith, Burns, Wordsworth, Lamb, Macaulay, Ruskin, Browning and Tennyson. Individual members will be assigned readings from various other authors.

# Short Course for Farmers

## FACULTY

CYRUS NORTHROP, LL.D., *President.*

WILLIAM M. LIGGETT, *Dean*

SAMUEL B. GREEN, B. S., *Horticulture, Forestry.*

J. A. VYE, *Business Methods.*

HARRY SNYDER, B. S. *Agricultural Chemistry, Soils.*

T. L. HAECKER, *Dairy Husbandry.*

M. H. REYNOLDS, M. D., V. M., *Veterinary Science.*

J. M. DREW, *Poultry, Workshop Hints.*

A. BOSS, *Live Stock, Dressing and Curing Meats.*

WM. BOSS, *Farm Mechanics.*

F. L. WASHBURN, M. A., *Insect Enemies.*

COATES P. BULL, B. Agr., *Farm Implements.*

W. L. OSWALD, *Farm Botany.*

D. D. MAYNE, *Parliamentary Practice.*

A. I. EWING, M. S., *Farm Physics.*

This is a course of instruction provided by the faculty of the School and College of Agriculture for the benefit of farmers who are unable to attend the regular school course.

The next term will open Jan. 8th, 1907. The first two weeks will be devoted to the judging of grains, soils, and live stock and for convenience will be known as the judging course. This will be followed by four weeks known as the lecture course during which time lectures will be given covering the more important branches of agriculture, horticulture, live stock breeding, farm botany, farm chemistry, entomology, poultry, dairying, etc., as outlined below.

During the judging course the time will be divided as follows: The judging of grains and soils will occupy the first four days, then will follow two days for the judging of sheep, two for swine, two for cattle, and two for horses.

Work will begin at 8:15 o'clock a. m., and close at 3.40 p. m. During



the four weeks of the lecture course there will be no work on Monday, but this day will be spent in visiting places of interest such as the stock yards, stock farms, flour and flax mills, etc.

For the entire course a fee of \$10.00 will be charged. For the judging course or any part thereof the fee will be \$3.00.

Board may be secured in either of the Twin Cities at from \$3.50 to \$4.50 per week.

The school is situated at St. Anthony Park, on the Como-Harriet car line, between St. Paul and Minneapolis. Get off at Commonwealth avenue.

Farmers wishing to register for the course, or desiring further information, should address Jas. M. Drew, St. Anthony Park, Minn.

The course of lectures and study is outlined as follows:

**Agriculture:** Judging the qualities of soils, the selection of farms, planning farms; developing the fields, drainage, roads, fences; developing the farmstead and its buildings; managing fields and growing, cultivating, harvesting and preserving forage and grain crops; the rotation of grain, cultivated and grass crops; the use of live stock; and general farm management.

**Dairy husbandry:** In this division there is a course of lectures giving an outline of the origin and history of the various breeds of dairy cattle, the characteristics of each and conditions to which each breed is especially adapted; the conformation and type of cow specially adapted to economical dairy work; an outline of the fundamental principles of feeding, the composition and character of the various feed stuffs with plain and practical instruction in rearing young stock and feeding dairy cows. Practice work will be given in judging dairy stock.

**Animal Husbandry:** During the four weeks of lecture work a series of lectures will be given on animal breeding. These lectures will include the known laws of breeding, such as heredity, variation and atavism. Attention will be given to such features as the selection of prepotent sires and dams, to cross breeding, in-breeding and other matters of interest to the breeder of live stock. Pedigrees will be discussed and the students made familiar with the registration and transfer of pure bred stock.

The feeding and management of horses, beef cattle, sheep and swine will also be discussed. Foods suitable to each class of animals, and methods of preparing and feeding them will be among the subjects receiving attention, together with directions for the practical management of stock while in the stable and pasture.

**Agricultural chemistry:** Soils and foods are made prominent features of the work in agricultural chemistry. Lectures are given on the conservation of the fertility of the soil, the composition and use of farm manures, the draft of different farm crops upon the soil and the methods of making the fertility of the soil available by the rotation of crops and by other means so as to secure the necessary changes in the soil to produce the highest degree of fertility. Lectures are also given on the composition and uses of human and animal foods. The judging of soils will be made a feature of this work.

**Farm mechanics:** The instruction given in this subject will consist of lectures on farm mechanics, taking up such subjects as pumps, farm water systems, windmills, the general principles of steam and gasoline engines, placing shafting, pulleys and belts, pipe fitting, soldering, etc. Some instruction will also be given in sharpening and using hand tools, such as saws, planes, chisels, and other tools necessary in farm practice.

**Farm implements:** The lectures on farm implements will be illustrated, as far as possible, by samples. Stereopticon views will be made use of in illustrating machines that cannot well be taken to the class room. It is the aim in these lectures to bring out the lines covering the draft of implements and the objects attained by their use. Suggestions will be made on selection of implements adapted to various kinds of work. The care of implements when not in use will also be discussed, and an attempt made to give as fully as possible all information that will be beneficial in the care and handling of farm machinery.

**Dressing and curing meats:** The work in dressing and curing meats will be given in a course of demonstration lectures. In demonstrating these lectures the animals will be dressed before the class and the reason for each operation

fully explained. The method of cutting up the dressed carcass for different purposes will also be shown before the class and the use and value of each cut explained. Sausage making, lard rendering, and the "working up" of all parts of the animals will be taught in a simple and direct way.

Farm accounts: A series of lectures will be given on business forms, business arithmetic and the keeping of simple farm accounts and records.

Farm botany: Eight lectures will be given on the phases of botany of special interest to farmers, for example, the pollination of flowers, weeds and weed seeds, poisonous plants, fungus diseases of plants and how to deal with them.

Farm horticulture: Lectures will be given on the care and management of the apple and plum in this climate, including such subjects as location of the orchard, selection of the trees, planting, cultivation, green manuring; preparation for winter; advantages and disadvantages of root grafting, budding, and top working; diseases injurious to orchards.

Lectures on the care and management of small fruits will consider the subjects of selection of varieties, planting and cultivation, origin of new varieties, propagation, marketing, winter protection, also the insects and diseases injurious to raspberries, blackberries, currants, gooseberries, strawberries and grapes.

Under vegetable gardening will be considered the growing of potatoes, tomatoes, celery, onions, squash and cucumbers.

Veterinary science: This work includes a series of lectures on elementary anatomy, animal foods and digestion; and causes, prevention and treatment of common diseases of farm stock. An especial effort is made to have this work practical and helpful to men who are actually handling farm stock.

Poultry: Lectures will be given on this subject with special reference to the needs of the Minnesota farmer. The following subjects will be considered: Location and construction of poultry buildings and yards; a study of the breeds best adapted to the farmer's use; the hatching, rearing and management of the farmer's flock; feeding for eggs and for fattening; killing and dressing fowls, and packing for market; marketing eggs.

In addition to the above, four lecture periods will be devoted to farm workshop hints, such as splicing rope, making rope halters and rope belting, and tempering simple tools.

Economic entomology: The entomologist will give a course of lectures on injurious and beneficial insects and will discuss the various insecticides and methods of application.

The four-footed pests of the farm—rabbits, gophers, etc., are also studied and a few lectures are given on practical bee-keeping.

If there be sufficient demand to warrant, and time permits, a few lectures will be given on birds and their relation to agriculture.

Parliamentary practice: A debating club is made up of the members of the short course class and weekly meetings are held which give opportunity for learning how to conduct public meetings and practice in public speaking.

Physics: This course consists of six lectures with illustrative experiments. In these exercises the following topics are discussed: The principles of draft in the horse; the causes of draft in wagons, including the effect of road-bed; the effect of grades or hills, involving the principle of the inclined plane; the various questions involved in eveners, road construction and maintenance, including the question of reducing grades, the rate a horse walks in plowing, hauling, etc.; horsepower; farm drainage; weather forecasting.

# Dairy School

## FACULTY

- CYRUS NORTROP, LL. D., *President.*  
WILLIAM M. LIGGETT, *Dean.*  
T. L. HAECKER, *Professor of Dairy Husbandry.*  
J. A. VYE, *Creamery Records and Accounts.*  
HARRY SNYDER, B. S., *Dairy Chemistry.*  
M. H. REYNOLDS, M. D., V. M., *Diseases of the Dairy Cow.*  
J. M. DREW, *Forage & Pastures.*  
WILLIAM BOSS, *Instructor in Practical Engineering.*  
E. L. ALLEN, *Instructor in Cultures and Starters.*  
H. L. RUSSELL, Ph. D., *Dairy Bacteriology.*  
A. W. PARKIN, *Instructor in Cheese Making.*  
H. T. SONDERGARD, *Instructor in Creamery Work.*  
M. P. MORTENSON, *Assistant Instructor in Cultures and Starters.*  
JAMES A. FISK, *Instructor in Dairy Laboratory.*  
H. J. CREDICOTT, *Instructor in Dairy Manufacture.*  
I. O. DYBEVICK, *Instructor in Pasteurizing.*

The next session of the Dairy School will open Monday, November 12th, 1906, and continue four weeks.

This course is designed to furnish persons who are actually engaged in the manufacture of butter and cheese in creameries and cheese factories, an opportunity to become more skilled in their work and also to study the many problems which have a direct bearing upon the dairy industry. Recognizing the fact that such persons cannot be away from business for a long period, the term has been so arranged that the time of each student is fully occupied by lectures and actual work in the creamery training room every hour of every working day of the term.

The rapid growth of the dairy industry in the Northwest calls for constant enlargement in equipments for dairy hall.

With each succeeding year as dairy products manufactured in our

creameries, take higher rank in quality and finish, the character of the instruction given must be of a higher order. To meet these requirements the training rooms are each year equipped with the best apparatus, and the corps of instructors is composed of the most skillful workmen and best instructors.

No pains will be spared to maintain the high standard which the school has attained. Each member of the faculty has special qualifications for the duties to which he has been assigned. The lecture course and practical instruction are arranged with special reference to giving the greatest amount of training and practice possible in a four weeks' session.

Instruction is divided into seven courses:

- 1st. Lectures covering the entire field of dairy husbandry.
- 2d. Practical work daily in the butter room.
- 3d. Practical work daily in the cheese room, where the manufacture of flats, cheddars, Swiss, brick, Edam and Gouda cheese is carried on.
- 4th. Practice work in the laboratory, examining milk, making daily composite tests, and the pasteurization of milk and cream.
- 5th. Practical engineering, steam fitting and plumbing.
- 6th. Practical work in factory bookkeeping.
- 7th. Practical work with cultures and starters.

#### I.—LECTURES.

The course of sixty lectures furnishes in a plain and concise form the most valuable information for those who are interested in any branch of agriculture, covering, as it does, the most important points in the breeding, rearing, feeding and general management of dairy stock, the economical production of milk, growing and preserving of forage and grain crops, the management of meadows and pastures, management of barns, stables and yards, construction of silos, co-operative dairying, creamery and cheese factory management, judging and marketing dairy products, the chemistry of milk, dairy bacteriology, engineering, animal hygiene and treatment of the common diseases of the dairy cow.

#### II.—BUTTER MAKING.

The running of separators; ripening and churning of cream; how to ripen cream to secure best flavor; how to churn, wash and salt butter so as to avoid specks and mottles; to secure good grain and best methods of preparing for market—are some of the points which receive special attention. As all creamery men should be able to judge butter from a commercial standpoint, students are trained daily in the art of scoring butter by the score card.

#### III.—CHEESE MAKING.

The work in the cheese room is conducted on a large scale, including the manufacture of several brands of fancy cheese. The fact that there is a demand for these at highly remunerative prices has induced the Regents to provide the necessary means for carrying on this work.

A complete record of every step taken is required of each student. Here is a good opportunity for cheese makers to meet, investigate new methods, make experiments on doubtful points, compare notes, and thus gather in a few weeks knowledge that otherwise would take years to acquire.

#### IV.—MILK TESTING.

It has been found that the value of milk for both butter and cheese is meas-

ured by the per cent of fat content, and nearly all our factories and creameries now base the payment for milk on the fat content. It is therefore necessary for every factoryman to familiarize himself with the best methods of milk testing. The chemist gives a general outline of the work, but in order that each student may have thorough training in milk testing daily exercise is given. Steam turbine and hand power machines and other apparatus are provided and operated in the laboratory.

The pure and wholesome milk and cream supply for our cities is a matter of vital importance, and there is great need for improved methods of handling milk intended for this purpose. To meet this, milk and cream pasteurizing apparatus of the latest and most improved makes has been provided for the dairy school, and a few advanced students will be given instruction in this work.

#### V.—MOTIVE POWER.

The work in engineering consists of practical talks on the construction, care and management of creamery engines and boilers, pumps, injectors, heaters, etc., and work in the practice room.

In the practice room are provided an eight horse power simple, slide-valve engine, three types of boiler feed pumps, two types of deep well pumps, one injector, two milk pumps and a steam gauge, which the students have the privilege of examining and operating. Instruction is also given in pipe fitting, placing shafting, babbitting bearings, soldering, etc.

It is the aim to make this work as practical as possible. Questions of interest on the subject are freely discussed.

#### VI.—FACTORY BOOKKEEPING.

All the essential features of factory accounting from the receipt of the milk to the returns in net proceeds are thoroughly considered. Paying for the milk according to the fat content, or otherwise, is fully explained. The students do, in books provided, the actual one month's accounting of a creamery.

#### VII.—STARTERS AND CULTURES.

Since all students who are admitted to the school have had some experience in the routine work of running separators, and since the most important part in butter making is the art of uniformly making a product having a fine flavor and good keeping qualities special attention is given to cultures, starters and pasteurization. Constant additions will be made to the equipment needed to make this course inviting to those who wish to fit themselves for masters of the art of creamery butter making.

### REQUIREMENTS FOR ADMISSION.

Experience has shown that students who have had some practical training in the creamery or cheese factory before coming to the dairy school are, as a rule, the ones who are able to make the most of the course; it is therefore required that persons who intend to take this course shall have had at least one season's experience before coming to the school. No entrance examination is required.

#### EXPENSE.

A registration fee of \$15 is required of each student. Students can board in either city and reach the school by street car, or board can be secured near the school for from \$3.50 to \$4.00 per week. Each student is required to supply himself with two white suits, including caps, to be worn during working hours in the creamery and cheese rooms. The suits may be procured for about \$1 each.

### DAIRY CERTIFICATES.

The Regents will grant dairy certificates to students who have taken the course and passed a satisfactory examination and in addition have demonstrated by at least one year's work in a factory that they have acquired special skill in the art of butter and cheese making, and are thoroughly qualified to take charge of a creamery or cheese factory.

To reach the school from either St. Paul or Minneapolis, take the Como-Harriet street car and get off at Commonwealth avenue.

Address applications for admission to T. L. Haecker, St. Anthony Park, St. Paul, Minn.

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### THE CROOKSTON SCHOOL OF AGRICULTURE.

At the 1905 session of the State Legislature, an act was passed creating a state school of agriculture at Crookston, Minn., and placing it under the direction of the Board of Regents of the University of Minn. To carry out the provisions of that act \$15,000 was appropriated for the construction and equipment of a building. A three-story building has, from this money, been erected on the Northwest Experiment Farm, near Crookston, and will be equipped ready for operation by the 1st of October, 1906.

### THE FARM STUDENTS' REVIEW.

The Farm Students' Review is a monthly agricultural paper owned and published by the Alumni Association of the School of Agriculture. The paper is intended to be a medium by which the former students of this institution shall be kept in touch with each other and also with the School and Experiment Station. It also endeavors to bring the farmers throughout the state generally, into closer connection with the institution and to this end strives to present the latest progress in experimental work at the various Stations. It is the official organ of the Alumni Association and of the Farmers' Club.

### THE FARMERS' CLUB.

The Farmers' Club of Minnesota is an organization composed of students and ex-students and members of the faculty of the School of Agriculture. Any one who has ever registered as a student in the regular, dairy, or short course or who is or has been a teacher in the School of Agriculture, is eligible to membership. The objects of the association are to foster and strengthen the ties between the School and its former students and to extend the work of the School and Experiment Station among the farmers of the state. To this end the members of the State

Club have formed County Clubs which hold annual meetings for the benefit of the farmers of the community. To quote from the annual address of its president: "The School of Agriculture is an institution of the farmers, for the farmers, and supported in a large measure by them, and each student of the School should use his knowledge to better the conditions about him. The State has invested from one to several hundred dollars in his education and expects to realize on that investment by the knowledge which he will distribute."

The Legislature at its last session made an appropriation of \$1,000 per year for two years to aid the Club in its work. The first annual report of the Club has recently been issued in book form.

# The Agricultural Experiment Station

## STATION OFFICERS.

WM. M. LIGGETT, *Director.*

J. A. VYE, *Secretary.*

## EXPERIMENT CORPS.

SAMUEL B. GREEN, B. S., *Horticulturist.*

HARRY SNYDER, B. S., *Chemist.*

T. L. HAECKER, *Dairy Husbandry.*

M. H. REYNOLDS, M. D., V. M., *Veterinarian.*

ANDREW BOSS, *Agriculturist and Animal Husbandry.*

FREDERICK L. WASHBURN, M. A., *Entomologist.*

J. A. HUMMEL, B. Agr., *Assistant Chemist.*

COATES P. BULL, B. Agr., *Assistant in Agriculture.*

A. G. RUGGLES, M. A., *Assistant Entomologist.*

A. J. MCGUIRE, B. Agr., *Superintendent, Grand Rapids.*

D. A. GAUMNITZ, B. Agr., *Assistant in Animal Husbandry.*

A. D. WILSON, B. S. Agr., *Assistant in Agriculture.*

E. C. PARKER, B. S. Agr., *Assistant in Agriculture.*

WM. ROBERTSON, B. S., *Superintendent, Crookston.*

The bulletins of this Station are mailed free to all residents of this State who make application for them.

The Agricultural Experiment Station of the University of Minnesota was established by National and State legislation in 1887. The function of the Experiment Station as set forth in the Hatch Act is, "to aid in acquiring and diffusing among the people useful and practical information on the subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and application of agricultural science." The funds provided by the National Government have been supplemented recently by the Adams Act which provides \$15,000 annually and appropriations for special lines of experimental work have also been made by the State Legislature.

The Experiment Station is located at University Farm, St. Anthony Park, and is one of the Divisions of the Department of Agriculture of the University of Minnesota, and the officers of the station are also professors and instructors in the School and College of Agriculture. The chief



executive officer of the station is the Director who is also Dean of the College of Agriculture. In addition to the main experiment station, branch or sub-stations are located at Crookston and Grand Rapids, and affiliated with the main station are a score or more of trial stations maintained by the State Horticultural Society. The Experiment Station also carries on co-operative tests and investigations with the U. S. Department of Agriculture and with farmers in various parts of the State. The Station has published since its organization in 1887, ninety-three regular, twenty-four press, and fifteen class bulletins.

The principal lines of work conducted at the station are as follows: Chemistry of soils and farm crops; field experiments—rotations, tests of varieties of cereals and forage crops, time and depth of seeding grains and amount of seed, methods of seeding grasses; horticulture—tests of varieties of fruits and vegetables, use of wind-breaks, testing hardy stocks for apple trees, improvement of native fruits; forestry; diseases of plants; food and nutrition of man; plant and animal breeding; feeding experiments; diseases of animals; entomology; dairying; farm management and farm statistics.

## PUBLICATIONS OF THE DEPARTMENT OF AGRICULTURE

Bulletins of the Experiment Station for 1905.

Annual Report for 1905.

### General Bulletins:

- No. 87 Potatoes at University Farm.
- No. 88 Injurious Insects of 1904.
- No. 89 Soil Investigations.
- No. 90
1. Heavy & Light Weight Grains.
  2. Starchy and Glutenous Grains.
  3. Light & Dark Colored Flax Seed.
  4. Rusted Wheat.
  5. Milling Tests of Wheat.
- No. 91 Poultry Culture in Minnesota.
- No. 92 The Digestibility & Nutritive Value of Cottage Cheese, Rice, Peas, & Bacon.
- No. 93 Diptera of Minnesota; Two-winged Flies Affecting the Farm, Garden, Stock & Household.

### Press Bulletins.

- No. 21 Seed Wheat Famine
- No. 22 Insects and Insect-like Animals attacking Live Stock in Minnesota.
- No. 23 Dipping Live Stock.
- No. 24 Seed Grain

THE COLLEGE *of* LAW

# The College of Law

## FACULTY.

CYRUS NORTHROP, LL.D., President.

WILLIAM S. PATTEE, LL.D., Dean and Professor of Law.  
*Equity and International Law.*

A. C. HICKMAN, LL.D., Professor of Law.  
*Pleading and Practice.*

JAMES PAIGE, A.M., LL.M., Professor of Law.  
*Torts and Criminal Law.*

HENRY J. FLETCHER, LL.M., Professor of Law.  
*Contracts and Real Property.*

EDWIN A. JAGGARD, LL.D., Associate Justice of the Supreme Court.  
*Taxation.*

HOWARD S. ABBOTT, B.L., of the Hennepin County Bar.  
*Corporations.*

ROBERT S. KOLLINER, LL.B., of the Hennepin County Bar.  
*Personal Property.*

HUGH E. WILLIS, A.M., LL. M., Instructor in Law.  
*Personal Property, Bailments and Carriers.*

## LECTURERS.

GEORGE B. YOUNG, LL.B., St. Paul, Minn.

(Ex-Associate Justice of the State of Minnesota.)

*Conflict of Laws.*

HON. JAMES O. PIERCE, Minneapolis, Minn.

(Ex-Judge of the Circuit Court of Memphis, Tenn.)

*Constitutional Jurisprudence and History.*

HON. C. D. O'BRIEN, St. Paul, Minn.

*Criminal Procedure.*

JOHN COCHRANE SWEET, LL.M., Minneapolis, Minn.

*Mortgage Foreclosure.*

JARED HOW, LL.B., St. Paul, Minn.

*Landlord and Tenant.*

FRED E. HOBBS, B.S., LL.B.

*Instructor in Justice and Moot Court Practice.*

HOMER W. STEVENS, A. B., LL. B.

*Librarian.*

## SPECIAL LECTURERS UPON GENERAL TOPICS FOR

1906-7.

C. W. BUNN, St. Paul, Minn.

(General Counsel of the Northern Pacific Ry. Co.)

FRANK B. KELLOGG.

(General Counsel for the Chicago Great Western Ry. Co.)

M. B. KOON.

(Ex-Judge of District Court.)

Hennepin County, Minn.

WILLIAM LOUIS KELLEY.

(Judge of District Court.)

Ramsey County, Minn.

## College Calendar, 1906-1907

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SEPTEMBER	10-17 Entrance examinations and registration. 18 Classes called for regular work.
DECEMBER	8 End of first term. 10 Second term opens, classes called for regular work. 21 Holiday recess begins—no classes.
JANUARY	7 Work resumed.
MARCH	16 End of second term. 18 Third term opens, classes called for regular work.
JUNE	9-13 Commencement week. 13 Commencement day, graduating exercises.

# The College of Law

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## OBJECT.

It is the object of the College of Law of the University of Minnesota to educate its students by means of the study of jurisprudence, and at the same time so familiarize them with the fundamental principles of positive law that they will be able, at the end of their course, to safely enter upon the duties of the legal profession. Education, and not simply information, is the prime object. The power to think clearly, to reason cogently, to perceive distinctions quickly, to investigate thoroughly, to generalize carefully and to express his thoughts accurately are the basal qualifications of the safe counsellor. To secure for the students these habits of thought and expression should be the aim of both the student himself and his instructor.

The method of work generally pursued in the college is threefold. *First.* The reported cases, being the original repositories of the principles of law and equity, are read by the student and considered in the class-room. To facilitate the work and save expense for the student, volumes of these cases are reprinted and put, free of charge, into the hands of the student during the continuance of the subject, and each subject is pursued daily until its completion. *Second.* Besides reading the cases, the student in most subjects is required to prepare a written analysis of each case, stating in his own words, the issue upon which the case turns, the law which governs it, a brief statement of the facts, and the conclusion which the law and facts logically necessitate. This practice has proved helpful in securing a greater thoroughness in reading, greater carefulness in reasoning and greater accuracy on the part of the student in the art of expression. *Third.* In addition to the student's in-

vestigation of the cases, and his presentation of them to his instructor, a systematic and orderly arrangement of each subject in the form of a summary, and much additional information regarding the details of the law's application in particular instances, and a consideration of the exceptions, limitations and statutory modifications of general principles, and especially information regarding the art of practice, are indispensable, and are in most instances supplied by printed lectures prepared for that purpose, or by well-written text-books upon the subject under consideration. *Information*, as well as *education*, is necessary to prepare a student to begin the practice of law. So far as possible he should, at the end of his course, grasp the various subjects of law in the unity of a system, and to do this he must, in many instances, take the generalizations of his instructor, or take them from some text-book, until he shall find time to investigate the subject for himself.

#### LAW BUILDING.

The Law building, recently enlarged, is admirably adapted to the uses for which it was constructed. It supplies ample facilities for all the varied exercises of the College. The accompanying cut shows its external form and style of architecture. The entire upper story is devoted to the library and reading room, except that portion of it conveniently arranged for the Judge's Chambers, the Court room, the Clerk's office, the Jury room, and the offices of the Dean. Upon the first floor there is a large and convenient auditorium, lecture rooms, and private offices for the professors, beside the general office for the special business of the department. Under the most recently constructed portion of the building there is a well-lighted and convenient basement, devoted to society rooms for the legal, literary, and debating organizations. As now reconstructed and arranged the building provides all the conveniences of a modern Court house for the practice department, furnishes ample light and well-ventilated reading rooms and other excellent library facilities, and affords sufficient room for all the other regular work of the College.



## REQUIREMENTS FOR ADMISSION.

Graduates of universities or colleges, and students who have graduated from any normal school or State high school of Minnesota, or from similar institutions of equal grade in other states, are admitted without examination upon presentation of their diplomas.

All other applicants must pass an examination in the studies required for admission to the freshman class of the College of Science, Literature and the Arts, which are as follows:

N. B.—*Time element, as indicated with each subject, is essential.*

*English*, four years, including

- (a) Classics.
- (b) Principles of composition.
- (c) Practice in written expression.

*Algebra*, elementary, one year.

*Geometry*, plane, one year.

In addition to the above named subjects, which are required for all courses, and for which substitutes cannot be accepted, applicants shall present evidence of preparation in *nine* year-credits, or their equivalent, to be chosen from the following list:

*Algebra*, higher, one-half year.

*Geometry*, solid, one-half year.

*Latin*,

Grammar, (one year-credit).

Caesar, four books, (one year-credit).

Cicero, six orations, (one year-credit).

Vergil, six books, (one year-credit).

*Greek*.

Grammar, (one year-credit).

Anabasis, four books, (one year-credit).

*German*,

Grammar, (one year-credit).

Literature, (one year-credit).

*French*,

Literature, (one year-credit).

Grammar, (one year-credit).

*Spanish*, (two years).

Grammar, one year.

Literature, one year.

*History*.

Ancient, to Charlemagne, one year.

Modern, from Charlemagne, one year.

England, one-half year.

Senior American, one-half year.

*Civics*, (one-half year-credit).

*Political economy*, (one-half year-credit).

*Physics*, (one year-credit).

*Chemistry*, (one year-credit).

*Botany*, (one-half or one year-credit).

*Zoology*, (one-half or one year-credit).

*Astronomy*, (one-half year-credit).

*Geology*, (one-half year-credit).

*Physiography*, (one-half year-credit).

*N. B.*—By a *year-credit* is meant, a full year's work upon one subject, five recitations per week, as given in an ordinary high school course.

Substantial equivalents may be substituted, and a business education, as well as experience in teaching, may be accepted in lieu of some of the less important subjects.

Applicants who have diplomas entitling them to admission without examination should present them to the Dean of the College, and those who are to take examinations or enter as special students, should present themselves to the Dean, who will, upon proof of their qualification for admission, refer them to the registrar and accountant to whom they pay their matriculation fee and the first term's tuition.

### SPECIAL STUDENTS.

Persons who are not candidates for a degree may enter the College as special students by special permission of the faculty; but any undergraduate from a high school will be required be-

fore admission to present to the faculty a satisfactory record of his high school work and an honorable discharge from such high school. And all such students will be entitled to a certificate upon satisfactory examination in the subjects pursued by them, stating the time they have been members of the college and the subjects in which they have passed a creditable examination.

Such students, however, if they elect studies in both the day and evening courses, pursuing both at the same time, will be charged ten dollars per term additional tuition.

Students in the day or evening classes will not be permitted to attend more than two courses of lectures daily, unless in exceptional cases, and then a card of admission must be procured from the faculty and ten dollars per term additional tuition must be paid.

Students who are regular members of one class, either day or evening, will not be permitted to pursue studies in any class in advance of that to which they belong, unless there are special circumstances requiring it, and only upon special permission granted by the faculty.

### SENIOR ELECTIVES.

Students in the senior class of the College of Science, Literature and the Arts, are permitted to elect, throughout the senior year, work in the College of Law, including the elements of contracts, domestic relations, torts, criminal law and negotiable paper. The satisfactory completion of the above named subjects will give the student a six hour credit throughout the senior year, and will entitle him to admission to the middle class of the College of Law. No such student will be permitted to take more than one lecture each day in the College of Law, without special permission of the faculty of the College of Science, Literature and the Arts.

### ADVANCED STANDING.

Should any person desire to enter the middle or senior class for a degree he must be at least nineteen years of age, must

pass the required preliminary examination upon the subjects of the preceding year or years, or their equivalents, but no person will be allowed to receive his degree who has not spent one full year in this department. Attorneys at law, however, who have been admitted to practice in the State of Minnesota and have a high school education or its equivalent, may enter the senior class without examination upon presentation of their certificates of admission, and shall be entitled to their degree upon a satisfactory showing at the final examination of the year upon the entire work of the three years.

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## FOUR COURSES OF STUDY.

### FIRST.

#### DAY COURSE OF THREE YEARS.

##### FIRST YEAR.—JUNIOR.

###### FIRST TERM.

Contracts, (including Statute of Frauds). Twelve weeks, six lectures a week.

Personal Property and Sales. Eight weeks, six lectures a week.

Domestic Relations. One week, six lectures a week.

###### SECOND TERM.

Domestic Relations. Three weeks, six lectures a week.

Common Law Pleading. Three weeks, six lectures a week.

Torts. Nine weeks, six lectures a week.

Equity, (Maxims). Four weeks, six lectures a week.

###### THIRD TERM.

Blackstone, (Second Book). Four weeks, six lectures a week.

Criminal Law. Five weeks, six lectures a week.

Agency. Three weeks, six lectures a week.

Commercial paper. Four weeks, six lectures a week.

## SECOND YEAR—MIDDLE.

## FIRST TERM.

Wills and Administration. Four weeks, six lectures a week.

Chattel Mortgages. Three weeks, six lectures a week.

Partnership. Four weeks, six lectures a week.

Code Pleading. Seven weeks, six lectures a week.

Liens. Two weeks, six lectures a week.

Bankruptcy. Two weeks, six lectures a week.

## SECOND TERM.

Bailments and Carriers. Four weeks, six lectures a week.

Private and Public Corporations. Eight weeks, six lectures a week.

Insurance. Three weeks, six lectures a week.

Equity, (Doctrines). Four weeks, six lectures a week.

## THIRD TERM.

Real Property, (including Covenants and Conveyancing).  
Twelve weeks, six lectures a week.

Landlord and Tenant. Two weeks, six lectures a week.

## THIRD YEAR—SENIOR.

## FIRST TERM.

Evidence. Five weeks, five lectures a week.

Trusts. Three weeks, five lectures a week.

Minnesota Real Property. Four weeks, five lectures a week.

Special Lectures on Abstracts, Conflict of Laws, Criminal Procedure, Extraordinary Remedies, Federal Jurisdiction and Practice.

College Court. Eight weeks.

## SECOND TERM.

Equity, (Accident, Mistake and Fraud). Four weeks, five lectures a week.

Mortgages and Mortgage Foreclosure. Four weeks, five lectures a week.

International Law. Four weeks, five lectures a week.

College Court. Twelve weeks.

THIRD TERM.

Taxation. Four weeks, five lectures a week.

Constitutional Law. Six weeks, five lectures a week.

College Court. Ten weeks.

SECOND.

THREE YEARS' EVENING COURSE.

To accommodate those who cannot attend the lectures during the day, there is offered an evening course comprising the same subjects as those above enumerated, extending over a period of three years, of nine months each. The students in this course pursue the same subjects as those in the day courses, and in the same order, except that the senior and middle classes are united, and the work of the two years is arranged to meet the demands of such a union.

FIRST YEAR—JUNIOR.

FIRST TERM.

Contracts, (including Statute of Frauds). Nine weeks, five lectures a week.

Bailments and Carriers. Three weeks, five lectures a week.

SECOND TERM.

Bailments and Carriers. One week, five lectures a week.

Domestic Relations. Three weeks, five lectures a week.

Criminal Law. Five weeks, five lectures a week.

Agency. Three weeks, five lectures a week.

## THIRD TERM.

Torts. Eight weeks, five lectures a week.  
 Commercial Paper. Four weeks, five lectures a week.

## SECOND AND THIRD YEARS—SENIOR AND MIDDLE.

1906-1907.

## FIRST TERM.

Evidence. Five weeks, five lectures a week.  
 Blackstone, (Second Book). Four weeks, five lectures a week.  
 Code Pleading. Three weeks, five lectures a week.  
 College Court, seniors. Eight weeks.

## SECOND TERM.

Code Pleading. Four weeks, five lectures a week.  
 Real Property. Eight weeks, five lectures a week.  
 College Court, seniors. Twelve weeks.

## THIRD TERM.

Minnesota Real Property. Three weeks, five lectures a week.  
 Equity Jurisprudence. Eight weeks, five lectures a week.  
 College Court, seniors. Twelve weeks.

## THIRD.

## SPECIAL COURSE.

For the benefit of those who do not care to pursue an extended course of legal instruction leading to the degree of bachelor of laws, (LL. B.), but desire such a knowledge of law as is of inestimable value to them in a business career, there is offered a special course.

This course extends over one year, and for the accommodation of business men the lectures are delivered in the evening.

The course embraces the following subjects: contracts, including statute of frauds; agency; commercial paper; partner-

ship; bankruptcy law; liens; bailments; master and servant; insurance; sales.

The subjects in this course may be varied upon consultation with the faculty, and other subjects in place may be substituted by those whose business life or whose preference render it desirable.

Those who complete the course and pass a satisfactory examination receive a certificate of proficiency.

FOURTH.

GRADUATE COURSE.

FIRST.

For the benefit of those students who wish to pursue their legal studies further than they are able to do in the undergraduate years, two graduate courses are offered, the first leading to the degree of master of laws, (LL. M.), the second to the degree of doctor of civil law, (D. C. L.).

The courses of lectures offered in the first year of graduate work are as follows:

Philosophic basis of jurisprudence.

Roman law.

Political science.

Constitutional jurisprudence and history.

Those who enter this course as candidates for the degree must have already received the degree of bachelor of laws, from this or some other law college having a three years' course of study. Those who spend the entire year in the work prescribed for this course, and pass a satisfactory examination upon the subjects taken, will be entitled to the degree of master of laws.

But no graduate of another law school, who has not been admitted to the Bar in Minnesota, will be matriculated in this course as a regular student for the degree of LL.M.; but any person who possesses the requisite legal learning may enter the course as a special student and pursue any or all of the studies offered.



## SECOND.

Students who have received the degree of LL. B., from this or some other law school requiring three years' study of law for said degree, and who have also received the degree of LL.M., from this or some other school, after not less than one year of graduate study, and who have taken high rank in all the studies leading to these degrees, may apply to the faculty for the degree of Doctor of Civil Law. A knowledge of French or German, as well as of Latin is required, and special proficiency in Roman history is necessary to entitle a student to entrance for such degree.

There is no prescribed time within which students are required to do their work in this course, but they must make themselves proficient in the subjects of Roman law, political science, comparative constitutional law, and the philosophy of jurisprudence before any thesis will be accepted from them.

None of the aforementioned degrees will be conferred until a satisfactory thesis is presented to the faculty by the student, and the thesis for the doctor's degree must be one evincing original investigation and special excellence.

Whether a class will be organized in this course during the academic year of 1906 and 1907 will depend upon the number of applicants for admission.

## TUITION.

### UNDERGRADUATE STUDENTS.

A matriculation fee of ten dollars must be paid by every student entering the college. The tuition fee is sixty dollars a year, or twenty dollars per term payable in advance at the beginning of each term.

### GRADUATE STUDENTS

The tuition fee for graduate students is thirty dollars, payable in advance, as follows: Ten dollars each term. In addition

a matriculation fee of ten dollars is due from each student entering upon the course who has not previously matriculated in this college. A diploma fee of ten dollars is due from each student upon receiving his diploma.

### FREE CASE BOOKS

In order to protect the College, Bar Association and State Libraries from the special injury incident to continual use and to facilitate the class work of the college, free case books are furnished the students by the University.

### LIBRARIES.

The college has a good library containing those English and American reports most frequently cited, digests, dictionaries, and a full and excellent selection of standard text-books. To this collection additions are being constantly made.

Further facilities are afforded the college by the generous action of the Bar Association of Minneapolis in granting to the students the free use of its extensive and ample library located in Temple Court. It contains all the American reports, state and national, and also the English text-books and reports, so necessary for the student in his study of fundamental jurisprudence.

Besides the University and Bar Association libraries, the State library, containing all books which a student would have occasion to consult, is located at the capitol, in St. Paul, and is thus within easy reach of the students.

The general library at the University contains about seventy-five thousand bound volumes, besides many thousand volumes of pamphlets, magazines, reports, etc. About one hundred and twenty periodicals are received regularly by the library, not inclusive of technical magazines and newspapers in English and other languages.

Besides the general library of the University, there are several special libraries, consisting mainly of books of reference and current periodicals relating to technical subjects in connection with the several departments of engineering, biology, and botany.

These libraries are open during the entire day, and the University library is open also in the evening.

### METHODS OF INSTRUCTION

The sessions of the junior, middle and senior day classes will begin respectively at 9:00 and 10:00 o'clock a.m., and 2:00 p.m.; and those of the evening classes will begin at 7:20 o'clock p.m.

Each subject is continued daily until its completion; and when a class carries two subjects daily, one recitation or lecture follows the other immediately in order to save the student the expense and time required in going to and returning from the University.

### EXAMINATIONS FOR PROMOTION

Examinations will be held at the close of each subject during the middle and junior years, and no student who fails to pass a satisfactory examination in any of his studies will be advanced to the next higher class, except upon special permission of the faculty; and no such permission will be granted to any student who has failed in more than two subjects; but if he has not failed in more than two subjects he may be admitted to the next higher class provided he makes up those studies in which he is deficient by taking in the regular classes where they are taught.

At the end of the middle year an examination will be held upon the work of both the Junior and Middle years, for such students as the Faculty may select because of their low grades, or because their work was, in whole or in part, taken in another school, and if any student fails to pass this examination satisfactorily to the faculty he will be denied admission to the Senior class.

### EXAMINATION FOR GRADUATION

While the grades secured by students upon examination at the end of each subject will, as a general rule stand as a final

grade, yet, if a student has taken any part of his work in an office or in another law school, or for any other reason the faculty consider a review of any student's work desirable, he shall take such examination upon such subjects as the faculty may select, and only upon passing such examination satisfactorily to the faculty, shall he be entitled to his diploma.

### COLLEGE COURTS

As fast as the student becomes acquainted with the primary rights of persons, cases are prepared for his consideration, whereby he may apply the principles of law with which he has become familiar.

There is also established in the senior year a system of college courts corresponding to the justice, the district and the supreme courts of Minnesota, wherein the student may become familiar with the practice and the rules of the courts respectively.

It is the aim of the department to acquaint the student with the practice as well as the theory of law, and to this end the subjects of pleading, evidence, rules of practice adopted by our state courts, methods of securing provisional remedies, appeals from one court to another, the writs of habeas corpus, certiorari, and others of frequent use, conveyancing, drawing contracts and other like practices which comprise the daily work of the general practitioner, will, during the senior year, receive special and careful attention.

Some member of the faculty will preside over each of these courts, and the student is required to prepare appeal papers, bonds, paper books and to furnish the courts with his points and authorities according to requirements of law applicable to the various courts of the state.

### STATE AND UNITED STATES COURTS

The department 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, 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 all the opportunity for witnessing the trial of actual cases which the student will have either time or desire to improve.

### THE LECTURERS

All the lecturers in the college are lawyers actively engaged in the practice of their profession. They come to the class-room direct from the bar, bringing with them fresh experiences and the spirit of actual contest. They all possess a high ideal of what a lawyer should be and do, and the student who enters here is expected to come with the fixed purpose of attaining a high degree of excellence in legal requirements, and to respond in earnestness and with fidelity to the faithful efforts of his instructors in his behalf.

### THE LITERARY SOCIETIES

The students of the college have joined in organizing three literary societies for the purpose of general improvement and for cultivation in the practice of extemporaneous speaking. They hold weekly meetings and derive great benefit from their exercises.

### PRIZES

#### THE PILLSBURY PRIZE.

Three prizes of \$100, \$50, and \$25, offered by the heirs of the Hon. John S. Pillsbury, are awarded for the best work in the rhetorical department, as evidenced finally by an oration in public.

#### THE DUNWOODY PRIZE.

Mr. Wm. H. Dunwoody, president of the St. Anthony and Dakota Elevator Co., offers \$100 to that student who shall earn the right to represent Minnesota in the Northern Oratorical League. This league is composed of the seven largest universi-

ties of the central states, viz.: Minnesota, Iowa, Wisconsin and Michigan State Universities, and Oberlin, Chicago and Northwestern.

#### THE LOWDEN PRIZE.

Mr. Frank O. Lowden, of Chicago, offers as a prize to be competed for by the Northern Oratorical League, an endowment of \$3,000, which will yield an annual income of about \$175. A prize of \$100 will be given to the winner of the first place, \$50 to the orator who gets second place, and the remainder will be set aside each year for an interest fund to accumulate, and, in time, produce another endowment.

#### ELECTIVES FROM OTHER DEPARTMENTS

Students of this college will be admitted, under proper regulations, to work in other departments or colleges of this University, without extra charge and, so far as it does not interfere with their law studies, they are urged to avail themselves of this opportunity to attend lectures and recitations in the other departments. Such elections should be made only after consultation with the faculty. The following subjects are suggested as being particularly suitable: international law, constitutional history and political science. Students who elect such work must complete it in a satisfactory manner before they shall be entitled to receive their law degree.

#### DEGREE OF BACHELOR OF LAWS

The degree of bachelor of laws will be conferred upon students of good moral character who pursue the full course in this college and pass an approved examination, and the degree will also be conferred upon those who, having attended another law school for the period of two years, shall also attend one year in this college and pass a like examination upon the three years' work.

#### EXPENSES

These depend largely upon the tastes and habits of the individual. Students find no difficulty in obtaining board among the people of the city. Good board can be obtained for \$4.00 per week. Students board in clubs at less expense.

For further particulars write to the Dean, W. S. Pattee, and all the information necessary for the student will be furnished promptly. The Dean will be pleased to correspond with any one who is thinking of pursuing a course of legal study, and he will gladly aid any student in selecting the proper books. Letters addressed to him at Minneapolis, Minnesota, will receive prompt attention.

#### ADMISSION TO THE BAR

The Legislature of Minnesota, in the year 1891, recognized the College of Law of the University of Minnesota in the following Section No. 7, whereby students graduating therefrom are entitled to admission to the Bar of the State without examination, upon presentation of their diplomas:

Section 7. No person shall hereafter be admitted to practice as an attorney and counsellor at law; or commence, conduct or defend any action or proceeding in any of the courts of record of this State in which he is not a party concerned, either by using or subscribing his own or the name or names of any other person or persons, unless he has complied with and been admitted under and pursuant to such rules as the Supreme Court of this State shall prescribe; provided that the provisions of this act shall not apply to or affect persons admitted to the bar of this State under pre-existing laws.

Provided, That the graduates from the Law Department of the University of Minnesota shall, upon presentation of their diploma from said University to the Supreme Court, or any District Court of this State, at any time within two (2) years from the date of such diploma, be entitled to a certificate of admission to the bar without any examination or fee whatever, and such court shall thereupon enter an order authorizing and directing the clerk of said court to issue to such graduate a certificate of admission to the bar, upon proof satisfactory to said court that such graduate is a citizen of the United States, a citizen and resident of the State of Minnesota; that he is twenty-one (21) years of age, of good moral character, and upon his subscribing such oath as is now provided by statute for persons upon their admission to the bar.

DEPARTMENT *of* MEDICINE

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THE COLLEGE OF MEDICINE AND SURGERY



# Calendar, College of Medicine and Surgery

## FIRST SEMESTER.

SEPTEMBER	13	Th.	Entrance and condition examinations. Registration.	
	14	F.	Entrance and condition examinations. Registration.	
	15	S.	Entrance and condition examinations. Registration.	
	17	M.	Registration and classification of students. Opening lecture, 8:00 P. M.	
	18	T.	Classes called for regular work.	
	22	S.	.....	1 wk.
	29	S.	.....	2 wk.
OCTOBER	6	S.	.....	3 wk.
	13	S.	.....	4 wk.
	20	S.	.....	5 wk.
	27	S.	.....	6 wk.
NOVEMBER	3	S.	.....	7 wk.
	10	S.	.....	8 wk.
	17	S.	First half semester ends.	9 wk.
	19	M.	Second half semester begins.	
	24	S.	.....	10 wk.
DECEMBER	29	Th.	Thanksgiving Day. Recess three days.	
	1	S.	.....	11 wk.
	8	S.	.....	12 wk.
	15	S.	.....	13 wk.
	22	S.	Holiday recess begins. No classes.	14 wk.
JANUARY	8	T.	Work resumed in all classes.	
	12	S.	.....	15 wk.
	19	S.	.....	16 wk.
	26	S.	.....	17 wk.
FEBRUARY	2	S.	End of first semester.	18 wk.

## SECOND SEMESTER.

FEBRUARY	5	T.	Second semester begins. Work resumed in all classes.	
	9	S.	.....	1 wk.
	12	T.	Lincoln's Birthday—Holiday.	
	16	S.	.....	2 wk.
	22	F.	Washington's Birthday—Holiday.	
	23	S.	.....	3 wk.
MARCH	2	S.	.....	4 wk.
	9	S.	.....	5 wk.
	16	S.	.....	6 wk.
	23	S.	.....	7 wk.
	30	S.	.....	8 wk.
APRIL	6	S.	First half semester ends.	9 wk.
	13	S.	.....	10 wk.
	20	S.	.....	11 wk.
	27	S.	.....	12 wk.
MAY	4	S.	.....	13 wk.
	11	S.	.....	14 wk.
	18	S.	.....	15 wk.
	25	S.	.....	16 wk.
JUNE	1	S.	.....	17 wk.
	7	F.	Annual Faculty meeting.	
	8	S.	End of second semester.	18 wk.

COMMENCEMENT WEEK, 1907.

Sunday,	June 9	Baccalaureate Service.
Monday,	June 10	Senior Class Exercises.
Tuesday,	June 11	Senior Promenade.
Wednesday,	June 12	Alumni Day.
Thursday,	June 13	Commencement Day—The Eighteenth Annual Commencement.
Friday,	June 14	Summer Vacation begins.

SCHEDULE OF EXAMINATIONS FOR ADVANCED STANDING  
AND TO REMOVE CONDITIONS.

September 13-15, 1906.

Thursday, Sept. 13, 9:00 a. m.

2:00 p. m.

- I. Year Chemistry
- II. Year Chemistry
- III. Year Principles of Surgery
- IV. Year Surgical Pathology, Tumors

- I. Year Histology and Embryology, practical and didactic
- II. Year Histology and Embryology, practical and didactic.
- III. Year Surgery.
- IV. Year Surgery.

Friday, Sept. 14, 9:00 a. m.

2:00 p. m.

- I. Year Physiology
- II. Year Physiology
- III. Year Practice of Medicine
- IV. Year Practice of Medicine

- I. Year
- II. Year General Pathology and Bacteriology, practical and didactic
- III. Year Special Pathology and Bacteriology, practical and didactic
- IV. Year Obstetrics

Saturday, Sept. 15, 9:00 a. m.

2:00 p. m.

- I. Year Anatomy
- II. Year Anatomy
- III. Year Surgical Anatomy
- IV. Year Clinical Microscopy

- I. Year
- II. Year Materia Medica
- III. Year Therapeutics
- IV. Year

Examination for advanced standing and to remove conditions in the following third and fourth-year subjects will be held by *appointment* during September 13-15: Operative Surgery, Diseases of Children, Medical Jurisprudence, Physical Diagnosis, Nervous and Mental Diseases, Gynecology, Ophthalmology and Otolology, Genito-Urinary Diseases, Orthopaedia, Skin and Venereal, Rhinology and Laryngology, Hygiene.

Students must register for examinations in Dean's office at least twenty-four hours prior to any examination they may wish to take. See also under Rules.

# College of Medicine and Surgery

## FACULTY

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CYRUS NORTHROP, LL. D., *President.*

CHARLES A. WHEATON, M. D., *Emeritus Professor of Surgery.*

J. W. BELL, M. D., *Emeritus Professor of Medicine and Physical Diagnosis.*

PARKS RITCHIE, M. D., *Dean and Professor of Obstetrics.*

### PROFESSORS.

AMOS W. ABBOTT, M. D., *Clinical Professor of Diseases of Women.*

EVERTON J. ABBOTT, A. B., M. D., *Clinical Professor of Medicine and Chief of Medical Clinic.*

RICHARD O. BEARD, M. D., *Professor of Physiology.*

HENRY M. BRACKEN, M. D., L. R. C. S., Edin., *Professor of Materia Medica and Therapeutics.*

HUBERT C. CAREL, B. S., *Professor of Chemistry.*

A. B. CATES, A. M., M. D., *Professor of Obstetrics.*

JAMES T. CHRISTISON, M. D., *Clinical Professor of Diseases of Children.*

FREDERICK A. DUNSMOOR, M. D., *Professor of Operative and Clinical Surgery.*

CHARLES A. ERDMAN, M. D., *Professor of Anatomy.*

BURNSIDE FOSTER, M. A., M. D., *Clinical Professor of Diseases of the Skin and Lecturer upon the History of Medicine.*

GEORGE B. FRANKFORTER, M. A., Ph. D., *Dean of the School of Chemistry. Professor of Chemistry.*

ARTHUR J. GILLETTE, M. D., *Professor of Orthopedic Surgery.*

CHARLES L. GREENE, M. D., *Professor of the Theory and Practice of Medicine.*

GEORGE D. HEAD, B. S., M. D., *Professor of Clinical Microscopy and Medicine.*

CHARLES H. HUNTER, A. M., M. D., *Clinical Professor of Medicine and Chief of Medical Clinic.*

WILLIAM A. JONES, M. D., *Clinical Professor of Nervous and Mental Diseases.*

THOMAS G. LEE, B. S., M. D., *Professor of Histology and Embryology, Secretary of the Faculty, and Librarian.*

J. WARREN LITTLE, M. D., *Clinical Professor of Surgery.*

ARCHIBALD MACLAREN, A. B., M. D., *Clinical Professor of Surgery.*

JAMES E. MOORE, M. D., *Professor of Surgery.*

- WILLIAM R. MURRAY, A. B., M. D., *Clinical Professor of Rhinology and Laryngology.*  
 LOUIS A. NIPPERT, M. D., *Clinical Professor of Medicine.*  
 CHARLES NOOTNAGEL, M. D., *Clinical Professor of Medicine and Physical Diagnosis.*  
 HENRY J. O'BRIEN, M. D., *Clinical Professor of Surgery.*  
 JUSTUS OHAGE, M. D., *Clinical Professor of Surgery.*  
 C. EUGENE RIGGS, A. M., M. D., *Professor of Nervous and Mental Diseases.*  
 THOMAS L. ROBERTS, M. D., *Professor of Diseases of Children.*  
 JOHN T. ROGERS, M. D., *Clinical Professor of Surgery.*  
 JOHN L. ROTHROCK, A. M., M. D., *Clinical Professor of Diseases of Women.*  
 JACOB E. SCHADLE, M. D., *Professor of Rhinology and Laryngology.*  
 GEORGE E. SENKLER, M. D., *Clinical Professor of Medicine.*  
 HENRY L. STAPLES, A. M., M. D., *Clinical Professor of Medicine.*  
 J. CLARK STEWART, B. S., M. D., *Professor of the Principles of Surgery.*  
 ALEXANDER J. STONE, M. D., LL. D., *Professor of Diseases of Women.*  
 ARTHUR SWEENEY, M. D., *Professor of Medical Jurisprudence.*  
 FRANK C. TODD, M. D., *Professor of Ophthalmology and Otology.*  
 MAX P. VANDER HORCK, M. D., *Professor of the Diseases of the Skin and Genito Urinary Organs.*  
 FRANK F. WESBROOK, M. A., M. D., C. M., *Professor of Pathology and Bacteriology.*

## ASSISTANT PROFESSORS.

- H. W. HILL, M. D., *Assistant Professor of Bacteriology.*  
 WINFIELD S. NICKERSON, Sc. D., M. D., *Assistant Professor of Histology and Embryology.*  
 S. M. WHITE, B. S., M. D., *Assistant Professor of Pathology and Bacteriology.*  
 LOUIS B. WILSON, M. D., *Assistant Professor of Clinical Pathology.*
- CLINICAL AND LABORATORY INSTRUCTORS AND DEMONSTRATORS.
- E. V. APPELEY, M. D., *Clinical Instructor in Ophthalmology.*  
 A. E. BENJAMIN, M. D., *Clinical Instructor in Diseases of Women.*  
 JNO. B. BRIMHALL, M. D., *Clinical Instructor in Orthopedic Surgery.*  
 R. A. CAMPBELL, M. D., *Clinical Instructor in Rhinology and Laryngology.*  
 A. B. CARR, D. D. S., *Instructor in Medical Chemistry.*  
 A. R. COLVIN, M. D., *Clinical Instructor in Surgery.*  
 W. H. CONDIT, B. S., M. D., *Instructor in Materia Medica.*  
 GEORGE M. COON, M. D., *Clinical Instructor in Genito Urinary Diseases.*  
 J. G. CROSS, M. D., *Clinical Instructor in Medicine.*  
 H. W. DAVIS, M. D., *Clinical Instructor in Obstetrics.*  
 WARREN A. DENNIS, M. D., *Clinical Instructor in Surgery.*  
 IRA H. DERBY, B. S., *Demonstrator in Medical Chemistry.*  
 A. W. DUNNING, M. D., *Clinical Instructor in Nervous and Mental Diseases.*  
 JUDD GOODRICH, M. D., *Clinical Instructor in Surgery.*  
 GEORGE D. HAGGARD, M. D., *Instructor in Physiology.*  
 ARTHUR S. HAMILTON, M. D., *Instructor in Pathology of the Nervous System.*  
 P. A. HOFF, M. D., *Clinical Instructor in Medicine.*  
 H. W. JONES, M. D., *Clinical Instructor in Nervous and Mental Diseases.*  
 ARTHUR A. LAW, M. D., *Instructor in Operative Surgery.*  
 FREDERICK LEAVITT, M. D., *Clinical Instructor in Obstetrics.*

- J. C. LITZENBERG, B. S., M. D., *Clinical Instructor in Obstetrics.*  
 A. T. MANN, B. S., M. D., *Clinical Instructor in Surgery.*  
 R. H. MULLIN, B. A., M. B., *Demonstrator in Pathology and Bacteriology.*  
 M. L. NICKERSON, A. M., M. D., *Instructor in Histology and Embryology.*  
 WALTER RAMSEY, M. D., *Clinical Instructor in Diseases of Children.*  
 H. K. READ, M. D., *Demonstrator of Anatomy.*  
 S. P. REES, B. S., M. D., *Instructor in Physical Diagnosis and Clinical Medicine.*  
 H. P. RITCHIE, Ph. B., M. D., *Clinical Instructor in Diseases of Women.*  
 HENRY L. ULRICH, M. D., *Instructor in Clinical Microscopy.*  
 M. R. WILCOX, M. D., *Demonstrator in Physiology.*  
 H. L. WILLIAMS, M. D., *Clinical Instructor in Diseases of Women.*  
 F. R. WRIGHT, M. D., *Clinical Instructor in Dermatology and Genito Urinary Diseases.*  
 VAN H. WILCOX, M. D., *Instructor in Operative Surgery.*

## CLINICAL AND LABORATORY ASSISTANTS.

- F. L. ADAIR, M. D., *Clinical Assistant in Medicine.*  
 W. H. AURAND, M. D., *Clinical Assistant in Medicine.*  
 JOHN M. ARMSTRONG, M. D., *Clinical Assistant in Genito Urinary Diseases.*  
 CHARLES R. BALL, M. D., *Clinical Assistant in Nervous and Mental Diseases.*  
 L. O. DART, M. D., *Clinical Assistant in Diseases of Children.*  
 R. E. FARR, M. D., *Clinical Assistant in Surgery.*  
 EMIL S. GEIST, M. D., *Clinical Assistant in Orthopaedia.*  
 JAMES T. GILFILLAN, M. D., *Clinical Assistant in Medicine.*  
 E. K. GREEN, A. B., M. D., *Clinical Assistant in Medicine.*  
 E. R. HARE, M. D., *Prosector in Anatomy.*  
 ALEX. R. HALL, M. D., *Clinical Assistant in Medicine.*  
 JOHN E. HYNES, M. D., *Clinical Assistant in Medicine.*  
 A. E. LOBERG, M. D., *Clinical Assistant in Nervous and Mental Diseases.*  
 J. S. MACNIE, M. D., *Clinical Assistant in Diseases of the Eye and Ear.*  
 JEANNETTE M. McLAREN, M. D., *Clinical Assistant in Obstetrics.*  
 W. D. SHELDON, M. D., *Clinical Assistant in Medicine.*  
 THOS. W. STUMM, M. D., *Clinical Assistant in Medicine.*  
 S. E. SWEITZER, M. D., *Clinical Assistant in Dermatology and Genito-Urinary Diseases.*  
 ARCHA WILCOX, M. D., *Clinical Assistant in Surgery.*

## UNIVERSITY SCHOLARS GIVING INSTRUCTION AND ASSISTING IN LABORATORIES.

## IN HISTOLOGY AND EMBRYOLOGY.

HENRY T. FOSHAGER, MARTIN OYEN, MATTHIAS SUNDT, CHARLES S. SUTTON.

## IN ANATOMY.

C. C. TYRELL, PAUL ASHLEY, FRED SMITH.

## IN PATHOLOGY AND BACTERIOLOGY.

JOHN P. SCHNEIDER, HARRY J. BARTRON, ED. MOREN, R. A. VARCO, B. A., EARL H. CURRENT, THOS. R. MARTIN, B. A., R. H. LABBITT, CARL O. ESTREM, B. A., J. P. WEYRENS, B. S.

# The Department of Medicine

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The Department of Medicine includes the following named colleges:

*The College of Medicine and Surgery.*

*The College of Homeopathic Medicine and Surgery.*

*The College of Dentistry.*

*The College of Pharmacy.*

Each college is distinct in the government of its internal affairs, has its own faculty and an independent curriculum, save in the studies of anatomy, physiology, chemistry, histology and embryology. These studies, so far as they are required in the various courses, are pursued by all students of the department in common.

## BUILDINGS AND EQUIPMENT.

The department is resident in six buildings, five of which are situated upon the University Campus, viz: Medical hall, the Medical Science building, the Laboratory of Chemistry, the Laboratory of Anatomy and the Institute of Public Health and Pathology. In addition, two more buildings, a University Hospital and a building for Operative Surgery, are provided for and will be erected.

Medical hall contains the offices of the dean and secretary of the college of medicine and surgery, and of the deans of the college of homeopathic medicine and surgery and of the college of dentistry; a large amphitheatre and lecture rooms for the several colleges, the library and reading room of the department, the laboratory of materia medica, the operating rooms and laboratories of dentistry and the dental infirmary.

The Medical Science building is a large three-story and basement building, 75 x 150 ft., especially designed for laboratory uses. The south wing of the building is occupied by the college of pharmacy and the department of physiology. It contains the office and private laboratory of the dean of the college of pharmacy, the pharmaceutical and botanical laboratories, the laboratory of organic chemistry, with preparation and stock rooms. A large lecture amphitheatre, especially arranged for demonstrative work in physiology, the laboratories of experimental physiology and of physiologic chemistry, the offices, library and recitation rooms of this department are also situated in this wing. Upon the basement floor are laboratory stock

rooms, work shop, and the animal rooms devoted to physiologic purposes.

The north wing and center are occupied by the department of Histology and Embryology. Each of these branches has its large, well-lighted laboratories, preparation rooms and private study rooms for research. In addition there are lecture and recitation rooms, smaller laboratories for micro-technique and neurology; animal rooms and operating rooms for experimental work; rooms for photography and photomicrography, for reconstruction work and the making of models and charts; chemical laboratory, departmental library, a vault for the storage of the very valuable collection of series of embryos and sets of histological slides; store rooms and the offices of the professors and assistants.

The Laboratory of Medical Chemistry is a one-story brick building, devoted entirely to the use of this department. It is equipped with amphitheatre, laboratories, preparation rooms, store rooms, and private offices of the professor and assistants.

The Laboratory of Anatomy is a new two-story and basement building, 35 x 60 feet. In the basement are the morgue, injecting room, cold storage vaults, and engine and apparatus for the carbon dioxide freezing plant. On the first floor there is an amphitheatre seating one hundred and seventy-five students, the private offices of the professors and instructors, a private dissecting room and a small laboratory for research work. The entire second floor is devoted to laboratories for practical work in anatomy.

The Institute of Public Health and Pathology, now almost completed, will be ready for occupancy for the year 1906-07.

The building, which is 213 feet over all and 100 feet deep in the central portion, consists of a central main portion 60 by 100 feet, with north and south wings each 56 by 75 feet.

In the south wing are housed the State Board of Health laboratories, which are connected by an underground passage with the adjacent Laboratory of Animal Research of the Minnesota State Board of Health. This wing also contains a suite of rooms for a Pasteur Institute in which the special treatment of and research in rabies will be carried on. Diagnostic laboratories are provided for the bacteriological, chemical and pathological work of the State Board of Health, workshops for the repair and making of special apparatus, unpacking, storage, shipping, washing and media rooms are also available. Research laboratories and the offices and special laboratories of the professional members of the staff are here provided together with vaults for records and offices for the clerical staff.

The central portion and north wing provide for teaching and research work in the University Departments of Pathology, Bacteriology and Public Health. The central portion of the building is 100 by 60 feet, being three stories in front and four stories in the rear, where three of the stor-

ies are devoted to museum and library purposes. Here special books and periodicals are provided and interesting pathological and bacteriological specimens and materials, apparatus, methods of construction and other illustrative features of public health are on exhibition. On the first floor is a preparation room for the museum and lecture room, beneath the museum and adjacent to the lecture and autopsy room. Six special laboratories and offices are provided for the Professor of Surgical Pathology, Assistant Professor of Pathology, Demonstrator of Pathology and Bacteriology and the Assistant Director of the State Board of Health Laboratory. The remainder of the central portion is occupied by the lecture and autopsy amphitheatre, special research laboratories, photographic laboratories and a cold storage plant.

In the north wing the main teaching laboratory occupies the full floor space of 75 by 56 feet. It is lighted on three sides and by a skylight and is divided by low partitions into twelve loges, each intended for the use of a group of students. Each loge is fully equipped with all apparatus and supplies which the students may need in the practical work of pathology, bacteriology or public health, so as to render each group independent. A coat room and a room for the distribution of supplies open off the main laboratory. Beneath this is a similar students' research laboratory containing six loges which are to be used for the teaching of such special courses as Pathology of Tumors, Neuro-Pathology, practical Public Health laboratory work, etc. Opening off this is a special laboratory for the teacher in charge, for the issuing of supplies and also a coat room. Other special laboratories, including rooms for the preparation and storage of media and the storage of stock cultures of bacteria, and living quarters for the janitor are also in this wing.

A University Hospital upon the Campus has been provided for through a bequest by the widow of the late Dr. A. F. Elliott; this money, amounting to over \$125,000.00 will be used in the construction of a large, thoroughly equipped hospital designed with especial reference to teaching purposes.

The last Legislature provided for a building adjacent to the Medical quadrangle which when completed will give fine accommodation for operative surgery, pharmacology, an animal hospital and for the storage and breeding of animals.

The University Clinical Building is situated in a part of the city most favorable to the development of an out-door service and, at the same time, accessible to the students. It is of two stories and covers 40x150 feet. It affords ample floor space for amphitheatres, waiting rooms, dispensary and class rooms for each of the clinical branches. Wards and laboratories, in which section work in medical and surgical diagnosis can be conducted, have been equipped.

The Department of Medicine is in intimate relationship, through its sev-



## *The College of Medicine and Surgery*

eral faculties, with the numerous hospitals, infirmaries and dispensaries of the cities of Minneapolis and St. Paul. Through these agencies it utilizes, for the benefit of its students, the clinical material of these two large cities with a population of 500,000 people. The location of the University between two interurban car lines enhances the value and convenience of these clinical opportunities.

A medical library, containing 4,000 volumes and supplied with current periodicals, is open to all the students of the department. The collection has been chosen with special regard to the need for reference work and collateral reading. The general library of the University and the public and medical libraries of Minneapolis and St. Paul are also open to the students of this department.

# The College of Medicine and Surgery

## Rules and Regulations of the College

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### COLLEGE YEAR.

The nineteenth annual course of study in this college will begin on September 13, 1906, and will continue nine months, closing upon Saturday, June 8, 1907.

The college year is divided into semesters; the first semester ending February 3, 1907. The last week is devoted mainly to mid-year examinations, which will be conducted in many of the departments. The second semester will begin February 5, 1907, and will close June 8, 1907. Many of the courses of study occupy the half semesters which terminate on November 17th, and April 6th. Commencement exercises will occur in common with the other departments of the University, during the week ending June 14, 1907.

### ENROLLMENT.

Students are urged to matriculate on or before September 13, 1906. Entrance and condition examinations will be held September 13 to 15. Opening lecture, September 17. Classes called for regular work, September 18.

Students will be assigned seats in order of and at the time of their matriculation. Such matriculation and assignment of seats will be had in the office of the registrar of the University.

Students, having matriculated, will present tuition receipts and entrance credentials to the dean and secretary of the college of medicine and surgery, who will pass upon their preliminary qualifications. If such credentials prove unsatisfactory they will be required to take the necessary entrance examinations before a committee of the college of science, literature and arts.

Students wishing to take advanced standing will apply to the secretary. Upon admission and classification, students will report to the professors in charge of their respective studies.

## REQUIREMENTS FOR ADMISSION.

Candidates for admission to the College of Medicine and surgery for the College year 1906-'07 must present evidence of the following:

I. That the candidate has satisfactorily completed at least one year's college work in Arts or Science that is recognized by this University as equivalent to its own requirements.

II. That in addition to the above each candidate must have satisfied all of the requirements for entrance to the College of Science, Literature and the Arts of this University. See under General Regulations pp 116-23.

Candidates for admission to College of Medicine and Surgery may be allowed, under certain circumstances, to enter with a condition in their first year's college work, but such condition must be satisfactorily removed before the beginning of the second year.

Beginning with the College year 1907-'08, all candidates for entrance to the College of Medicine and Surgery *must have completed two years' work in the College of Science, Literature and the Arts, or its equivalent.*

## EXAMINATIONS—FINAL STANDINGS.

No student with an entrance condition will be allowed to register for any second-year subject, nor will any student with any first-year condition or failure be allowed to register for a third-year subject; nor will any student having a second-year condition or failure be allowed to register for any fourth-year subject.

No student will be allowed to omit any freshman work in order to make up entrance conditions, except by special permission of Department affected.

Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension.

Students will not be permitted to substitute private work in any branch for the regular college course work, excepting in the case of actual laboratory exercises done under the direct supervision of an instructor appointed by the chair and approved by the faculty. Examinations in such private laboratory work will be conducted by the chair. This rule does not apply to conditioned students.

Final examination in every required subject is held at the close of the work at the end of the semester or half semester, according to the extent of the course given. Opportunity is offered to remove conditions at the opening of the school year in September. The examinations at the end of

semester or half semester are only for those who are taking the courses, while the September examinations are only for those who are attempting to remove conditions or are applicants for advanced standing.

The final standing of any student in a given subject shall be determined as the result of his (a) practical work (laboratory or clinical) (b) recitations and (c) oral or (d) written examinations.

All of these factors shall be taken into consideration in making up the final grading in any subject.

Students' standings shall be determined at the end of the year by a conference of the heads of the departments in which the work is pursued during that year.

All standings shall be reported officially to and from the Dean's office at the end of the year.

Students shall be reported as Passed, Incomplete, Conditioned or Failed.

Conditions must be removed at the beginning of the school year in September. No student who has any conditions unremoved at the close of this examination is allowed to continue with his class without the express permission of the Dean on the recommendation of the Departments concerned.

A condition not made up before the subject is offered again becomes a failure subject to the rule governing failures.

Failures must be taken over again in class.

A student taking work over again (by reason of having "failed") must pay the fees connected with that course.

A student who is conditioned in the majority of the subjects given in any year will become a failed student and must repeat the work of that year.

Students who carry conditions into a succeeding year may find a resultant conflict of study hours. In that event they will give preference to the unfinished studies of the lower conflicting course.

#### ADVANCED STANDING.

All persons applying for advanced standing must present satisfactory evidence of time spent in medical studies, must pass examinations in the branches already taken by the class they seek to enter and satisfy all other admission requirements, but any student who has satisfactorily completed the requirements of any department of this College in any other school of recognized standing may be excused from repeating such examinations if the instruction which he has received is considered satisfactory by the head of the corresponding department in this College.

No condition of advanced standing will entitle the student to take the two years of any graded study coincidently.

Seniors in the college of science, literature and the arts, or in other

recognized colleges, who contemplate entering the department of medicine, are permitted to elect courses in anatomy, histology and embryology, physiology and chemistry in this department in lieu of similar science courses in the college of science, literature and the arts or in the other colleges.

No student may be advanced with his class or given advanced standing unless he has passed the majority of the required examinations in the studies of the previous year; nor shall any student be admitted to the second semester's work of the fourth year who has any unremoved conditions of any of the preceding years, but an opportunity to remove such conditions shall be given to fourth-year students at the close of the first semester.

#### TERMS OF TUITION.

The annual fee in the College of Medicine and Surgery is \$100. This includes all charges for matriculation, lecture and laboratory courses, dissections and graduation, excepting a \$3.00 Hospital fee to Juniors and Seniors and a rental fee for microscopes;\* payable by all students who do not own their own instruments.

One-half of the annual fee will be payable when the student matriculates. The accountant's receipt for this portion of the fee will entitle the holder to take the entrance examinations and to classify. The second half will be payable at the opening of the second semester, February 5, 1907. Failure to register within the dates assigned for registration will subject the delinquent to an increase in the registration fee, amounting to twenty-five cents for each day of such delinquency. If the applicant fails to pass the entrance examination, his fees will be returned by the accountant. Absence or failure to continue study will not entitle the student to return of fees, excepting in cases of special hardship, when application may be made to the executive committee of the Board of Regents.

A student who takes advanced standing will not receive any credit therefor upon his annual fees.

Students who are conditioned and fail to remove their conditions within one year shall be charged an extra examination fee.

Senior conditioned students who re-enter for work in any succeeding year will be charged a matriculation fee of ten dollars.

#### BREAKAGE AND LOSS.

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give a receipt.

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\*In each semester a fee of \$1.00 to \$5.00 will be charged for the rental of a microscope in the courses in which its use is required, provided the student is not supplied with a satisfactory instrument of his own. It is an advantage for the student to possess a microscope.

For apparatus and material attaching to his laboratory desk he will also be held responsible. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

A deposit of five dollars will be made with the accountant each year, by every student, at the time of enrollment as a caution fee. This fee is intended to cover the cost of unnecessary damage in the college buildings and of breakage and loss of laboratory apparatus and materials. It will be returned to the student at the close of each year, minus the cost of articles assigned to him, which are not returned in good condition, or of damage to college property for which he is individually responsible. If responsibility for such damage cannot be individually fixed, a pro rata charge upon all students will be made.

### SPECIAL STUDENTS.

Special students will pay to the accountant a fee of twenty dollars per year for each study they elect to pursue. They will be charged additional fees, varying from five to twenty dollars, for each laboratory course they may enter.

Graduate students will pay an admission fee of ten dollars which will entitle them to attend any lectures they may desire in regular courses.

### CURRICULUM.

The course in the college of medicine and surgery leads to the degree of doctor of medicine. It covers a four years course of collegiate study, each year representing nine months in actual residence.

The studies are graded, so far as practicable, throughout the four years and this grading is arranged with careful reference to the relation which the subjects naturally bear to each other.

The work of the first two years deals with the so-called scientific or laboratory branches; while that of the last two years includes the principles and practice of medicine and surgery, their associated specialities and the application of scientific or laboratory methods to clinical experience.

### GRADED SYSTEM OF STUDY.

#### FIRST YEAR.

Histology and embryology, anatomy, physiology, chemistry.

#### SECOND YEAR.

Histology and embryology, anatomy, physiology, chemistry, general bacteriology and pathology, materia medica, therapeutics.

#### THIRD YEAR.

Surgical anatomy, special pathology and bacteriology, surgical pathology, operative surgery, practice of surgery, practice of medicine, diseases of children, obstetrics, medical jurisprudence, physical diagnosis.

## FOURTH YEAR.

Practice of surgery, practice of medicine, clinical obstetrics, surgical pathology, practical physical diagnosis, nervous and mental diseases, gynecology, ophthalmology and otology, clinical microscopy, genito-urinary diseases, orthopaedia, diseases of the skin, diseases of the nose and throat, hygiene.

## ELECTIVE COURSES.

The elective system, which has been, for some years, in process of adaptation to the course in medicine and surgery in the fourth year, has been extended to the work of the third year and further systematized. The following electives are offered. The courses in italics are open to both third and fourth year students, the remainder only to students of the fourth year. The hours occupied in each course are cited and thirty-six hours are counted as an elective unit. Students of the third year are required to elect one unit of elective work; those of the fourth year to elect three units. Courses elected will become subjects of continued study and examination. Other electives may be taken at the choice of the student, but will not be a matter of compulsory study.

Electro-therapy (half-unit) .....	18 hours
Mechano-therapy (half-unit) .....	18 hours
<i>History of Medicine</i> (half-unit).....	18 hours
Ophthalmoscopy (half-unit) .....	18 hours
Operative Surgery (one and one-half units).....	54 hours
<i>Pathology of Nervous System</i> (one and one-half units).....	54 hours
<i>Special Pathology of Tumors</i> (one and one-half units).....	54 hours
<i>Methods of Microscopical Technique</i> (one and one-half units).....	54 hours
<i>Comparative Histology and Histogenesis of Tissues</i> (one and one-half units) .....	54 hours
<i>Comparative Embryology of Man and Vertebrates</i> (one and one-half units) .....	54 hours
<i>Microscopic Anatomy and Organogenesis</i> (one and one-half units).....	54 hours
<i>Comparative Histology and Development of Central Nervous System</i> (one and one-half units).....	54 hours
<i>Practical Pathology</i> (unit).....	36 hours
<i>Applied Anatomy of Nervous System</i> (unit).....	36 hours
<i>Animal Parasites of Man</i> (half-unit).....	18 hours
Dispensary Out-door service (half-unit).....	18 hours

These elective courses are open to post-graduate students who can occupy in their study brief periods of time, since several courses will be concentrated in each half-semester.

## Six-Year Medical Course

In the year 1903-04, the University established a six years' course of study, arranged especially for students of medicine. The first two years of the course are given in the College of Science, Literature and the Arts and the last four years are given in the College of Medicine and Surgery. It leads to the degree of Bachelor of Science at the end of the first four years

and to the degree of Doctor of Medicine at the end of the six years' course. The work of the first two years is adapted to the needs of the student of medicine and all who expect to take the professional degree are urged to enter this course.

COURSES IN THE COLLEGE OF SCIENCE, LITERATURE AND ARTS.

FIRST YEAR.

1. \*German.
2. Botany.
3. Chemistry
4. Zoology.
5. Higher Algebra and Trigonometry.

\*Note—Students who enter with two years of German may elect French in its stead in the first or second year.

SECOND YEAR.

1. Rhetoric.
2. German or French.
3. Chemistry.
4. Comparative Anatomy of Vertebrates.
5. Physics.

COURSES IN COLLEGE OF MEDICINE AND SURGERY.

THIRD YEAR.

1. Human Anatomy.
2. Histology and Embryology.
3. Organic Chemistry, Toxicology and Hygiene.
4. Physiology.

FOURTH YEAR.

1. Human Anatomy.
2. Histology and Embryology.
3. Medical Chemistry.
4. Physiology.
5. Pharmacology.
6. Bacteriology and General Pathology.

FIFTH AND SIXTH YEARS.

The work of the fifth and sixth years will be essentially the same as is given in the third and fourth years in the college of medicine and surgery.



## Courses of Instruction—Six-Year Medical Course

### ANIMAL BIOLOGY.

- Course I. General Zoology.* [3] First year, both semesters.  
*Professors Sigerfoos and Oestlund and Assistants.*

Lectures, quizzes and laboratory work. Text-book required,—Hertwig's Manual of Zoology.

This course is a comprehensive study of the principles of structure, physiology and development in animals. In the laboratory a brief study of insects and the dissection of the frog are used as a practical introduction to the course. Then follow a study of cell structure and cell division; a systematic study of representatives of the chief phyla or branches of the animal kingdom; and a study of the elements of embryology as illustrated by the development of the starfish and chick.

- Course VI. Comparative Anatomy of Vertebrates.* [3] Second year, both semesters. *Mr. Brown.*

Lectures, quizzes and laboratory work. The first semester's work is based upon a study of the chordates, cartilaginous and bony fishes and all classes up to the Mammalia.

Laboratory and reference books:

Parker's Zootomy; Parker's and Haswell's Zoology, Vol. 2; Wiedersheim's Comparative Anatomy; Willey's Amphioxus and the Ancestry of the Vertebrates; Gegenbaur—Bell's Comparative Anatomy of Vertebrates.

The second semester is given to a detailed study of the Cat and comparative studies of the Rabbit, Sheep and Man. The laboratory and reference books for the second semester are Davison's Mammalian Anatomy; Jayne's Mammalian Anatomy; Reighard and Jennings' Anatomy of the Cat.

### BOTANY.

- Course I. General Botany.* [3] First year, both semesters. *Dr. Lyon*

This course comprises a general survey of the plant kingdom with laboratory work on the cell, on algae, lichens, fungi, mosses, ferns, gymno-sperms and flowering plants. Lectures and laboratory. Open to all.

### CHEMISTRY.

- Course I. Inorganic Chemistry.* [3]. First year, first semester.  
*Professor Frankforter, Mr. West and Mr. Badger.*

This course is arranged for those who have already had an elementary course in chemistry. The course includes an introduction to physical chemistry with special reference to solutions and the electrolytic dissociation theory. This work is followed by a systematic study of the non-metals from the general standpoint of the Periodic law. Special attention is given to the relationship between the different elements and their analogous compounds.

Note:—A course is offered in the College of Science, Literature and the Arts to those who had not had the elementary course.

- Course II. Inorganic chemistry.* (Continuation of course I.) [3]  
First year, second semester. *Professor Frankforter, Mr. West and Mr. Badger*

This course consists of lectures, recitations and laboratory work on the metals.

**Course III. Qualitative Analysis.** [3] Second year, first semester.  
Asst. Prof. Nicholson, Mr. Anderson and Mr. Wilhoff.

Lectures, recitations and laboratory work. The course includes the general reactions of the metals and the qualitative separation and identification.

**Course IV. Qualitative Analysis.** [3]. Second year, second semester.  
Asst. Prof. Nicholson, Mr. Anderson and Mr. Wilhoff.

Lectures, recitations and laboratory work. Reactions, separations and identification of the acids.

**Course V. Organic chemistry.** [3] Third year, second semester.  
Professor Frankforter and Mr. Newton.

This course includes a study of the different groups of carbon compounds with special reference to those groups which are closely associated with biological processes and Bio-chemistry, bacteriological, pathological chemistry, physiology and materia medica. The course consists of lectures with frequent recitations and laboratory work. The laboratory preparation work included the making and studying of one or more compounds in each important organic group. Some time is devoted to practical organic analysis, including the analytical side of the alcohols and the sugar group.

**Course VI. Toxicology and Hygiene.** [3] Third year, second semester.  
Professors Frankforter and Harding and Mr. Newton.

**Toxicology.**—This course includes the general methods for the separation and identification of the poisons both organic and inorganic. Attention will be given to the identification of poisons associated with medicines and with vegetable and animal matter. Besides this qualitative and quantitative work, attention is given to the structure of those organic groups of compounds which have poisonous properties.

**Hygiene.**—Chemistry lectures and laboratory work. This course includes the chemical analysis of air, water and some of the common foods, as milk, sugar and the fruit products. Special attention is given to food adulterations and to food preservations.

#### FRENCH.

Students who enter with two years of German may elect French instead in the first or second year.

**Course I. French beginning.** [5] First year, both semesters.  
Mr. Frelin, Mme. Bertin, Mr. Melom.

Fraser and Squair's French Grammar and Reader; *modern texts*.

**Course II. French, intermediate.** [3] Second year, both semesters.  
Professor Benton, Mme. Bertin.

Grammar and composition continued; modern texts will be read including selections from Merimee, Daudet and Scribe.

**Course III. French conversation.** [2] Second year, both semesters.  
Professor Benton, Mme. Bertin.

[Note: May be taken with course II.]

#### GERMAN LANGUAGE AND LITERATURE.

**Course I. German, beginning.** [5], First year, both semesters.  
Professor Schlenker, Assistant Professor Wilkin,  
Mr. Juergensen and Mr. Burkhard.

Pronunciation, grammar, selections in prose and verse. German conversation and composition (Bernhardt); short stories.

**Course II. German, intermediate.** [3] Second year, both semesters.  
Assistant Professor Wilkin, Mr. Juergensen, Mr. Burkhard  
and Mr. Williams.

First semester.—Selections from modern prose, narrative and descriptive; German lyrics and ballads. Second semester, A drama of Lessing, Goethe or Schiller. Open to students who have completed course I.

*Course III. Scientific prose, intermediate.* [3] Second year, both semesters.  
Mr. Juergensen.

First semester.—Hodge's German Science Reader (or equivalent).

Second semester.—Brandt and Day's German Scientific Reading.

This course aims to give the student a reading knowledge of German for the use of the language in his scientific studies. Open to students who have completed course I.

[Note: students must take either II. or III.]

*Course IV. Classic prose and poetry.* [3] First year, both semesters.  
Professor Moore, Assistant Professor Wilkin, Mr. Burkhard  
and Mr. Williams.

First semester.—Schiller's Historische Skizzen or Heine's Harzreise; Spanhoofd's Deutsche Grammatik.

Second semester.—Goethe's Prosa and Gedichte; Deutsche Grammatik completed.

[Note: open to those who have had two years High School German].

*Course V. Conversation and composition.* [2] Second year, both semesters  
Assistant Professor Wilkin, Mr. Juergensen and Mr. Williams.

Translation into German of short English selections; conversation on topics of every day life; narrative and descriptive essays, and letters in German.

[Note: this course may be taken with either II. or III.]

*Course VI. The drama.* [3] Second year, both semesters.  
Professor Schlenker, Assistant Professor Wilkin, Mr. Juergensen  
and Mr. Burkhard.

First semester.—Modern drama. Sudermann's Johannes, and Heibel's Herodes und Marianne. Study of the present day drama in Germany. Assigned readings and reports; occasional lectures on related subjects.

Second semester.—Classic drama. Lessing's Nathan der Weise and Goethe's Egmont. Study of dramatic structure; history of the drama in the 18th century. Open to students who have completed either course II., III. or IV.

*Course VII. Advanced scientific reading.* [3] Second year, both semesters.  
Mr. Juergensen.

Reading of monographs and periodicals.

[Note: students must take course VI. or VII. during second year].

*Course VIII. Advanced composition and conversation.* [2] Second year, both semesters.  
Professor Schlenker and Assistant Professor Wilkin.

Translation into German of longer selections from good English authors; original essays in German on assigned themes; oral debates; oral reports in German on collateral readings in German and English authors.

[Note: this course may be taken with either VI. or VII.]

#### MATHEMATICS.

*Course III. Higher algebra.* [3] First year, first semester.  
Assistant Professor Bauer, Dr. Manchester, Mr. Dalaker  
and Mr. Shumway

Variation, quadratic equations, special higher equations, simultaneous equations of the second degree, maxima and minima of algebraic functions, differentiation of algebraic functions, development of functions, logarithms, theory of equations and solution of numerical higher equations.

*Course IV. Trigonometry.* [3] First year, second semester.  
Assistant Professor Bauer, Dr. Manchester, Mr. Dalaker and  
Mr. Shumway.

Text. tables and numerous applications.

#### PHYSICS.

*Course I. Physics.* [6] Second year, both semesters.  
Professor Jones and Assistants.

Mechanics, properties of matter, heat, sound, experimental lec-

tures, recitations and laboratory work. Open to those who have completed the higher algebra and trigonometry courses III. and IV. in mathematics.

#### RHETORIC.

*Course I. Rhetoric.* [3] *Professor Sanford.* Second year, both semesters. This course includes the study of formal rhetoric, the writing of compositions, and the study and analysis of masterpieces of prose. Specially adapted to the need of medical students.

#### PHYSICAL CULTURE.

DRS. COOKE AND LITZENBERG.

A well equipped gymnasium in charge of a professional medical director is open for the young men. The training and exercise is under the immediate oversight and authority of the medical director and is wholly with a view to the healthful physical development of the whole student body.

All young men are required to be examined by the medical director of physical culture upon registration and during the course as often as the indications of the physical condition may require.

The decision of the director will be either:

1. Advisory, indicating what course of hygiene and exercise will best sustain and improve the health of the student, or
2. Mandatory, requiring the students to pursue the course of hygiene and physical exercise necessary for the proper care of health and the discharge of their duties as students.

Gymnasium work is required of all men in the freshman class, one hour per week (in two half-hour periods if the director so decides) throughout the year. The required work includes a course of lectures on personal hygiene, during the first term.

#### MILITARY SCIENCE AND TACTICS.

CAPTAIN EDWARD SIGERFOOS Ph. B., 5th U. S. INFANTRY.

For the instruction in military drill and administration the students are organized into a corps of cadets, consisting of three battalions of infantry, and a platoon of artillery.

A uniform of prescribed pattern is worn by all cadets during drill.

The uniform consists of blouse, trousers, vest and cap, modelled after the U. S. Military Academy cadet uniform, and costs in Minneapolis about \$15, and is as neat and economical dress as the student can obtain.

Drill is required of all men in the freshman and sophomore classes.

In view of the fact that beginning with September, 1907, the College of Medicine and Surgery will require two years' college work for entrance, it becomes very desirable that students intending to take up Medicine should matriculate in the six-year course upon entering the University and thus secure both degrees.

Students who wish to enter this combined course will receive equivalent credit for College work done elsewhere.

## Seven-Years' Course Leading to the Degrees of A. B. and M. D.

Seniors in the College of Science, Literature and the Arts and in other colleges, who contemplate entering the College of Medicine and Surgery, are permitted to elect courses in Anatomy, Histology and Embryology, Physiology and Chemistry in this college in lieu of similar science courses in the College of Science, Literature and the Arts or in other colleges. Since the medical practice act of this state requires full four years of medical study, these students must elect this work in the College of Medicine and Surgery, in order that it may be contributive toward the two degrees given in both colleges.

### AFFILIATION WITH OTHER COLLEGES.

Carleton College has entered into an arrangement with the University of Minnesota whereby students from Carleton who have completed three full years' work without conditions and who have also met all the requirements for admission to the College of Medicine and Surgery may elect as the work of their Senior year the first year's work in the College of Medicine and Surgery, upon the satisfactory completion of which they will receive a bachelor's degree from Carleton College.

By this arrangement students from this college, having satisfactorily completed their four years' work in the College of Medicine and Surgery, will have received both degrees in a period of seven years.

Opportunity is offered to other colleges meeting the University requirements to enter into similar relations of affiliation for the purpose of shortening the time whereby a student can secure both degrees.

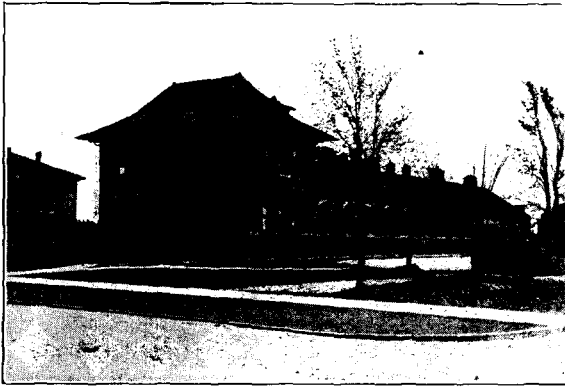


Laboratory of Histology and Embryology

MEDICAL SCIENCE BUILDING

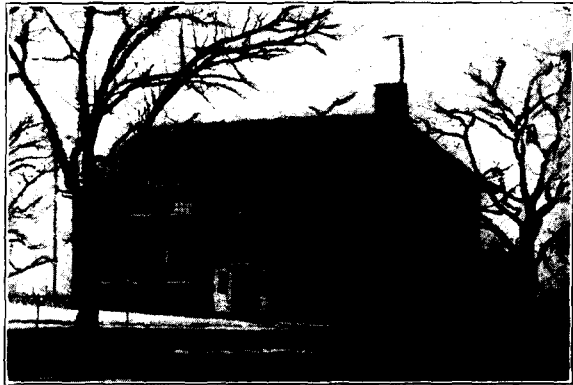
Laboratory of Physiology

ANATOMY  
BUILDING



CHEMICAL  
LABORATORY

BOARD OF  
HEALTH  
BUILDING





INSTITUTE OF PUBLIC HEALTH AND PATHOLOGY



# Courses of Instruction

## DEPARTMENT OF HISTOLOGY AND EMBRYOLOGY.

### OFFICERS OF INSTRUCTION.

- THOMAS GEORGE LEE, B. S., M. D., *Professor Histology and Embryology.*  
WINFIELD S. NICKERSON, Sc. D., M. D., *Assistant Professor of Histology.*  
MARGARET L. NICKERSON, A. M., M. D., *Instructor in Histology.*  
ERNEST V. SMITH, *Assistant in Histology.*  
JARL FERDINAND LEMSTROM, Ph. K., *Assistant in Micro-Technique.*  
AMOS S. WELLS, A. B., D. D. S., *Assistant in Dental Histology.*  
FREDERICK HAROLD POPPE, B. A., *Assistant in Dental Histology.*  
Departmental Laboratory Assistants: Henry Theodore Foshager, B. S.,  
Martin Oyen, Mathias Sundt, B. A., Charles Stewart Sutton, B. A.

This department occupies the entire north wing and center of the Medical Science Building, and includes two general laboratories, each 44 x 72 feet, which are finely lighted by windows on three sides and part of the fourth. These laboratories provide for the general courses in histology, microscopic anatomy, neurology, embryology, micro-technique. Each student is provided with a sink, gas, electric light, copper heating table, microscope locker and microscope, and a locker for the storage of apparatus and material. Several smaller laboratories are provided for special, elective and other courses; in addition there are preparation rooms, store rooms, animal rooms, rooms for experimental work in histology and embryology, for reconstruction, chemical, photographic and photomicrographic work.

A departmental library which contains a carefully selected collection of reference literature, both standard and periodical. In addition to the laboratory library, the other libraries of the University, together with the Public libraries of Minneapolis and St. Paul, afford the students access to almost all the important literature relating to the work in this department.

These laboratories are equipped with Leltz' microscopes, each fitted with nose-piece and Abbe condenser; various forms of microtomes, such as freezing, Thoma, Minot, Schanze, etc., injection apparatus, aquaria, thermostats, incubators, water baths, chemical hoods, a great variety of technical glassware. Grubler's stains, a set of His' wax models, photomicrographic and reconstruction apparatus, charts, reference cabinets containing carefully selected slides, a large collection of hardened histological and embryological material with an abundant supply of fresh tissues.

The courses are made as practical as possible, beginning with the technique of the microscope, followed by the preparation of permanent specimens. In addition, there is a valuable loan collection of several thousand specially prepared histological slides and a large number of series of mammalian and other embryos, sufficient to provide each student with several complete series of various ages and different planes for study. These collections are being constantly increased and are of sufficient value to have warranted the construction of a fire-proof vault 15x17 feet, for their preservation.

During the two years' course the student will acquire a valuable collection of slides of his own preparation illustrating the structure and development of the human body.

The course is illustrated by charts and lantern-slides of histological and embryological specimens. Demonstrations are given under the microscope of typical sections of tissues and organs, accompanied by camera lucida drawings, or photomicrographs, with explanatory text.

All students are recommended to purchase a microscope at the beginning of their medical course. This instrument is an indispensable part of the outfit of a well-trained physician. Suitable microscopes can be purchased at from \$50 to \$60, which may be fitted at any time with such other parts as may be desired.

Students not owning microscopes will be furnished with instruments at a rental fee.

**Course I. General morphology and histology.****Professor Lee, Assistant Professor Nickerson and Dr. M. L. Nickerson.**

Lectures, recitations, demonstrations and laboratory work. The course includes the structure and manipulation of the microscope; the structure and properties of the protoplasm; the cell, its structure; cell division and reproduction leading to the consideration of the elements of structure in the vertebrata. A comparative study of the histology of the blood, of the epithelial, connective, muscular and nervous tissues and of the vascular and lymphatic systems of man and the vertebrata. Lectures, etc., 6 hours a week. Laboratory work, 18 hours a week, first half, first semester, first year.

**Course II. Elements of vertebrate embryology and histogenesis.****Professor Lee, Assistant Professor Nickerson and Dr. M. L. Nickerson.**

Lectures, recitations, demonstrations and laboratory work. A comparative study of reproduction; the ovum, the spermatozoon, fertilization, cleavage, formation of blastodermic layers, the formation of the embryo, foetal envelopes, etc., with practical work on chick and mammalian frog embryos. The differentiation and histogenesis of the tissues, etc. Lectures, etc., 6 hours a week; laboratory work, 18 hours a week, first semester, first year. Open to those who have completed course I.

**Course III. Microscopic anatomy of man and vertebrates.****Professor Lee, Assistant Professor Nickerson and Dr. M. L. Nickerson.**

Lectures, recitations, demonstrations and laboratory work. Advanced methods of histological technique, with practical laboratory work. The comparative study of the morphology, microscopic anatomy, origin and development of the various organs of the integumentary, alimentary, respiratory and uro-genital systems, etc. Lectures, etc., 6 hours a week; laboratory work, 18 hours a week. First semester, first year. Open to those who have completed course I in histology and embryology.

**Course IV. Vertebrate neurology and neurogenesis.****Professor Lee, Assistant Professor Nickerson and Dr. M. L. Nickerson.**

Lectures, recitations, demonstrations and laboratory work. A comparative study of the morphology, microscopic anatomy, origin and development of the central, peripheral and sympathetic nervous systems and the organs of special sense. Lectures, etc., 6 hours a week; laboratory, 18 hours a week. First half, second semester, second year.

**Course V. Human embryology and organogenesis.****Professor Lee, Assistant Professor Nickerson and Dr. M. L. Nickerson.**

A comparative study of human mammalian embryos, including impregnation, segmentation, and implantation of the ovum; the formation, structure and relationships of the placenta and foetal envelopes; the details of organogenesis, etc., studied in a practical manner upon a very large collection of serial sections of human and mammalian embryos, cut in various planes and representing all phases of development. Lectures, etc., 6 hours a week, laboratory, 18 hours a week. First half, second semester, second year.

**Course VI. Dental histology and embryology.****Professor Lee, Drs. M. L. Nickerson and A. S. Wells.**

A course modified from I., III. and V. especially arranged for and open only to Dental students. Lectures, recitations and laboratory work; the structure and histogenesis of the tissues and organs; the structure and development of the teeth and jaws, the mouth cavity and glands. Lectures, etc., 6 hours, laboratory 12 hours per week. Second half, first semester, first year.

**ELECTIVE AND GRADUATE COURSES.**

The following elective courses are open to a limited number of properly qualified third and fourth-year students, and to graduates. These courses will consist of laboratory work, lectures, demonstrations and prescribed courses of reading, and will be made as practical as possible, being planned with special reference to their application to internal medicine, surgery, obstetrics and the specialties.

For dates see schedule and for details of courses consult Professor Lee.

**Course VI. Methods of microscopical technique.** Professor Lee.  
The preparation and use of the various solutions employed in fixing, hardening and staining. Methods of embedding, sectioning, reconstruction, etc.

**Course VII. Comparative histology and histogenesis of the tissues of man and vertebrates.** Professor Lee, Assistant Professor Nickerson, Dr. M. L. Nickerson.

- (a) The cell, spermatogenesis and oogenesis.
- (b) The epithelial, connective and muscular tissues.
- (c) The nervous tissues.
- (d) Blood and lymph.

**Course VIII. Microscopic anatomy and organogenesis of man and vertebrates.** Professor Lee, Assistant Professor Nickerson, Dr. M. L. Nickerson.

- (a) The digestive system.
- (b) The respiratory system.
- (c) The cutaneous system.
- (d) The uro-genital system.

**Course IX. Comparative histology and development of central nervous system and special sense organs.** Professor Lee

**Course X. The animal parasites of man.** Assistant Professor Nickerson.

The general outlines of the morphology and classification of the different groups which contain members parasitic upon man, with special consideration of each species of medical importance, including its distribution, life history, methods of infection, means for diagnosis, and the chief symptoms produced by it. The course is illustrated by the study of many specimens, charts, lantern slides, etc.

Open to third and fourth year students. Second half, second semester.

**Course XI. Comparative embryology of man and vertebrates.** Professor Lee.  
A study of special problems in vertebrate development.

**Course XII. Research work in histology and embryology.** Professor Lee.

Every facility in the way of apparatus, material, literature and private rooms for study will be offered those who desire to take up any original investigation in vertebrate histology and embryology, human or comparative.

The following text and reference books should be consulted:

**Histology.** Wilson's The Cell; Bohm-Davidoff-Huber's Histology; Stohr's Histology; Bailey's Histology; Piersol's Histology; Ferguson's Histology; Szymonowicz-MacCullum's Histology; Sobotta-Huber's Atlas; Klein's Histology; Mann's Histology; Lee's Vade Mecum; Kolliker's Gewebelehre; Oettel's Mikroskopische Anatomie; Duval's Histologie; Ranvier's Histologie.

**Embryology.** Minot's Human Embryology; Minot's Laboratory text books; Hertwig-Mark's Embryology; McMurrich's Embryology; Heisler's Embryology; Marshall's Embryology; Kolliker's Embryologie; Schultze's Embryologie; Köllman's Embryologie; Schenk's Embryologie; Reese's Embryology.

**Neurology.** Barker's Nervous System; Edinger's Vorlesungen; Lectures Nervous System; Gordinier's Nervous System; Van Gehuchten's System Nerveux; Kolliker's Gewebelehre; Obersteiner; Sabin's Atlas.

## DEPARTMENT OF ANATOMY.

### OFFICERS OF INSTRUCTION.

CHARLES A. ERDMAN, M. D., *Professor of Anatomy.*  
HARRY K. READ, M. D., *Demonstrator of Anatomy.*  
EARLE H. HARE, M. D., *Prosector of Anatomy.*  
C. C. TYRELL, B. A., *Assistant in Anatomy.*  
E. E. HEMINWAY, Ph. D., *Assistant in Anatomy.*

### ANATOMY.

The department of anatomy occupies a separate building, adapted to its work and equipped with the best modern appliances. It includes two large students' dissecting rooms, the general laboratories of anatomy, a bone laboratory for bone research work, the offices of the professor and demonstrator of anatomy, preparation rooms and morgue. An ample supply of dissecting material is provided.

In the first year the subjects of osteology and syndesmyology are pursued by

means of lectures, laboratory demonstrations and recitations from the specimen. The bones of a human skeleton are loaned to the student for purposes of study and recitation.

Myology, angiology and splanchnology are studied in connection with the dissection and laboratory demonstrations of the thoracic, abdominal and pelvic viscera upon the lower animal. This is followed by the dissection of one-half of the human body.

In the second year the alimentary canal, respiratory tract, genito-urinary system, organs of special sense and the cerebro-spinal nervous system are pursued by means of lectures, recitations and laboratory demonstrations. The dissection of the human body is completed and followed by a series of lectures and demonstrations on descriptive and surgical anatomy.

The student dissects in the first semester of the first year and in the first half of the second semester of the second year, recites upon the subject and observes demonstrations made by a corps of assistants under the direction of the demonstrator of anatomy.

Dissection is supplemented by drawings from dissections, made upon outlines of the human skeleton, which are furnished to the student.

In the third year the student takes up the study of the human body from a topographical and surgical standpoint and is given a thorough review of the surgical regions, emphasizing the practical points in the relations, structure and distribution of the nervous system.

#### Course I. Osteology.

Lectures and recitations upon the human skeleton and supplementary work on the osteology of domestic mammals; 12 hours each week, for 5 weeks of first semester. Practical study of the skeleton, followed by recitations from the specimen, taken by the class, first semester. Required of all first year students.

#### Course II. Syndesmology.

Lectures, recitations and laboratory demonstrations, 12 hours each week, for 2 weeks first semester, first year. Open to those who have taken course I.

#### Course III. Myology and Angiology.

Lectures and recitations, covering the entire muscular and arterial systems of the human body, with a supplementary study of comparative myology. Laboratory work consists in the dissection and identification of the muscles of the human body and the study of their nerve and blood supply, as well as their action.

#### Course IV. Splanchnology.

Professor Erdmann, Dr. Read and Dr. Hare.

Lectures and laboratory work in dissecting and demonstrating the thoracic, abdominal and pelvic viscera. First semester of the first year and first half of second semester of the second year. Recitations upon the subjects of the first year's work, conducted in sections.

#### Course V. The nervous system.

Professor Erdmann.

Cerebro-spinal axis and its membranes; the cranial and spinal nerves; the sympathetic nervous system, and the special-sense organs. Lectures, recitations and dissections of the brain, 5 hours each week, for 4 weeks, first half, second semester, second year.

#### Course VI. Dissections. Drs. H. K. Read, E. R. Hare and Professor Erdmann.

This work extends over a period of 9 weeks, in the first semester of the first year, and 9 weeks in the first half of the second semester of the second year, occupying with the lecture course the half days of this period each week. The method of work follows that laid down in Holden's Manual of Dissections.

The second year lecture and dissecting courses are open to those having completed the first year's work in anatomy and histology. Daily recitations, upon the subjects of the second year's course, conducted in the laboratory.

#### Course VII. Surgical anatomy.

Professor Erdmann

The instruction consists of dissections, demonstrating the relations of structures composing the surgical regions of the body; demonstrations, upon the living subject, showing the anatomical and surgical landmarks and their applications; also the location, by surface tracings, of the viscera contained in the various cavities and of the important arteries, veins and nerves; 3 hours a week, second half, second semester. Required of third year students.

#### Course VIII. Applied anatomy of the nervous system.

Elective.

Opportunity is afforded for advanced work in practical anatomy at any time during the college year.

The following text-books should be consulted:

Anatomy. Cunningham, Morris' Gray, Spalteholz Atlas, Barker's Laboratory Manual, Holden's Practical Anatomy, Erdmann's Manual of Dissection, Treve's Applied Anatomy, Barker's Anatomy of the Nervous System.

Collateral Readings. Quain's Anatomy, Gerrish's Anatomy, Flower's Osteology of Mammals, Gegenbauer's Elements of Comparative Anatomy; Chauveau's Comparative Anatomy, Wiedersheim's Elements of Comparative Anatomy, McClellan's Regional Anatomy, Deaver's Surgical Anatomy; Edinger's Anatomy of the Nervous System, Hildebrand's Chirurgisch Topographische Anatomie.

## DEPARTMENT OF PHYSIOLOGY.

### OFFICERS OF INSTRUCTION.

RICHARD OLDING BEARD, M. D., *Professor of Physiology.*

M. RUSSEL WILCOX, M. D., *Demonstrator of Physiology.*

GEORGE D. HAGGARD, M. D., *Instructor in Physiology.*

### COURSES OF INSTRUCTION.

The department of physiology occupies rooms in the laboratory of medical sciences, including the laboratory of experimental physiology, the laboratory of physiologic chemistry, a demonstration and recitation room, the laboratory library and the office of the professor in this branch. A large amphitheatre, adapted to the demonstration of major experiments, immediately adjoins the physiologic laboratories and is used, also, for lecture purposes by this and other chairs.

In the basement of the laboratory of medical sciences, the chair maintains large and well-equipped animal rooms, which are furnished with a large aquarium, frog tanks, animal enclosures and breeding cages. From this animal room are furnished supplies of material and animals for the work in experimental physiology, physiologic chemistry, histology, embryology, pathology and bacteriology. The hygienic conditions of the room are studied carefully, with a view to maintaining the physiologic and structural integrity of its animal occupants as perfectly as possible.

The physiologic laboratories are equipped with a full supply of apparatus, instruments, etc., for experimental purposes, and for the work in physiologic chemistry. Their outfit includes vivisection instruments, artificial respiratory machines, batteries, Du Boise-Raymond coils, galvanometers, rheostats, Deapretz signals, moist muscle chambers, kymographions, spring myograph, stethometer, stethoscopes, phonendoscopes, Dudgeon's and Marey's sphygmographs, cardiographs, Runne's chronograph, Roy's tonometer, Gaskell's clamp, oncometers, hæmometers, hæmoglobinometers, hæmatocrits, plethysmograph, ergograph, etc., etc. They are furnished with motor power for the operation of recording apparatus and for the manufacture of apparatus in the laboratory workshop.

The laboratory manufactures its own apparatus in almost every line of work.

The course in physiology is graded in the first and second years. In the first year, the student hears lectures, recites and attends demonstrations and practical exercises in general physiology. These embrace the discussion, and, so far as possible, the observation of the physiologic ingredients of the animal body; the study of the physiology of cell-life, of the fundamental properties of the cell, of the nutritive media, blood, lymph and chyle; of the elementary functions of nervous system; of the muscular tissues, the connective tissues and the epithelial tissues; of the vascular mechanism; of the alimentary canal; of the organs of secretion, respiration, excretion, and metabolism.

In the second year, the work is as practical as possible and includes the study of advanced physiology, dealing in particular, with the subjects of nutrition, the physiology of development, and the functions of the central and peripheral nervous system. Twelve hours each week, during the first half of the first semester, are occupied in laboratory work in physiologic chemistry. This course affords the student a practical knowledge of the tissues and fluids of the body from a chemical standpoint. It embraces studies in the several classes of proteids, in fats, carbohydrates, bone, muscle, blood, milk, the digestive fluids, glycogen, etc.

A similar number of hours during the second half of the first semester are devoted to experimental physiology. For this work the class is divided into sections and the instruction is individualized so far as possible. The student is familiarized with physiologic apparatus and its uses, with forms of electrical stimulation and with methods of experimentation, while his knowledge of

physiologic principles is strengthened by the observation of functional facts. Demonstrative work is combined with the individual experiments performed by the pupil.

A laboratory reference library is accessible to the students for collateral reading.

*Course I. General physiology.*

*Professor Beard.*

Lectures, recitations and demonstrations, dealing with the physiologic chemistry of the human body; the physiologic properties of the cell; the nutritive media; the nervous mechanisms in general; the muscular tissues, the connective tissues and the epithelial tissues, as the structural bases of the animal body. Twelve hours a week, first half second semester, first year.

*Course II. Systemic physiology.*

*Professor Beard.*

Lectures, recitations and demonstrations and practical exercises. This course includes the physiology of the vascular system; the digestive system; the respiratory system; the secretory and excretory systems; and metabolism. Twelve hours a week, second half second semester, first year. Open to those who have completed course I.

Recitations upon the subject of the first year are conducted in sections of the class.

*Professor Beard, Drs. M. R. Wilcox and G. D. Haggard.*

*Course III. Advanced physiology.*

*Professor Beard.*

Lectures, recitations and demonstrations. The course includes the discussion of the subjects of nutrition; of reproduction; of the physiologic changes incident to successive periods of life, and of the functions of the nervous system, six hours a week, first semester, second year. Open to those who have completed the courses in physiology of the first year.

Recitations upon the subjects of this course are conducted in sections of the class.

*Professor Beard and Drs. Wilcox and Haggard.*

*Course IV. Physiologic chemistry and microscopy.*

*Professor Beard, Drs.*

*M. R. Wilcox and G. D. Haggard.*

Laboratory work and demonstrations. A practical study of the several classes of proteids; of carbohydrates, fats, muscle and bone; of gastric juice, saliva, pancreatic juice and bile in their respective digestions; of glycogen, and of blood, lymph, chyle and milk. Microscopic study of the carbohydrates in vegetable and animal forms; of the physiologic emulsions of fat; of the crystalline waste products, and of the physiologic conditions of the blood cells and of blood crystals. Practical instruction is given during this course in the enumeration of the blood cells, in the estimation of hemoglobin and of the corpuscles in mass, in the spectroscopic examination of the blood, in the determination of blood tests, etc. Twelve hours a week, first half of first semester, second year. Open to those who have completed courses I and II.

*Course V. Experimental physiology.*

*Professor Beard, Drs. M. R. Wilcox and G. D. Haggard.*

Laboratory work and demonstrations. A study of physiologic apparatus, electrical stimuli and methods of experimentation; the demonstration and performance of experiments which illustrate physiologic function in the muscular, nervous, vascular, respiratory and glandular systems; and the study of the cardiac areas, the heart and respiratory sounds, and of pulse tracings, including training in the use of the sphygmograph, the stethoscope, phonendoscope, etc. Six hours a week, second half of first semester, second year. Open to those who have completed course IV.

*Text-Books:*

First and second years—

Howell's American Text-Book of Physiology.

Poster's Physiology, sixth edition.

Simon's Physiologic Chemistry.

Waller's Human Physiology.

Collateral Reading—Landois and Stirling's Handbook of Physiology; Chapman's Physiology; Stewart's Practical Physiology; Blyth's Foods; Raymond's Physiology; Kirk's Physiology; Hutchinson's Dietetics.

## DEPARTMENT OF CHEMISTRY.

GEORGE B. FRANKFORTER, A. M., Ph. D., *Dean of the School of Chemistry, Professor of Chemistry.*

CHAS. F. SIDENER, B. S., *Professor of Chemistry.*

HERBERT C. CAREL, B. S., *Professor of Chemistry.*

EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry.*

EVERHART P. HARDING, M. S., Ph. D., *Assistant Professor of Chemistry.*

IRA HARRIS DERBY, B. S., *Demonstrator in Chemistry.*

LILLIAN COHEN, M. S., *Instructor in Chemistry.*

ALBERT D. WILHOIT, B. A., *Instructor in Chemistry.*

RODNEY WEST, B. A., *Instructor in Chemistry.*

HAROLD M. NEWTON, *Instructor in Chemistry.*

Chemistry is taught to the medical and all other students of the University in the School of Chemistry under the directorship of Dean Frankforter. The School of Chemistry is housed in two buildings.

The main building formerly known as Science Hall has been completely remodeled to meet the needs of the department of chemistry. The building is 198 by 78 feet and consists of several large laboratories well equipped for a wide range of chemical work. The general laboratory is located on the first floor and is large enough to accommodate 350 students. The laboratory tables are arranged with cupboards, drawers and locks and supplied with gas and water. Connected with this laboratory by means of sliding windows, is a preparation room which is directly joined to the general store room. The remaining part of this floor is given to cloak rooms, furnace and motor rooms, and a large lecture room with a gallery designed to comfortably seat 350 students. The qualitative laboratory, located on the second floor, is arranged with tables similar to those of the general laboratory and will accommodate 250 students. The library and three technical laboratories are likewise on this floor. The third floor contains the quantitative laboratory large enough to accommodate 120 students. Directly connected with this laboratory are the balance, preparation, evaporation and drying rooms. There are also on this floor, six special laboratories, an organic laboratory, a physical laboratory, a lecture room and a museum. There is a suite of rooms on the fourth floor entirely given to photography.

*Library.* The chemical library contains complete sets of many of the more important journals. It contains besides these special sets, a well represented list of analytical and technical works, as well as many rare old works of great historical value. Most of the important journals are taken, thus enabling the student to keep abreast of the times. All books are easily accessible, with only the necessary restrictions to guard against injury and loss.

The second building which is one of the units of the medical quadrangle, contains two large laboratories with a combined floor space of 3,800 sq. ft., a smaller laboratory equipped to accommodate students in quantitative analysis, a lecture room, a preparation room, balance room, store rooms and the private laboratories of the instructors.

## COURSES IN CHEMISTRY.

*Course I. General Chemistry.*

PROFESSOR FRANKFORTER.

Lectures and laboratory work. The course includes a detailed study of chemical and physical properties of the non-metals and their more important compounds, with an introduction to organic chemistry.

*Course II. Advanced Inorganic Chemistry.*

PROFESSOR FRANKFORTER, MR. WEST AND MR. BADGER.

This course is arranged for those who have already had an elementary course in chemistry. The course includes an introduction to physical chemistry with special reference to the laws of solutions and electrolytic dissociation theory. This work is followed by a systematic study of the non-metals from the general standpoint of the periodic law. Special attention is given to the relationship between the different elements and their analogous compounds.

**Course III. Inorganic Chemistry. (Continuation of Course II.)**

PROFESSOR FRANKFORTER, MR. WEST AND MR. BADGER.

This course consists of lectures, recitations and laboratory work on the metals.

**Course IV. Qualitative Analysis.**ASSISTANT PROFESSOR NICHOLSON, MR. ANDERSON, AND MR. WILHOIT.  
Lectures, recitations and laboratory work. The course includes the general reactions of the metals and the qualitative separation and identification.**Course V. Qualitative Analysis.**ASSISTANT PROFESSOR NICHOLSON, MR. ANDERSON, AND MR. WILHOIT.  
Lectures, recitations and laboratory work. Reactions, separations and identifications of the acids.**Course VI. Organic Chemistry.**

PROFESSOR FRANKFORTER AND MR. NEWTON.

This course includes a study of the different groups of carbon compounds with special reference to those groups which are closely associated with biological processes and bio-chemistry, bacteriological, pathological chemistry, physiology and materia medica. The course consists of lectures with frequent recitations and laboratory work. The laboratory preparation work included the making and studying of one or more compounds in each important organic group. Some time is devoted to practical organic analysis, including the analytical side of the alcohols and the sugar group.

**Course VII. Toxicology and Hygiene.**

PROFESSOR FRANKFORTER, PROFESSOR HARDING AND MR. NEWTON.

**Toxicology.**—This course includes the general methods for the separation and identification of the poisons both organic and inorganic. Attention will be given to the identification of poisons associated with medicines and with vegetable and animal matter. Besides this qualitative and quantitative work, attention is given to the structure of those organic groups of compounds which have poisonous properties.

**Hygiene.**—Chemistry lectures and laboratory work. This course includes the chemical analysis of air, water, and some of the common foods, milk sugar and fruit products. Special attention is given to food adulterations and to food preservations.

For work in other special or technical lines of chemistry, numerous courses are offered (see Bulletin of the School of Chemistry). Facilities for research work are also afforded in a large number of lines.

The analysis of the urine is dealt with under physiological chemistry in the department of Physiology, in the pathology of the urinary system in the Department of Pathology and in the clinical laboratories in connection with the microscopy of the urine.

## DEPARTMENT OF MATERIA MEDICA AND THERAPEUTICS.

## OFFICERS OF INSTRUCTION.

HENRY MARTYN BRACKEN, M. D., L. R. C. S. (Edin.), *Professor of Materia Medica and Therapeutics.*WILLIAM H. CONDIT, B. S., M. D., *Instructor in Materia Medica.*

The work in materia medica and therapeutics is graded to cover a period of three years. It consists of lectures, recitations and demonstrations, conducted in the laboratory of materia medica. This laboratory is in Medical Hall. Pharmaceutical preparations are placed before the student and he is taught the method of their preparation in their most eligible forms.

**Course I. Pharmacology.***Professor Bracken.*

This course includes the study of the general characteristics of drugs and of their physiologic actions. Lectures, recitations and laboratory work. Five hours a week, second semester, second year.



**Course II. Therapeutics.**

*Professor Bracken.*

In this course drugs are studied in groups, as governed by their physiologic action, and the therapeutic features of such groups are described. Other remedial measures than those depending upon drugs, are fully considered. Lectures and recitations, four hours a week, first semester, third year.

**Course III. Therapeutics.**

*Professor Bracken.*

In this course the treatment of individual diseases is studied and the application of therapeutic agents to them is discussed. Lectures. Two hours a week, first semester, fourth year.

**Text-Books:**

Collateral Reading.—The Pharmacopeia of the U. S.; The National Dispensatory; Sayre's Organic Materia Medica and Pharmacognosy; Culbreth's Materia Medica and Pharmacology.

DEPARTMENT OF PATHOLOGY AND BACTERIOLOGY.

OFFICERS OF INSTRUCTION.

F. F. WESBROOK, M. A., M. D., C. M., *Professor of Pathology and Bacteriology.*

S. MARX WHITE, B. S., M. D., *Assistant Professor of Pathology and Bacteriology.*

HIBBERT WINSLOW HILL, M. D., *Assistant Professor of Bacteriology.*

L. B. WILSON, M. D., *Assistant Professor of Clinical Pathology.*

R. H. MULLIN, B. A., M. B., *Senior Demonstrator of Pathology and Bacteriology.*

J. L. ROTHEROCK, A. M., M. D., *Clinical Instructor in Pathology.*

A. S. HAMILTON, B. S., M. D., *Instructor in the Pathology of the Nervous System.*

Hospital Laboratory Assistants:—E. L. Tuohy, B. A., M. D.; C. C. Pratt; Geo. N. Freeman, M. D.; Henry Goehrs, M. D.; Oliver M. Porter, M. D.; Nathan C. Bulkley; Lee A. Scace.

Departmental Laboratory Assistants:—John P. Schneider; Harry J. Bartron; Ed. Moren; R. A. Varco, B. A.; Earl H. Current; Thos. R. Martin, B. A., R. H. Labbitt; Carl O. Estrem, B. A.; J. P. Weyrens, B. S.

The Institute of Public Health and Pathology, to which attention has already been directed, provides adequate room and facilities for teaching and research in pathology, bacteriology and public health.

The main laboratory 56x75 feet lighted on three sides and by a skylight, is used for the general or required courses. It is divided into twelve loges, each fully and independently equipped in every detail for the use of six students, who are responsible for all equipment therein contained. Supplies are distributed from a supply room opening off the main laboratory. Books and specimens required in teaching are easily procurable from the museum which is connected by a special or private passageway with the main laboratory. A combined lecture and autopsy room opens both from the main laboratory and from the hall so that autopsies, lantern demonstrations or lectures may be given during the period devoted to the laboratory exercises without interference with the practical work.

A smaller laboratory, one-half the size of the main laboratory, is provided for special work in graduate and optional courses in the Diagnosis of Tumors, Pathology of the Nervous System, Practical Public Health, etc. The same loge arrangement obtains as in the main laboratory.

The hospitals of Minneapolis, St. Paul, Duluth, Rochester and St. Peter, Minn., in which members of the staff are working, afford a large supply of material and frequent opportunities for post-mortem examinations. From many institutions and physicians throughout the state, valuable interesting gross and microscopic materials are received from time to time and are made available in the museum and for macroscopic and microscopic class use.

The State Board of Health laboratories for research and routine investigation are located in the Institute as well as a Pasteur Institute for the study and treatment of rabies. This affords an abundance of illustrative material for Public health, pathology and bacteriology.

A full equipment of microscopes permits of the rental of an instrument to each student, if he is unprovided with one suitable for his purpose.

*Course I. General bacteriology.*

*Professor Wesbrook, Assistant Professor Hill and Dr. Mullin.*

Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of bacteria will be dealt with. The classification of the various bacterial forms, the methods of isolation and culture and the composition and manufacture of culture media will be studied until a thorough knowledge of technique is acquired. General and special study of the various antiseptics, disinfectants and bactericidal substances and conditions will be undertaken.

Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, will be thoroughly carried out. Testing of various germicides—chemical and physical—and the use of bacteriological methods in the examination of drinking water will form an important part of the work. Bacterial activities concerned in sewage purification, etc., will receive attention. Twenty hours per week during the last eight weeks of the second semester, second year.

*Course II. General pathology.*

*Professor Wesbrook, Dr. Mullin, Assistant Professor White, and Assistant Professor Hill.*

Lectures, demonstrations and laboratory work on the general processes involved in disease, to include the study of inflammation, the degenerations and tumors. Twenty hours per week during the last eight weeks of the second semester, second year.

*Course III. Pathology of special diseases (includes bacteriology).*

Disease processes will be grouped, so far as practicable, according to their etiology. Instruction will be afforded by means of lectures, demonstrations of museum specimens and preparations, and laboratory work on materials secured from clinical cases and at autopsy.

The course will consist of instruction in

1. Pathology of infectious diseases.

- (a) Special bacteriology of the infectious diseases with the cultivation on the various media of all the important pathogenic bacteria, sown and kept under observation by each student. Fluids and tissues from clinical cases and autopsies (human and animal) will be supplied for microscopic and cultural examination and an intimate relationship with clinical pathological work maintained.
- (b) Special pathology of the infectious diseases. Concurrently with the bacteriology and parasitology of each of the diseases, the pathology of each infection will be studied.

The important gross and microscopic lessons in all the organs will be illustrated from clinical and autopsy material, fresh and preserved, and supplemented by experimental work. Each student will be required to prepare and examine under the microscope selected fresh and stained specimens of morbid tissues, fluids, etc.

*Professor Wesbrook, Assistant Professor White, Dr. Mullin.*

2. Pathological diseases of toxic and obscure origin. Under this are included the special degenerations, inflammations and other pathological conditions not already included under infectious diseases. *Assistant Professor White, Dr. Mullin.*

Sixteen hours per week throughout the first semester of the third year.

**Course IV.** *Assistant Professor White, Dr. Rothrock and Dr. Mullin.*

Autopsies and post-mortem technique. Students will have an opportunity of personally taking part in this work, under the direction of the pathologists in charge, in the hospital of Minneapolis and St. Paul. A knowledge of the technique of post-mortem work and of morbid anatomy will be thus afforded. Throughout the third and fourth years.

**Course V.** *Special pathology of the nervous system.* *Dr. A. S. Hamilton.*

An elective course, limited to twenty-five students, in the fourth year.

So far as possible, the clinical history, autopsy notes, gross specimens and sections stained by various special methods will be presented of individual cases representing the principal organic diseases of the nervous system. Twelve hours per week, first four weeks, second semester, fourth year.

**Course VI.** *Assistant Professor White.*

Laboratory course on the microscopic study and diagnosis of tumors. (Elective for a limited number of students in fourth year.)

This course includes the comprehensive study of tumors, with the view of giving the student a knowledge of the methods employed in the laboratory diagnosis of this class of pathological conditions and familiarizing him with the characters of the commoner as well as the rarer types, special attention, however, being given to the latter. It is intended to supplement the course on the surgical pathology of tumors by Professor Stewart. Twelve hours per week, four weeks, second semester, fourth year.

**Course VII.** *Research work in one of the following lines:*

(a) General pathology.

(b) Special pathology and bacteriology and technique.

Second semester of third and throughout the fourth year, hours assigned.

**Course VIII.** *Surgical pathology.* *Professor Stewart*

(See principles of surgery.) This course will consist of lectures and laboratory demonstrations and will cover the general subject of the pathological and bacteriological basis of surgery. The lectures will be illustrated by charts and diagrams, by fresh and preserved specimens and, so far as practicable, demonstrations will be given of the various processes of the bacteria concerned. Especial attention will be given to inflammation and its complications, to the infectious diseases of surgical importance and to tumors. Two hours a week, first semester, third year, and two hours per week, second semester, fourth year.

**Text-Books:****Pathology—**

American Text-Book of Pathology.

Ziegler's General and Special Pathology.

Schmaus-Ewing: Pathology and Pathological Anatomy.

Coplin's Manual of Pathology.

Cattell's Post-Mortem Pathology.

Durck-Hektoen: Special Pathologic Histology.

Jakob: Nervous System.

Coat's Manual of Pathology.

Mallory and Wright's Pathological Technique.

**Collateral Reading—**Hamilton's Text-Book of Pathology; Delafield

and Prudden's Handbook of Pathological Anatomy and Histology;

Woodhead's Practical Pathology; von Kahliden's Pathological

Histology; Thoma's Text-Book of General Pathology; Lubarsch

Ostertag, Ergebnisse der Pathologie u Anatomie; Orth, Pathologische

Anatomie; Birch-Hirschfeld, Pathologische Anatomie; Chif-

ford Allbutt's System of Medicine; Leukhart's die Thierische Parisiten

des Menschen; Bouchard, Traite de Pathologie Generale;

Eichorst, Pathologie u Therapie; Gaylord and Aschoff, Pathological

Histology; Nothnagel, Encyclopedia of Practical Medicine;

Wood, Chemical and Microscopical Diagnosis.

**Surgical Pathology—**

Bland Sutton, Tumors, Innocent and Malignant.

Collateral Reading—Park's Surgery, Vol. 1; Warren's Surgical Pathology; Senn on Tumors; Bowlby's Surgical Pathology; Nancrede's Lectures upon the Principles of Surgery; Watson's Cheyne's Tuberculosis of Bones and Joints.

**Bacteriology.**

Muir and Ritchie's Manual of Bacteriology.  
 Park, Bacteriology in Medicine and Surgery.  
 Levy-Klemperer-Eshner Clinical Bacteriology.  
 Lehmann-Neumann-Weaver, Atlas and Textbook of Bacteriology.  
 Abbott, The Hygiene of Transmissible Diseases.  
 Collateral Reading—Kolle and Wassermann, Handbook der Pathologischen Mikroorganismen; Sternberg's Manual of Bacteriology; Woodhead's Bacteria and Their Products; Duflocq, Lecons sur les Bacteries Pathogenes; Flugge, de Mikroorganismen; Migula, System de Bakterien; Duclaux, Traite de Microbiologie; Hueppe (Jordan), Principles of Bacteriology; Novy; Laboratory Work in Bacteriology.

## DEPARTMENT OF MEDICINE.

### OFFICERS OF INSTRUCTION.

- CHAS. LYMAN GREENE, M. D., *Professor of the Theory and Practice of Medicine.*  
 JOHN W. BELL, M. D., *Emeritus, Professor of Physical Diagnosis and Clinical Medicine.*  
 EVERTON J. ABBOTT, A. B., M. D., *Clinical Professor of Medicine and Chief of Medical Clinic, Minneapolis.*  
 CHARLES H. HUNTER, A. M., M. D., *Clinical Professor of Medicine and Chief of the Medical Clinic, Minneapolis.*  
 J. T. CHRISTISON, M. D., *Clinical Professor of Diseases of Children.*  
 GEO. D. HEAD, B. S., M. D., *Professor of Clinical Microscopy and Clinical Medicine.*  
 L. A. NIPPERT, M. D., *Clinical Professor of Medicine.*  
 C. NOOTNAGEL, M. D., *Clinical Professor of Medicine and Physical Diagnosis.*  
 THOMAS S. ROBERTS, M. D., *Professor of Diseases of Children.*  
 GEO. E. SENKLER, M. D., *Clinical Professor of Medicine.*  
 HENRY L. STAPLES, A. M., M. D., *Clinical Professor of Medicine.*  
 J. G. CROSS, M. D., *Instructor in Clinical Medicine.*  
 PEDER A. HOFF, M. D., *Clinical Instructor in Medicine.*  
 WALTER R. RAMSEY, M. D., *Clinical Instructor Diseases of Children.*  
 SOREN P. REES, B. S., M. D., *Clinical Instructor in Medicine.*  
 H. L. ULRICH, M. D., *Instructor in Clinical Microscopy.*

### ASSISTANTS IN MEDICINE.

- L. O. DART, M. D., *Clinical Assistant in Medicine.*  
 JAS. S. GILFILLAN, M. D., *Clinical Assistant in Medicine.*  
 E. K. GREEN, A. B., M. D., *Clinical Assistant in Medicine.*  
 ALEX. R. HALL, M. D., *Clinical Assistant in Medicine.*  
 JOHN E. HYNES, M. D., *Clinical Assistant in Medicine.*  
 W. D. SHELDON, M. D., *Clinical Assistant in Medicine.*  
 THOMAS W. STUMM, M. D., *Clinical Assistant in Medicine.*

GENERAL MEDICINE.

JUNIOR YEAR.

*Course I. Case-taking and general symptomatology.*

Three times a week, first half of first semester.

- (a) Lectures and recitations. *Professor Greene.*
- (b) Practical clinical exercises at University Clinical Building and St. Paul Free Dispensary.

*Course II. Physical Diagnosis.*

- (a) Lectures and recitations second half first semester, three times weekly. *Professor Greene.*
- (b) Clinical exercises throughout the junior year at the hospitals and dispensaries of Minneapolis and St. Paul. *Professors C. Nootnagel and G. A. Senkler.*

This course includes:

- (a) The thorax, its topography and the methods of examination applied to both the normal and abnormal chest.
- (b) The cardiac region, its topography and methods of examination.
- (c) The lungs and pleura in health and disease.
- (d) The abdominal organs, including both general and special methods of examination, i. e., examination of stomach contents, practical urinary examination, etc.

In this course especial attention is given to the study of the normal as well as the abnormal chest and abdomen, and, wherever possible, opportunity is given the student to personally examine cases and watch their progress and termination.

*Course III.* Three hours a week, second semester. *Professor Greene.*

- (a) Systematic lectures, case analyses and quizzes on the diseases of the heart and blood vessels.
- (b) Diseases of the lung and pleura.
- (c) Diseases of the kidney.

*Course III.*

- (b) Practical clinical exercises in the form of clinical lectures and work in small sections in the wards of the various hospitals and St. Paul Free Dispensary, twice weekly, and in the University Dispensary daily throughout the whole semester.

*Course IV. Acute infectious diseases.*

Work in small sections in the city hospitals of Minneapolis and St. Paul, twice weekly (in St. Paul after January 1st).

SENIOR YEAR.

*Course V. Systematic lectures, case analyses and recitations.* Twice weekly. *Professor Greene.*

Covering the acute infectious diseases. In this connection special attention is given to the so-called tropical diseases, at the present day important because of our territorial extension.

*Course VI. Clinical exercises at the City Hospitals of the Twin Cities.*

Correlated with the instruction given in course v. Minneapolis City Hospital throughout the year. St. Paul City Hospital after January 1st, each year.

*Course VII.*

- (a) Diseases of the blood and ductless glands. Systematic lectures, case analyses and recitations, second half of second semester, twice weekly. *Professor Greene.*
- (b) Special instruction in sections at the hospitals and dispensaries, correlated with the course as given above.

*Course VIII.*

- (a) Diseases of the stomach, liver and intestines. Systematic lectures and recitations twice weekly. *Professor Greene.*
- (b) Special clinical work in sections correlated with course given above.

The Clinical Courses I b, II b, III b, IV, VI, VII b, and VIII b, are given for the most part to small sections of the Junior and Senior classes in the wards

and amphitheatres of the several hospitals and dispensaries of Minneapolis and St. Paul, as follows:

- (a) City Hospital, Minneapolis, two hours a week, both years. Professors J. W. Bell, H. L. Staples and C. Nootnagel, Dr. L. A. Nippert and Dr. S. P. Rees. One hour a week, senior year. Dr. Geo. D. Head and Dr. Marx White, and Dr. W. D. Sheldon.
- (b) St. Barnabas' Hospital, Minneapolis, two hours a week, both years. Professor C. H. Hunter.
- (c) City and County Hospital, St. Paul, and St. Joseph's Hospital, St. Paul, four hours a week, for part both years. Professor E. J. Abbott.
- (d) City and County Hospital, St. Paul, two hours a week, both years. Professor C. L. Greene and Dr. Senkler.
- (e) Free Dispensary, St. Paul, two hours a week, both years. Professor C. L. Greene and Drs. Senkler, Ramsey and Hoff.
- (f) University Clinical Building, Minneapolis, four hours a week, both years. Dr. L. A. Nippert, Dr. Geo. D. Head.

**Course IX. General Clinical Course.**

In addition to the courses above named, clinical lectures are given twice weekly to both junior and senior classes. At each are shown cases of unusual interest and importance. The section work throughout the two years is exceptionally valuable by reason of the small size of the sections, every effort being made to bring the student closely in touch with the teacher and patient.

**Course X. Case analysis.**

Throughout both the junior and senior year special attention is given to the analysis of actual cases illustrating those portions of the courses that have been dealt with in the lecture room or in the clinical lectures, students being this way compelled to apply practically such knowledge as they have gained and not only make a diagnosis but go thoroughly into the analysis and bearing of general symptomatology. The older method of simple quizzing in connection with lecture work has been so far as possible abandoned. Exercises throughout the year.

*Professor Greene and Clinical Instructor Hoff.*

Text and Reference Books—*Practice of Medicine*: Osler's Practice; Tyson's Practice; Thompson's Practical Medicine; Ander's Practice. *Physical Diagnosis and Clinical Methods*: Greene's Medical Diagnosis; Butler's Diagnosis; Sahli's Diagnostic Methods; Cabot's Diagnosis; Musser's Diagnosis; Hare's Diagnosis; Bramwell's Practical Medicine; Cabot's Medical Cases; Hutchinson and Rainey's Clinical Methods. *Collateral Reading*: Cabot on the Blood; Du Costa on the Blood; Hemmeter's Diseases of the Stomach; Bons' Diseases of the Stomach; Allbutt's System of Medicine; American Text Book of Medicine; Gibson's Practice; Gibson on Diseases of the Heart and Aorta; Babcock on Diseases of the Heart; Ebstein and Schwalbe, Handbuch der Praktischen Medizin.

DISEASES OF CHILDREN.

**Course I.** Lectures, arranged to cover, so far as possible, the general subject of pediatrics. A course, consisting of two lectures a week, in the second semester of the third year; beginning with a consideration of the special characteristics of the normal infant and child, as distinguished from the adult, and passing on to a detailed description of the features and management of the diseases peculiar to infancy and childhood and of the more or less specialized forms in which certain diseases common to all ages exist during the early years of life. These lectures will be suitably illustrated by charts, colored plates, specimens, and the occasional use of the stereopticon. Third year. *Professor T. S. Roberts.*

**Course II.** Clinical instruction will be given at the St. Paul Free Dispensary and the St. Paul City Hospital four hours weekly throughout the third and fourth years.

*Professors J. T. Christison and Dr. Ramsey.*

**Course III.** Clinical instruction will be given in Minneapolis at the contagious wards of the City Hospital, the Children's Home, the

University Free Dispensary and other specially designated places at such times as opportunity presents. Third and fourth years.

Professor T. S. Roberts.

**Text-Books:**

Holt's Diseases of Children.

Rotch's Pediatrics.

American Text-Book of Diseases of Children.

Collateral Reading—Osler's Practice of Medicine; Keating's Cyclopaedia of Diseases of Children; Corlett's Acute Infectious Exanthemata; Chapin's Theory and Practice of Infant Feeding; Stengel's Nootnagel's Encyclopedia.

DEPARTMENT OF SURGERY.

OFFICERS OF INSTRUCTION.

CHARLES A. WHEATON, M. D., *Emeritus Professor of Surgery.*

JAMES E. MOORE, M. D., *Professor of Surgery.*

FREDERICK A. DUNSMOOR, M. D., *Professor of Operative and Clinical Surgery.*

ARTHUR J. GILLETTE, M. D., *Professor of Orthopaedic Surgery.*

J. WARREN LITTLE, M. D., *Clinical Professor of Surgery.*

ARCHIBALD McLAREN, A. B., M. D., *Clinical Professor of Surgery.*

H. J. O'BRIEN, M. D., *Clinical Professor of Surgery.*

JUSTUS OHAGE, M. D., *Clinical Professor of Surgery.*

JOHN ROGERS, M. D., *Clinical Professor of Surgery.*

J. CLARK STEWART, B. S., M. D., *Professor of Principles of Surgery.*

JOHN B. BRIMHALL, M. D., *Clinical Instructor in Orthopedic Surgery.*

A. R. COLVIN, M. D., *Clinical Instructor in Surgery.*

WARREN A. DENNIS, M. D., *Clinical Instructor in Surgery.*

JUDD GOODRICH, M. D. *Clinical Instructor in Surgery.*

ARTHUR A. LAW, M. D., *Instructor in Operative Surgery.*

ARTHUR T. MANN, B. S., M. D., *Clinical Instructor in Surgery.*

VAN H. WILCOX, M. D., *Instructor in Operative Surgery.*

R. E. FARR, M. D., *Assistant in Surgery.*

EMIL S. GEIST, M. D., *Clinical Assistant in Orthopaedia.*

ARCHA WILCOX, M. D., *Clinical Assistant in Surgery.*

COURSES OF INSTRUCTION.

The course in surgery is graded in the third and fourth years. Examinations are held at the close of each of these years. Lectures and recitations are given by the teaching staff in surgery and clinics at the dispensaries and hospitals of Minneapolis and St. Paul by a large corps of instructors.

*Course I. The principles of surgery.*

*Professor Stewart.*

Inflammation; traumatic fevers, suppurations; acute inflammations of joints; ulceration, gangrene; thrombosis and embolism; septicæmia; pyæmia; erysipelas; tetanus; surgical tuberculosis; actinomycosis, anthrax and glanders. Lectures and recitations, two hours a week, first semester, third year.

**Course II. Operative surgery.***Professor Dunsmoor.*

Lectures upon the principles of operative procedure; the preparation of patient, operator and operating rooms; the principles of asepsis, antiseptics and sterilization; anæsthesia and anæsthetics; hæmostasis, ligatures and sutures; dressings, bandages and the treatment of wounds. Two hours a week, first half, second semester, third year.

**Course III. The practice of surgery.***Professor Moore.*

Fractures and dislocations; injuries of joints; injuries and surgical diseases of the skin; of the lymphatics, blood vessels and nerves; of the tendons, fasclæ and bursæ; of the face, mouth tongue, jaws (excepting the study of tumors). Lectures and recitations. Three hours a week, second semester, third year.

**Course IV. The practice of surgery.***Professor Moore.*

Surgery of the head, neck, chest, back, breast, abdomen, including hernia, anus, rectum and urinary tract. Lectures and recitations. Three hours a week, first semester, fourth year.

**Course V. Operative surgery.***Professor Dunsmoor and Dr. Law.*

An elective laboratory work, consisting of operations, performed by sections of the class, under the supervision of the instructors, upon the cadaver and upon animals. Six hours a week, first half of first semester, fourth year.

**Course VI. Orthopedic surgery:** including diseases of bones, joints, synoviæ and bursæ, congenital and acquired deformities; dystrophies, with the principles of treatment. Lectures and recitations. Three hours a week, second half, second semester, fourth year.

*Professor Gillette.***Course VII. Tumors.***Professor Stewart.*

A special course upon tumors, taking up the general pathology and the general principles of the treatment of tumors. Each variety of tumor is then discussed, together with its histology, life-history, diagnosis and treatment. The course is illustrated by charts and museum specimens and lantern slide demonstrations. Lectures and recitations, two hours a week, second semester, fourth year.

**Course VIII. Bandaging and dressings.***Professor Dunsmoor and Dr. Law*

A practical course of instruction, by means of demonstrations and drill upon animals and cadaver by the student in person, under the supervision of the chair of operative surgery. Eight hours, first half, first semester, fourth year.

**Course IX. Clinical surgery.**

Courses of clinics at which operations, in the whole domain of surgery, are witnessed by the students of the third and fourth years. These clinics are held in the dispensaries and hospitals of the cities of Minneapolis and St. Paul, upon Thursdays and Saturdays throughout the year. The classes alternate at the two cities in their attendance upon these clinics. They are conducted personally, throughout the year, by the clinical chiefs and their associates, as follows:

At the City and County Hospital, St. Joseph's Hospital or St. Luke's Hospital in St. Paul, weekly, by Professor John T. Rogers.

At the City and County Hospital, St. Joseph's Hospital, St. Luke's Hospital, or Free Dispensary, at St. Paul, with sections of class weekly, by Professor John T. Rogers, Dr. G. M. Coon, Professor A. J. Gillette, Dr. W. A. Dennis, Dr. Judd Goodrich and Dr. A. Colvin.

At the City and County Hospital, or at St. Joseph's Hospital, or at St. Luke's Hospital, St. Paul, weekly, by Professor Justus Ohage.

At the Northwestern Hospital, Minneapolis, weekly, by Professor J. E. Moore.

At the Asbury Hospital, Swedish Hospital or the City Hospital, Minneapolis, weekly, by Professor F. A. Dunsmoor, Dr. J. Warren Little.

At the City Hospital, Minneapolis, weekly, by Professor J. Clark Stewart, Dr. A. T. Mann.

At the University Free Dispensary, by Drs. Law, Mann and Condit.



**Text-Books:**

Rose and Carless.  
 International Text-Book of Surgery.  
 Warren's Surgical Pathology and Therapeutics.  
 Surgical Diagnosis, Berg.  
 Bryant's Operative Surgery.  
 Binnie's Operative Surgery.  
 Scudder on Fractures.  
 Collateral Reading—Von Bergmann's System of Surgery.  
 Moore's Orthopædic Surgery.  
 Bradford's and Lovett's Orthopædic Surgery.  
 Witman's Orthopædic Surgery.

## DISPENSARY AND HOSPITAL CLINICS.

## DEPARTMENT OF NERVOUS AND MENTAL DISEASES.

## OFFICERS OF INSTRUCTION.

C. EUGENE RIGGS, A. M., M. D., *Professor of Nervous and Mental Diseases.*  
 W. A. JONES, M. D., *Clinical Professor of Nervous and Mental Diseases.*  
 A. W. DUNNING, M. D., *Clinical Instructor in Nervous and Mental Diseases.*  
 H. W. JONES, M. D., *Clinical Instructor in Nervous and Mental Diseases.*  
 CHARLES R. BALL, M. D., *Assistant in Nervous and Mental Diseases.*  
 A. E. LOBERG, M. D., *Clinical Assistant in Nervous and Mental Diseases.*

## COURSES OF INSTRUCTION.

The required courses of lectures and recitations in this department will be given in the fourth year. Instruction will be by recitations and the "case method." Elective courses in clinical neurology, psychiatry, medical electricity and neuropathology will be offered in the fourth year.

*Course I. Neurology.* Professors Riggs and Jones (Alternating).  
 Lectures, recitations and demonstrations. Two hours a week, twelve weeks, first semester, fourth year.

*Course II. Psychiatry.* Professors Riggs and Jones (Alternating).  
 Lectures, recitations and demonstrations. Two hours a week, five weeks, first and second semesters, fourth year.

*Course III. Electro-therapeutics (elective).* Dr. A. W. Dunning.  
 Fourth year.

*Course IV. Clinical neurology and psychiatry.* Professors Riggs and Jones.  
 Practical instruction will be given upon Thursdays and Saturdays, fourth year. Clinics will be conducted in St. Paul, by Professor Riggs, at the City and County Hospital, St. Luke's Hospital, St. Joseph's Hospital and the Free Dispensary; and at Minneapolis by Professor Jones, at the City Hospital, Asbury Hospital, St. Mary's Hospital and the University Free Dispensary.

**Text-Books:**

Oppenheim's Diseases of the Nervous System.  
 Dana's Nervous Diseases.  
 Church-Peterson, Nervous and Mental Diseases.  
 Collins' Treatment of Nervous Diseases.  
 Brower and Bannister's Mental Diseases.  
 Berkeley's Mental Diseases.  
 Robertson, Pathology of Mental Diseases.  
 Collateral Reading—Clouston's Lectures on Mental Diseases; Edinger's Anatomy of the Central Nervous System; Gordinier's Anatomy of the Central Nervous System; Mills' Nervous Diseases; Gower's Diseases of the Nervous System; A. M. Starr's Organic Nervous Diseases.

## DEPARTMENT OF SKIN, GENITO-URINARY, AND VENEREAL DISEASES.

## OFFICERS OF INSTRUCTION.

MAX P. VANDER HORCK, M. D., *Professor of Diseases of the Skin and of the Genito-Urinary System.*

BURNSIDE FOSTER, A. B., M. D., *Clinical Professor of Diseases of the Skin.*  
F. R. WRIGHT, M. D., *Clinical Instructor in Dermatology and Genito-Urinary Diseases.*

GEO. M. COON, M. D., *Clinical Instructor in Genito-Urinary Diseases.*

JOHN M. ARMSTRONG, M. D., *Clinical Assistant in Genito-Urinary Diseases.*

S. E. SWEITZER, M. D., *Clinical Assistant in Dermatology and Genito-Urinary Diseases.*

## COURSES OF INSTRUCTION.

This subject is taught by lectures, recitations and clinical demonstrations.

*Course I. The anatomy and physiology of the skin; diseases of the skin and its appendages; venereal and genito-urinary diseases. Two hours a week, second semester, fourth year.*

*Professor Vander Horck.*

*Course II. Clinical lectures, in connection with the dispensaries and hospitals of Minneapolis and St. Paul. Weekly in the third and fourth year.*

*Professors Vander Horck and Burnside Foster and Dr. F. R. Wright.*

**Text-Books:**

Keyes' or White and Martin's Diseases of Urinary Organs.

Lydston's Genito-Urinary, Venereal and Sexual Diseases.

Hyde's Diseases of the Skin.

Walker's Dermatology.

Jackson's Diseases of the Skin.

Hyde and Montgomery's Venereal Diseases.

Collateral Reading—Crocker's Diseases of Skin; Morris' Diseases of the Skin; Hayden's Diseases of the Skin; Stelwagon's Diseases of the Skin; Taylor's Genito-Urinary and Venereal Diseases of the Skin.

## DEPARTMENT OF DISEASES OF THE THROAT AND NOSE.

## OFFICERS OF INSTRUCTION.

JACOB E. SCHADLE, M. D., *Professor of Rhinology and Laryngology.*

W. R. MURRAY, A. B., M. D., *Clinical Professor of Rhinology and Laryngology.*

R. A. CAMPBELL, M. D., *Instructor in Rhinology and Laryngology.*

## COURSES OF INSTRUCTION.

*Course I. Anatomy and physiology of the nose and throat; pathology, diagnosis and treatment.*

Lectures and recitations. Two hours a week, eight weeks, fourth year.

*Professor Schadle.*

*Course II. Clinical instruction, given at the University Free Dispensary, Minneapolis, in the diagnosis and treatment of diseases of the nose and throat; in the methods of examination; in the use of instruments, and in the application of remedies, etc. Five hours a week, both semesters, fourth year.*

*Drs. Murray and Campbell.*

*Course III. Operative clinics* will be held at Asbury or City Hospital, Minneapolis, every Saturday, third and fourth year. *Professor Murray.*

*Course IV. Clinical instruction*, given at the St. Paul Free Dispensary, in the diagnosis of diseases of the nose and throat; in the methods of examination; in the practical use of instruments and application of remedies; and in the applied anatomy of the nose and throat, illustrated by dry and wet preparations. *Two hours a week, fourth year. Professor Schadle.*

*Text-Books:*

Schadle's Outlines of Diseases of Nose and Throat.  
Coakley's Diseases of the Nose and Throat.  
Grayson's Diseases of the Nose and Throat.  
Collateral Reading—Bosworth's Diseases of the Nose and Throat;  
Posey and Wright's Diseases of the Ear, Nose and Throat; and  
Kyle's Diseases of the Nose and Throat.

DEPARTMENT OF GYNECOLOGY.

OFFICERS OF INSTRUCTION.

ALEX. J. STONE, LL. D., M. D., *Professor of Diseases of Women.*  
AMOS W. ABBOTT, M. D., *Clinical Professor of Diseases of Women.*  
J. L. ROTHROCK, A. M., M. D., *Clinical Professor of Diseases of Women.*  
ARTHUR E. BENJAMIN, M. D., *Clinical Instructor in Gynecology.*  
H. P. RITCHIE, Ph. B., M. D., *Clinical Instructor in Gynecology.*  
H. L. WILLIAMS, A. B., M. D., *Clinical Instructor in Gynecology.*

COURSES OF INSTRUCTION.

The course in the diseases of women consists of lectures, recitations, clinical instruction and the witness of operations upon the human subject, as they may offer.

*Course I. Lectures and recitations. Professor Stone.*

Two hours a week, first semester, fourth year. One hour a week, second semester, fourth year.

*Course II. Clinical courses at the City and other hospitals in Minneapolis and St. Paul.* Observations and examinations of patients, methods of examination, diagnosis and treatment.

Weekly Clinics in Minneapolis Hospitals, by Prof. A. W. Abbott and Dr. A. E. Benjamin.

Weekly clinics held in St. Joseph's Hospital, St. Paul, by Prof. Stone.

Weekly clinics held at the City and county Hospital, St. Paul, during January, February, and March, by Dr. J. L. Rothrock.

The above announcements represent the surgical work given in gynecology throughout the entire year. Every operation in this branch of surgery is presented in these clinics. Owing to the limited field within which this work must be done, the attempt is always made to divide the class into small sections. Daily clinics for small sections are held at the University and St. Paul Free Dispensaries by Drs. A. W. Abbott, A. E. Benjamin, J. L. Rothrock, and H. P. Ritchie. This course is especially valuable since it brings the student into direct acquaintance with the patient. Individual instruction is given in history-taking, diagnosis, methods of examination, treatment and minor gynecology.

*Text-Books:*

Dudley's Diseases of Women.  
Reed's Text-Book of Gynecology.  
Kelly's Operative Gynecology.  
Collateral Reading—Penrose, Gleist and Ashton.

## DEPARTMENT OF OPHTHALMOLOGY AND OTOTOLOGY.

## OFFICERS OF INSTRUCTION.

- FRANK C. TODD, M. D., *Professor of Ophthalmology and Otology.*  
 E. VILLIERS APPELBY, M. D., *Clinical Instructor in Ophthalmology.*  
 JOHN S. MACNIE, M. D., *Clinical Assistant in Ophthalmology and Otology.*

## COURSES OF INSTRUCTION.

- Course I. Diseases of the eye and its appendages; refraction and its errors. Lectures and recitations. Illustrated with specimens and stereopticon. Three hours a week, first half, first semester, fourth year.* *Professor Todd.*
- Course II. Diseases of the ear.*  
 Lectures and recitations. One hour a week, first half, first semester, fourth year. *Professor Todd.*
- Course III.* *Professor Todd.*  
 Clinical lectures will be given and operations performed at Asbury or Northwestern Hospital, Minneapolis, every Thursday, third and fourth year. Clinics will be given at the Minneapolis City Hospital during December, January, February and March. Third and fourth years.
- Course IV.* Clinical instruction will be given at the University, and St. Paul Free Dispensaries in the diagnosis of diseases of the eye and ear; in the methods of examination; in the use of instruments, including the ophthalmoscope, and in the treatment of eye and ear diseases, etc. Fourth year. *Professor Schadle.*  
 Diseases of ear, St. Paul, *Dr. Appleby.*  
 Diseases of eye, St. Paul, *Dr. Macnie.*  
 Diseases of eye and ear, Minneapolis,
- Course V. Ophthalmoscopy; a practical course of instruction, elective in the senior year.* *Dr. J. C. Macnie.*

*Text-Books:*

- Wood and Woodruff, *Commoner Diseases of the Eye.*  
 Fox's *Diseases of the Eye.*  
 Bacon's *Diseases of the Ear.*  
 Collateral Reading—DeSchweinitz's *Diseases of the Eye*; American Text-Book; Norris and Oliver's *Ophthalmology*; Politzer's *Diseases of Ear*; Vaasey's *Diseases of the Eye*; Posey Wright, *Diseases of the Eye, Ear, Nose and Throat*; May's *Diseases of the Eye.*

## DEPARTMENT OF OBSTETRICS.

## OFFICERS OF INSTRUCTION.

- PARKS RITCHIE, M. D., *Professor of Obstetrics.*  
 A. B. CATES, A. M., M. D., *Professor of Obstetrics.*  
 FREDERICK LEAVITT, M. D., *Clinical Instructor in Obstetrics.*  
 J. S. LITZENBERG, B. S., M. D., *Clinical Instructor in Obstetrics.*  
 JENNETTE McLAREN, M. D., *Assistant in Obstetrics.*  
 F. L. ADAIR, M. D., *Assistant in Obstetrics.*

## COURSES OF INSTRUCTION.

The subject of obstetrics is taught by lectures, recitations and demonstrations upon the manikin; by illustrative drawings and by attendance upon cases

of labor. The didactic work is done in the third year; the clinical study is had in the fourth year. A large part of the obstetric service of the City Hospital in St. Paul and of the Minneapolis City Hospital is at the disposal of the chair of obstetrics. Clinics are also held at other hospitals in St. Paul and Minneapolis.

*Course I. The anatomy and physiology of the pelvic organs: the development of the embryo and appendages; pregnancy; symptoms and diseases; operative obstetrics; the complications of labor and its sequelæ. Lectures and recitations two hours a week in October and January, and three hours a week, second semester, third year.*  
*Professor Cates.*

*Course II. The theory and practice of obstetrics.* *Professor Ritchie.*  
 The mechanism and conduct of normal labor, with its complications; abortions. Lectures and recitations. Two hours a week. November and December, third year.

*Course III. Hospital ward work.* *Drs. Leavitt and Litzenberg.*  
 Twice a week, from January 1st to May 1st, Dr. Frederick Leavitt will conduct sections of students through the maternity wards of the St. Paul City and County Hospital. A similar service will be conducted in the wards of the Minneapolis City Hospital, from October 10th to May 1, by Dr. Jennings C. Litzenberg. This course will be in the nature of an ante-partum clinic, in which will be studied the signs of pregnancy, pelvimetry, palpation, obstetric diagnosis, etc. This work is in the nature of a conference, each student viewing the subject from the standpoint of a practitioner. In addition Dr. Litzenberg gives a course of demonstrative obstetrics on the manikin to third and fourth year students.

*Course IV. Clinical obstetrics.*  
 The study of and the participation in the conduct of two or more hospital deliveries in the fourth year, under the direction of Professors Ritchie and Cates and personally conducted by Drs. Frederick Leavitt, J. C. Litzenberg, Jennette McLaren and F. L. Adair. A limited number of out-patients is assigned to members of the senior class who are authorized to attend these cases, under the supervision of the instructors, before, during and after labor.

*Text-Books:*

Edgar, Williams, Jewett, Lusk, Hirst, and the American Text-Book of Obstetrics.

#### THE HISTORY OF MEDICINE.

An elective course of lectures is given in the history of medicine and of the medical profession from the earliest times, including accounts of the epoch-making discoveries in medicine, brief sketches of the lives of eminent physicians and an account of the great plagues of history. Two hours a week, second half, second semester, fourth year.  
*Professor Burnside Foster.*

#### MEDICAL JURISPRUDENCE.

A course of lectures and recitations, in the legal relations of medicine. Two hours a week, second half, second semester, fourth year.  
*Professor Sweeney.*

*Text-Books:*

Taylor's Medical Jurisprudence.  
 Collateral Reading—Hamilton's American System of Legal Medicine; Withaus' Principles of Forensic Medicine and Toxicology; Wharton and Stille's Medical Jurisprudence; Reese's Medical Jurisprudence and Toxicology.

#### HYGIENE.

A course of lectures in hygiene is conducted by a corps of the faculty. The general subject is thus divided into several branches; namely, chemistry of air, water and soil (included in the course in chemistry); the hygiene of foods, beverages, clothing, bathing and exercise; public sanitation (including sewage and garbage

disposal, disinfection, regulations of quarantine, the disposal of the dead, the development of vital statistics, the care of slaughter houses, etc.); the various factors concerned in the spread of transmissible diseases and the logical methods of prevention; some practical phases of sanitary engineering. The examinations in this branch are conducted by the lecturers jointly. The course includes about forty lectures and recitations, which are given during the second semester of the fourth year.

*Professors Bass, Beard, Bracken and Westbrook.*

**Text-Books:**

Abbott—The Hygiene of Transmissible Diseases.  
 Harrington—Practical Hygiene.  
 Sedgwick—Principles of Sanitary Science and Public Health.  
 Coplin's and Bevan's Practical Hygiene.  
 Park's Hygiene.  
 Bergey's Principles of Hygiene.  
 Collateral Reading—Richardson's Preventive Medicine; Buck's Hygiene and Public Health; Winter Blyth's Foods and Their Composition; State Board of Health Reports; Reports of American Public Health Association; Handbook on the Prevention of Tuberculosis, etc., etc.

**CLINICAL MICROSCOPY.**

A required course given in the second semester of the senior year. The course includes:

- (a) The urine; a macroscopical study of its colors, and sediments, and the microscopical study of blood, pus, epithelial casts, spermatozoa, etc., in the urine of disease.
- (b) The blood; the counting of red and white cells in the blood, the estimation of hæmoglobin, the making of blood smears, and the fixing, staining, mounting, and studying of all forms of normal and pathological red and white blood cells. In this course students are given specimens of blood from cases of pernicious anaemia, myelogenous leukaemia, and lymphatic leukaemia, for study.
- (c) Stomach contents; the macroscopical, chemical, and microscopical study of gastric contents in various diseases of the stomach, with special reference to differential diagnosis, by lectures and demonstrations.
- (d) Exudates and transudates in various diseases of the pleura and peritoneum. Nine hours a week during half of the second semester.

*Professor George Douglas Head.*

**Books of Reference:**

Simon's Clinical Diagnosis.  
 Cabot's Clinical Examination of the Blood.  
 Ewing's Clinical Pathology of the Blood.  
 Reider's Atlas of Urinary Sediments.  
 Sahli's Lehrbuch der Klinischen Untersuchungs Methoden.  
 Ogden's Clinical Examination of the Urine.  
 Boston's Clinical Diagnosis.  
 Wood's Chemical and Microscopical Diagnosis.

The senior class is divided into sections of four each and assigned to the laboratory of clinical microscopy four days of the week throughout the college year. In this work the students are required to make urine, sputum, and stomach contents examinations of the cases coming to the free dispensary. This instruction is under the charge of Dr. Henry L. Ulrich.

**DEGREES.**

The degree of doctor of medicine is conferred by the Board of Regents upon the students who are recommended, by vote of the faculty, for graduation. Candidates for the degree must possess the following essential qualifications:

- (1) Twenty-one years of age and upwards.
- (2) Good moral character.
- (3) A degree of preliminary education equivalent to that demanded by the examination for entrance to this college.
- (4) Four full college years spent in the study of medicine; the fourth year, at least, in this University, and the remainder in this or other recognized colleges of medicine.
- (5) Satisfactory examinations passed in all branches in accordance with the foregoing rules.

#### THE ROLLIN E. CUTTS PRIZE IN SURGERY.

Dr. Mary E. Smith Cutts, '91 Medical, has given the University, as a memorial of her husband, Dr. Rollin E. Cutts, '91 Medical, the sum of \$500.00, the income from which is to be awarded in the form of a gold medal to that member of the Senior class of the College of Medicine and Surgery who shall present the best thesis showing original work upon a surgical subject.

#### LIBRARY OF MEDICAL DEPARTMENT.

Thomas G. Lee, B. S., M. D., Librarian.

The Library consists of (a) The General clinical and reference Collection of some 4,000 books and bound periodicals, and thirty-four current periodicals; (b) The College Collections of the College of Homeopathic Medicine and Surgery, the College of Dentistry and the College of Pharmacy; (c) The Departmental Libraries, being special collections of books and current periodicals belonging to the Laboratories of Anatomy, Chemistry, Histology and Embryology, Pathology and Bacteriology and Physiology. In addition, the Libraries of the Hennepin County Medical Society, some 3,800 volumes and 50 Journals, and that of the Ramsey County Medical Society, some 4,500 volumes and 150 Journals, are accessible to the Medical student for reference work and collateral reading.

Other Libraries of value to the Medical student are the General University and other departmental libraries 110,000 volumes; the Minneapolis Public Library 125,000 volumes; the St. Paul Public Library 55,000 volumes.

#### DISPENSARIES.

In its clinical instruction the medical department makes use of two well organized free dispensaries, each having a large out service clinic. The University Clinical Building is located across the river from the medical department proper, at 1810 Washington Avenue South. A large commodious, two-story building has been erected by the Regents of the University for the accommodation of the free dispensary. This building is situated in a thickly populated part of Minneapolis, and received last year over 2,500 new patients, aggregating more than 10,000 visits. The staff is composed

of members of the faculty and their assistants, and is organized under a Chief of Staff. The service is divided into medical, surgical, gynecological, eye and ear, nose and throat, skin and venereal, mental and nervous departments. Senior students are required to attend daily the clinics at the free dispensary. They are drilled in the taking of histories, the making of physical examinations, etc. Sections of senior students are assigned each day to the drug room of the dispensary and to the laboratory of clinical microscopy, located in the basement of the building. Competent instructors are in charge of the sections of students so assigned. The free dispensary also provides a residence service for senior students, which service is elective and open to a limited number of the senior students. Students electing this service are required to reside at the dispensary and attend the emergency, sick, and accident calls. An obstetrical out service department is also conducted in connection with the dispensary and obstetrical cases are assigned to sections of senior students. These clinics are conducted under the direction of some member of the obstetrical staff.

The St. Paul free dispensary is centrally located in a twenty-room building, and its clinical service is wholly under the control of the staff of the University instructors. During the past year nearly 1,200 individuals received attention, who by repeated visits aggregated over 9,000 patients. Twice weekly clinics are given in this dispensary to sections of students.

#### HOSPITALS.

The hospitals of the city of Minneapolis and St. Paul have very generously opened their doors to the students of this department. Saturday and Thursday mornings and afternoons, throughout the year, are devoted to the use of these clinical opportunities by the junior and senior classes. These classes alternate in periods of six weeks between the two cities upon the days mentioned.

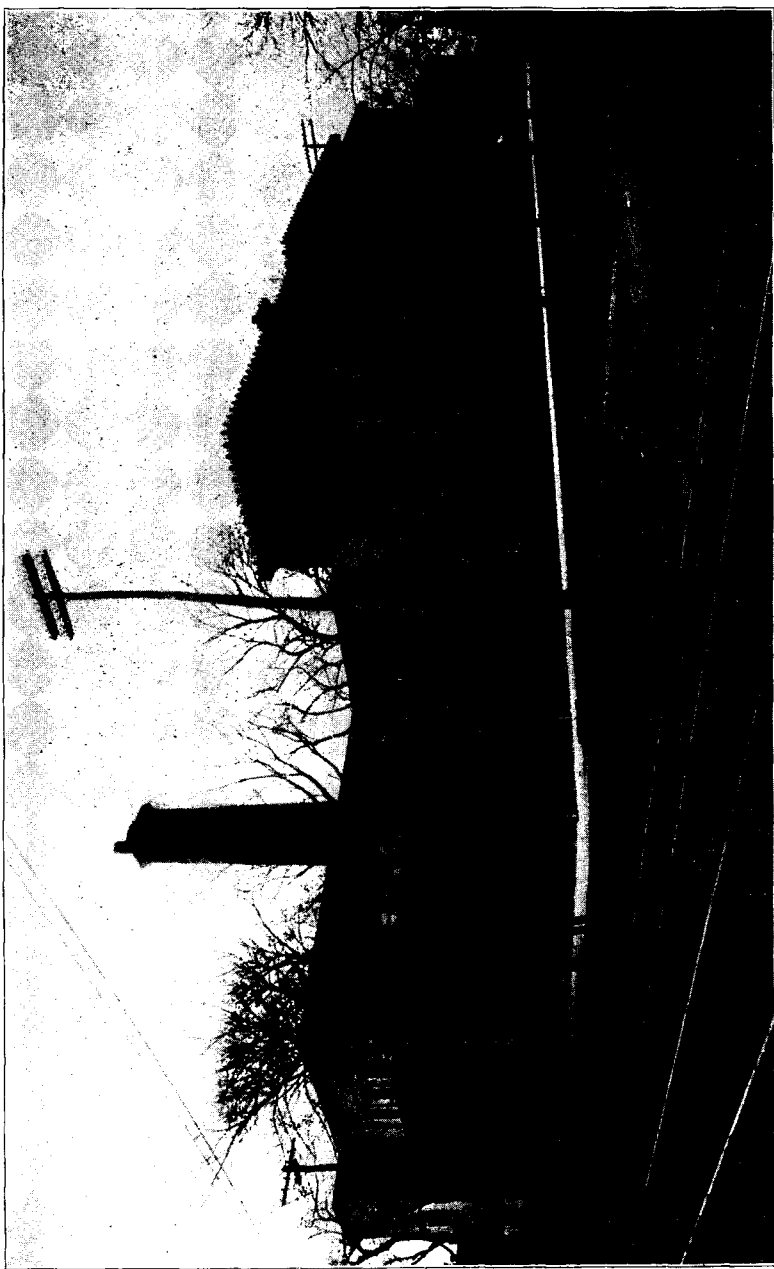
The hospital facilities of the University are thus exceptionally good, since they are not limited to one large amphitheatre, where but a few students can closely observe diagnostic and surgical methods, but are divided among a number of hospitals where the various professors care for their private and clinical cases. This makes it possible to divide the classes into sections, so that each student has equal opportunities of observation and is in close touch with his teacher.

The City Hospital of Minneapolis places its entire clinical material at the command of the clinical teachers of the University. This is a large modern hospital, with splendid equipment, and has a capacity of one hundred and forty beds. During the year 1904, this hospital received 1,298 patients. A large new administration building is now being completed by the city at a cost of about \$55,000 which will greatly increase the efficiency of the hospital. A modern, newly erected, contagious ward furnishes excellent opportunity for bedside clinical instruction in contagious diseases





ST. PAUL CITY AND COUNTY HOSPITAL.



MINNEAPOLIS CITY HOSPITAL.

under the direction of the Professor of Diseases of Children. In the City Hospital, both bedside and amphitheater, medical and surgical clinics are conducted twice weekly by members of the faculty. Clinics in diseases of the skin, nervous diseases, obstetrics, etc., are likewise given in the hospital throughout the school year. Special medical bedside clinics are conducted in the wards of the hospital to small sections of senior students, during the year, by members of the faculty.

St. Barnabas Hospital, an institution with the capacity of eighty-four beds, furnishes medical and surgical material for clinics to Junior and Senior classes of the University. This hospital received last year 1,375 patients. Several members of the faculty are upon its staff. University clinics are given in the amphitheater twice weekly throughout the college year.

Asbury Methodist Hospital affords clinical material for the State University. In 1904 the hospital received 600 patients. The hospital at the present occupies its old building at the corner of Ninth avenue and Sixth street south, but is constructing a large new building with the capacity of 160 beds. Semi-weekly clinics are given by members of the faculty in this hospital.

Northwestern Hospital with its capacity of 50 beds offers splendid surgical material for University clinics. Semi-weekly clinics in surgery are given in its amphitheatre by members of the faculty who are on its staff. An addition will be built to this hospital this year which will double its capacity, making it one of the finest hospitals in the state. In this addition will be three operating rooms, one of them an amphitheatre.

The Swedish Hospital has a newly constructed modern building with a capacity of fifty beds. Members of the faculty utilize the material of this hospital for teaching purposes.

St. Paul City Hospital, with a capacity of over 300 beds is the largest and most complete of its kind in the Northwest. From January 1st to May 1st, its entire clinical facilities are at the disposal of the University. It enters over two thousand patients annually, a large proportion of whom are of the emergency order, or are suffering from acute disease. The opportunities for bedside instruction are very great, and the hospital theatre is maintained for teaching purposes. Recently a modern fireproof building has been erected for contagious diseases, where the students have unexcelled opportunities to see and study diphtheria, scarlatina, erysipelas, etc., etc. A separate building is provided for midwifery, and senior students see labor cases under the personal supervision of the professor or instructor in obstetrics.

The orthopedic department containing a large number of crippled and deformed children is under the personal control of the professor of orthopedic surgery.

St. Joseph's Hospital with 125 beds and one of the finest amphitheatres

with every modern device, contributes largely to the clinical instruction. Members of the faculty are on the staff and give clinics every week.

St. Luke's Hospital, with 90 beds, is largely devoted to surgical clinics, as several of our faculty are upon its staff. University clinics are held in this hospital twice a week. Two operating rooms with conveniences for students, give unusual facilities and the service is of the highest order.

The new University Hospital, soon to be erected upon the Campus, at a cost of \$125,000, will provide unexcelled opportunities for clinical instruction taken in connection with the clinics at the other hospitals mentioned above.

#### CLINICAL OPPORTUNITIES.

Clinical records are kept of the Senior class and the following example, which is by no means exceptional, gives a fair indication of the character and amount of work done by the students.

Six hundred and sixty-eight (668) clinical cases have been reported by a single member of the senior class as coming under his observation and study during a period of eight months. This number by no means represents the total of clinics, but simply those seen by him alone, nor does it include any of the Junior year clinics. Approximately, it is the work done by every member of the class though the clinical instruction is constantly varying because of the small sections and individual teaching which forms the basis of modern methods. Indeed, comparatively few clinical lectures are given to the class as a whole; students come in close relation with patients and study them much the same as though the cases were their own.

The following is a summary of one student's clinics as reported:

	CASES.
Internal medicine .....	128
Diseases of Children .....	39
General Surgery .....	144
Orthopedic Surgery .....	35
Mental and Nervous Diseases.....	72
Genito-urinary and Skin.....	104
Nose and Throat.....	40
Diseases of Women.....	38
Eye and Ear .....	59
Obstetrics .....	9
Total.....	668

# MINNEAPOLIS CLINICS

## Thursday

Hour	Subject	Clinician	Hospital
9:00-11:00	Medicine	Prof. Bell or Prof. Nootnagel and Dr. Rees	
11:00-12:00	Medicine	Prof. Head	
9:00-10:30	Eye and Ear	Prof. Todd	City
11:00-12:00	Medicine	Dr. Rees	N. W. City, Asby.
9:00-10:30	Surgery	Prof. Little	City
10:30-12:00	Gynecology	Dr. Benjamin	Asbury, City
1:00-2:00	Medicine	Prof. Hunter	St. Barnabas
1:00-2:00	Surgery	Dr. Mann	St. Barnabas
1:00-2:00	Medicine	Prof. Head	City, Clin Building
2:00-3:00	Neurology	Prof. Jones	Clin Building
3:00-4:00	Dermatol.	Prof. Vander Horck or Dr. Wright	City, Clin. Building
4:00-5:00	Autopsies	Prof. White	City

## Saturday

9:00-11:00	Surgery	Prof. Moore	Northwestern
11:00-12:00	Gynecology	Prof. Abbott or Dr. Williams	
9:00-11:00	Surgery	Prof. Dunsmore	N. W., City
11:00-12:00	Pediatrics	Prof. Roberts	Swedish, City
9:00-10:30	Nose and Throat	Prof. Murray	Clin. Building
10:30-12:00	Medicine	Prof. Nippert	Asbury, City
1:00-2:30	Orthoped.	Dr. Giest	City
1:00-2:30	Pediatrics	Dr. Dart	Clinic Building
1:00-2:30	Gynecology	Dr. Williams	Clinic Building
1:00-2:30	Pharmacol.	Mr. Eglund	Clinic Building
1:00-2:30	Clin. Mich.	Dr. Ulrich	Clinic Building
1:00-2:30	Medicine	Prof. Staples or Dr. Cross	Clinic Building
1:00-2:30	Surgery	Prof. Stewart	City
2:30-3:30	Obstetrics	Dr. Litzenberg	City, N. W.
2:30-3:30	Surgery	Dr. Farr	Clinic Building
2:30-3:30	Medicine	Dr. Cross	St. Mary
2:30-3:30	Medicine	Dr. Sheldon	City
4:00-6:00	Autopsies	Prof. White	City

Contagious Diseases. During October, November and December, the senior class, one section at a time, will be given a clinic at the City Hospital by Prof. Roberts or Dr. Dart on Mondays, Wednesdays and Fridays from 11 to 12.

Practical Physical Diagnosis (for juniors) on Tuesdays, Wednesdays and Fridays, from 12:30-1:30, by Profs. Nippert and Nootnagel and Dr. Rees at the Clinical Building.

Parturition clinics throughout the year by Prof. Cates and Dr. Litzenberg (for seniors) at City Hospital and other places.

Bedside clinics in medicine, Monday, 4:30-5:30, at City Hospital by Prof. White. (One section.)

Bedside clinics in Medicine, Wednesday, 4:30-5:30, at City Hospital, by Dr. Sheldon. (One section.)

# ST. PAUL CLINICS

Thursday

Hour	Subject	Clinician	Hospital
9:00-10:00	Orthopedia	Prof. Gillette	City, St. J., St. L.
10:15-12:00	Surgery	Prof. McLaren	St. L., St. J.
10:15-12:00	Surgery	Prof. O'Brien	St. Joseph
10:15-12:00	Gynecology	Prof. Rothrock	City (2nd sem)
1:30-2:30	Medicine	Prof. Greene	Disp. (2nd sem)
1:30-2:30	Medicine	Dr. Hoff	Disp.
1:30-2:30	Medicine	Dr. Stumm	Disp. (1st sem)
1:30-2:30	Surgery	Dr. Dennis	Disp. (1st sem)
1:30-2:30	Surgery	Dr. Goodrich	Disp. (2nd sem)
1:30-2:30	Neurology	Dr. Dunning	Disp.
1:30-2:30	Neurology	Dr. Ball	Disp. (Apr. 1)
1:30-2:30	Ophthalmol.	Dr. Appleby	Disp.
1:30-2:30	Pediatrics	Dr. Ramsey	Disp. (2nd sem)
1:30-2:30	Pediatrics	Dr. Hall	Disp. (1st sem)
1:30-2:30	Ear, Nose, Throat	Prof. Schadle	Disp.
2:30-3:30	Medicine	Dr. Hoff	Disp. (1st sem)
2:30-3:30	Gen-Urine	Dr. Coon	City (2nd sem)
3:00-4:00	Medicine	Prof. Abbott	City (2nd sem)
4:00-5:00	Medicine	Prof. Abbott	City (2nd sem)
4:00-5:00	Medicine	Prof. Senkler	City (2nd sem)
4:00-5:00	Pediatrics	Prof. Christison	City (2nd sem)
4:00-5:00	Pediatrics	Dr. Ramsey	City (1st sem)
4:00-5:00	Obstetrics	Dr. Leavitt	City (2nd sem)
4:00-5:00	Surgery	Dr. Colvin	City (2nd sem)
4:00-5:00	Gen-Urine	Dr. Armstrong	City (1st sem)
4:00-5:00	Ophthalmol	Dr. Fulton	City (2nd sem)

Saturday

9:00-10:00	Neurology	Prof. Riggs	Dispensary, City
10:15-12:00	Surgery	Prof. Rogers	City, St. L., St. J.
10:15-12:00	Surgery	Prof. Ohage	City, St. L., St. J.
10:15-12:00	Gynecology	Prof. Rothrock	City (2nd sem)
1:30-2:30	Medicine	Prof. Greene	Disp. (2nd sem)
1:30-2:30	Medicine	Dr. Huff	Disp.
1:30-2:30	Medicine	Dr. Stumm	Disp. (1st sem)
1:30-2:30	Surgery	Dr. Dennis	Disp. (1st sem)
1:30-2:30	Surgery	Dr. Goodrich	Disp. (2nd sem)
1:30-2:30	Neurology	Dr. Dunning	Disp.
1:30-2:30	Pediatrics	Dr. Ramsey	Disp. (2nd sem)
1:30-2:30	Pediatrics	Dr. Hall	Disp. (1st sem)
1:30-2:30	Ear, Nose, Throat	Prof. Schadle	Disp.
1:30-2:30	Skin and Sypl.	Prof. Foster	Disp.
2:30-3:30	Pediatrics	Prof. Christison	Disp. (1st sem)
3:00-4:00	Medicine	Prof. Abbott	City (2nd sem)
4:00-5:00	Medicine	Prof. Abbott	City (2nd sem)
4:00-5:00	Medicine	Prof. Senkler	City (2nd sem)
4:00-5:00	Pediatric	Prof. Christison	City (2nd sem)
4:00-5:00	Pediatrics	Dr. Ramsey	City (1st sem)
4:00-5:00	Obstetrics	Dr. Leavitt	City (2nd sem)
4:00-5:00	Surgery	Dr. Colvin	City (2nd sem)
4:00-5:00	Gen-Urin	Dr. Armstrong	City (1st sem)
4:00-5:00	Ophthalmol	Dr. Fulton	City (2nd sem)

Note.—When no time is mentioned, the clinics continue throughout both semesters.

Gynecology. Prof. Stone at St. Joseph's Hospital.

Gynecology. Prof. Rothrock and Dr. H. P. Ritchie, daily clinic at Dispensary (One student).

Parturition Clinics throughout the year at the City Hospital, Maternities, Dispensary Out-service, with Drs. Leavitt and Jenette McLaren. (One to five students.)

# DISPENSARY CLINICS

At the Clinical Building, from 1:00 to 3:00 p. m.

FIRST AND SECOND SEMESTER, 1906-1907.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
Medicine	Prof. Head and Dr. Aurand	Prof. Noot- nagel and Dr. Rees	Prof. Nip- pert and Dr. Rees	Prof. Head and Dr. Aurand	Dr. Shel- don and Dr. Adair	Dr. Shel- don and Dr. Adair	2 Sections
Surgery	Dr. Mann	Dr. Law	Dr. Mann	Dr. Condit	Dr. Law	Dr. Condit	1 Section
Nose & Throat	Dr. Campbell	Prof. Murray	Dr. Mead	Dr. Campbell	Prof. Murray	Dr. Mead	1 Section
Pediatrics	Dr. C. B. Wright	Dr. Dart	Dr. C. B. Wright	Dr. Dart	Dr. C. B. Wright	Dr. Dart	1 Section
Eye and Ear	Dr. Macnie	Dr. Macnie	Dr. Macnie	Dr. Wells	Dr. Macnie	Dr. Wells	1 Section
Skin and Venereal	Dr. F. R. Wright	Dr. Schweitzer	Dr. F. R. Wright	Dr. Schweitzer	Dr. F. R. Wright	Dr. Schweitzer	1 Section
Neurology	Dr. Hamilton	Dr. H. W. Jones	Dr. Hamilton	Dr. H. W. Jones and Dr. Loberg	Dr. Hamilton	Dr. Loberg	1 Section
Gynæcology	Dr. Benjamin	Dr. Williams	Dr. Benjamin	Dr. Williams	Dr. Benjamin	Dr. Williams	2 Students
Pharmacology	Mr. Englund	Mr. Englund	Mr. Englund	Mr. Englund	Mr. Englund	Mr. Englund	2 Students
Clinical Microscopy	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich	2 Students
Orthopedics	Dr. Geist		Dr. Geist			Dr. Geist	1 Section

## ALUMNI ASSOCIATION.

The Alumni Association of the College of Medicine and Surgery of the University of Minnesota holds its annual banquet and reunion during Commencement week. All graduates of this department are eligible who are in good standing. Graduates may become members by payment of annual dues of \$1. The officers of this association for the year ending June '06 are as follows:

President, Dr. Warren A. Dennis, St. Paul, Minn.

First Vice President, Dr. A. B. Stewart, Owatonna, Minn.

Second Vice President, Dr. Anna L. Osborn, Mankato, Minn.

Secretary-Treasurer, Dr. H. W. Jones, Minneapolis, Minn.

An advisory committee consisting of twelve graduates and the president and the secretary of the Alumni Association, endeavors to keep in touch with the faculty of the College and is ever on the look-out for an opportunity to improve this department of the University, by recommending certain changes or modifications in the method of teaching.

The Advisory Committee for 1905-'06 is as follows:

Dr. John C. Boehm, St. Cloud, Minn.

Dr. Frank C. Todd, Minneapolis, Minn.

Dr. L. B. Wilson, Rochester, Minn.

Dr. Frank Wright, Minneapolis, Minn.

Dr. Frank S. Warren, Faribault, Minn.

Dr. John T. Rogers, St. Paul, Minn.

Dr. John T. Christison, St. Paul, Minn.

Dr. E. H. Beckman, Minneapolis, Minn.

Dr. W. R. Ramsey, St. Paul, Minn.

Dr. Paul Cook, St. Paul, Minn.

Dr. A. E. Hedback, Barron, Wis.

Dr. W. A. Dennis, President.

Dr. H. W. Jones, Secretary-Treasurer.

All the Medical Alumni are cordially urged to subscribe to the Alumni Weekly; \$1.00 per year, if paid in advance. The editor, Mr. E. B. Johnson, is giving his whole time to this work, and the Weekly will keep you posted in regard to all that happens at the University, and fresh news regarding all the Alumni.

DR. H. W. JONES, Secretary-Treasurer,  
Minneapolis, Minn.



THE COLLEGE OF HOMEOPATHIC MEDICINE  
AND SURGERY

# Calendar of the College of Homeopathic Medicine and Surgery

(Same as given on pages 375, 376)

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## SCHEDULE OF EXAMINATIONS FOR ADVANCED STANDING AND TO REMOVE CONDITIONS.

September 13-15, 1906.

Thursday, Sept. 13, 9:00 a. m.		2:00 p. m.
I. Year Chemistry	I. Year Histology and Embryology,	
II. Year Chemistry	practical and didactic	
	II. Year Histology and Embryology,	
	practical and didactic.	
Friday, Sept. 14, 9:00 a. m.		2:00 p. m.
I. Year Physiology	I. Year	
II. Year Physiology	II. Year General Pathology and Bac-	
	teriology, practical and didactic	
Saturday, Sept. 15, 9:00 a. m.		2:00 p. m.
I. Year Anatomy	I. Year	
II. Year Anatomy	II. Year Materia Medica	

The College of Homeopathic Medicine and Surgery sets forth as its peculiar advantages:

First—That it is an integral part of a great university, fully equipped for carrying out of its work by the munificence of the state.

Second—That its students partake of all the privileges accruing from living in a university atmosphere which draws to itself the leaders of thought in all branches of science and literature.

Third—That the libraries not only of the Medical Department but of the entire university and the cities of Minneapolis and St. Paul are open to those investigating any line of thought.

Fourth—That the arrangement of work and division of classes is such as to give each student the greatest amount of individual practical work under trained instructors.

Fifth—The state of Minnesota shows its loyalty to the university by a constant demand for the graduates and the dean has each year requests for physicians to locate in various parts of the state.

# Faculty

CYRUS NORTHPROP, LL. D., *President of the University.*  
EUGENE L. MANN, A. B., M. D., *Dean of the College.*  
694 Endicott Arcade, St. Paul.

## MATERIA MEDICA AND THERAPEUTICS.

W. E. LEONARD, A. B., M. D., *Senior Professor.*  
Andrus Building, Minneapolis.  
ADOLPH W. JOHNSON, *Lecturer on Pharmacy.*

## PRACTICE OF MEDICINE.

ASA S. WILCOX, A. B., M. D., *Senior Professor.*  
Masonic Temple, Minneapolis.  
O. H. HALL, M. D., *Associate Professor, Renal Diseases.*  
Pittsburg Building, St. Paul.  
D. W. HORNING, A. B., M. D., *Associate Professor, Diseases of Heart and Lungs.*  
Pillsbury Building, Minneapolis.  
ANNA H. HURD, Phm. D., M. D., *Lecturer, Diseases of Blood and Ductless Glands.*  
Pillsbury Building, Minneapolis.

## CLINICAL MEDICINE AND PHYSICAL DIAGNOSIS.

H. M. LUFKIN, M. D., *Senior Professor.*  
Germania Life Ins. Bldg., St. Paul.  
D. W. HORNING, A. B., M. D., *Associate Professor*  
Pillsbury Building, Minneapolis.  
A. G. PHELPS, M. D., NORMAN M. SMITH, H. O. SKINNER, M. D., *Assistants.*

## SURGERY.

R. D. MATCHAN, M. D., *Senior Professor.*  
Masonic Temple, Minneapolis.  
W. S. BRIGGS, M. D., *Senior Professor, (Clinical.)*  
Pittsburg Building, St. Paul.  
A. E. COMSTOCK, M. Sc., M. D., *Professor, Regional Surgery.*  
N. Y. Life Building, St. Paul.  
A. E. BOOTH, M. D., *Professor of Orthopaedia.*  
Andrus Building, Minneapolis.  
W. B. ROBERTS, A. B., M. D., *Professor of General Surgery.*  
Pillsbury Building, Minneapolis.  
A. E. AHRENS, M. D., *Assistant.*

OBSTETRICS.

- B. H. OGDEN, A. B., M. D., *Senior Professor.*  
Ernst Building, St. Paul.
- HUGH J. TUNSTEAD, M. D., *Associate Professor.*  
829 16th Ave. N., Minneapolis.

GYNAECOLOGY.

- R. R. ROME, M. D., *Senior Professor.*  
Andrus Building, Minneapolis.
- E. E. AUSTIN, M. D., *Professor.*  
Andrus Building, Minneapolis.
- F. G. COBB, M. D., *Assistant.*

MENTAL AND NERVOUS DISEASES AND MEDICAL JURISPRUDENCE.  
OPHTHALMOLOGY.

- H. H. LEAVITT, M. D., *Professor.*  
Pillsbury Building, Minneapolis.

OTOLOGY-RHINOLOGY AND LARYNGOLOGY.

- EUGENE L. MANN, A. B., M. D., *Professor.*  
Endicott Arcade, St. Paul.
- L. D. SHIPMAN, M. D., *Clinical Professor.*  
Medical Building, Minneapolis.

SKIN AND GENITO-URINARY DISEASES.

- C. H. NEILL, M. D., *Professor.*  
Medical Building, Minneapolis.

PAEDOLOGY.

- GEO. B. HAMLIN, M. D., *Professor.*  
506 Masonic Temple, Minneapolis.

ELECTRO-THERAPEUTICS.

- ETHEL S. HURD, M. D., *Lecturer.*  
Pillsbury Building, Minneapolis.

ANATOMY.

- C. A. ERDMANN, M. D., *Professor.*  
Pillsbury Building, Minneapolis.

PHYSIOLOGY.

- R. O. BEARD, M. D., *Professor.*  
Pillsbury Building, Minneapolis.

HISTOLOGY AND EMBRYOLOGY.

- T. G. LEE, B. S., M. D., *Professor.*  
The University.

PATHOLOGY AND BACTERIOLOGY.

- F. F. WESBROOK, M. A., M. D., C. M., *Professor.*  
The University.

CHEMISTRY.

- H. C. CAREL, B. S., *Professor.*  
The University.

## Announcement

The College of Homeopathic Medicine and Surgery offers special advantages to students seeking a medical education. Through the generosity of the state, an equipment of buildings, laboratories and apparatus is provided, equal to that of the best medical schools in this country or Europe. With this equipment it is possible to lay that broad foundation for a medical education without which no physician can hope for the highest success. An institution deficient in the requirements for teaching the fundamental branches of medical practice cannot long maintain the confidence of the medical profession. Homeopathy, as an expanding science, draws toward itself as a part of its rightful possession, every addition to medical knowledge that can be of any service in the cure of the sick. The homeopathic physician should feel that he is "heir of all ages" in medical learning, having that catholicity of training which places at his command every known resource, including as his especial advantage, the added power of coping with disease, that comes from his knowledge of the science of homeopathy.

The breadth of view of this result is provided in the college of homeopathic medicine and surgery in a real university course, botany, chemistry (organic and inorganic), histology, embryology, bacteriology, pathology, anatomy, physiology, hygiene and sanitary science, with all the accessories of laboratory work; second, in building upon this foundation a comprehensive knowledge of therapeutics, practice and surgery. The student has daily training in both the practical and theoretical aspects of medicine. In the first two years the practical training is provided in constant individual work in the laboratories of dissecting rooms; in the last two is a broad field of clinical study and observation, in both medical and surgical cases, which the nearly one-half million population of the Twin Cities abundantly supplies. The theoretical work is carried on in daily didactic lectures and text-book study throughout the entire course.

Special emphasis is placed upon the clinical instruction in both dispensary and hospital practice. Senior students have the opportunity to attend out-door patients, assist in special and general operations, and to attend obstetrical cases during the last course of lectures.

The college alumni now in practice are evidence of the character of its work. The loyal support of the profession throughout the northwest has encouraged and upheld the faculty in giving form to this new phase of the work.

The college proposes to stand for a broad, catholic, scientific and therefore, homeopathic education in medicine and surgery.

## Rules and Regulations

For rules and regulations of this college with reference to

The College year

Enrollment

Requirements for admission

Examinations—Final standings

Advanced standing

Terms of tuition

Breakage and loss

Special students

Curriculum

Six-year medical course

see pages 383-389.

# Course of Study

## FIRST YEAR.

History and methodology of medicine.  
Medical terminology.  
Medical botany.  
Inorganic chemistry—laboratory.  
Anatomy—bones, muscles and joints.  
Physiology.  
Homeopathic pharmacy.

## SECOND YEAR.

Materia medica—experimental.  
Organic chemistry—toxicology and urinalysis.  
Histology and embryology—laboratory.  
Anatomy, dissection.  
Physiology—chemical and experimental.  
Surgical emergencies and bandaging.  
Bacteriology.  
General pathology.

## THIRD YEAR.

Surgical anatomy.  
Materia medica and therapeutics.  
Practice of medicine, organon and institutes of medicine.  
Clinical medicine and physical diagnosis.  
Obstetrics.  
Principles and practice of surgery.  
Diseases of women.  
Ophthalmology.  
Nose, throat and ear.  
Medical jurisprudence.  
Clinics, medical and surgical.  
Special pathology.

## FOURTH YEAR.

Surgical pathology.  
Materia medica and therapeutics.  
Practice of medicine.  
Clinical medicine.  
Mental and nervous diseases.  
Dermatology and genito-urinary diseases.  
Obstetrics.  
Clinical obstetrics.  
Principles and practice of surgery.  
Ophthalmology.  
Diseases of women—didactic and practical.  
Orthopædic clinical surgery.  
Pædology.  
Electro therapeutics.  
Life insurance examination.  
Clinics, medical and surgical.



# Courses of Instruction

For courses of instruction in

Histology and Embryology

Anatomy

Physiology

Chemistry

Pathology and Bacteriology

see pages 399-400.

## MATERIA MEDICA AND THERAPEUTICS.

This course upon this subject is graded to cover four years' study. Lectures, daily quizzes and daily demonstrations of materials and methods are held regularly throughout the year.

### FIRST YEAR.

Ten lectures in the first half of the year are given upon the methods of homeopathic pharmacy, each student being trained in writing and filling prescriptions and the technique of the more common preparations. Apparatus and material for these purposes are taken from Professor Leonard's laboratory, which is abundantly supplied with the crude and perfected drugs for demonstration throughout the course. Mr. G. A. Babendrier, who has kindly given this instruction so satisfactorily for several years, will continue the same the coming year.

### SECOND YEAR.

The toxicological and physiological action of a few typical drugs will be studied in lectures and quizzes twice each week; including the action of both large and small doses as well as the official doses (U. S. P.) of the leading drugs and the alkaloids. Here, in the more detailed study of a few drugs, the ground work will be laid for the comprehension of the symptomatology of the later years.

When practicable, actual experiments on the effects of the drugs upon individual persons in the class will be made, the blanks used and methods being under Professor Leonard's personal supervision and in accordance with the rules of the Provers' Union of the American Institute of Homeopathy.

### THIRD YEAR.

Three lectures a week with quizzes, upon the vegetable remedies, about thirty major and seventy-five minor drugs, arranged according to their natural groups and their clinical relationship in diseases, and studied in their origin, history, preparation, physiology and symptomatology, full practical comparison being made with other allied remedies. The endeavor on these studies and those of the following year will be to present only such usage of drugs as is practical and fully corroborated.

Three lectures and quizzes each week upon the mineral, animal and nosological remedies of materia medica—about forty major and twenty minor drugs grouped and studied in detail as those of the second year, attention being given to their toxicological and physiological action, where this has a direct bearing upon their homeopathic application to chronic diseases, inasmuch as the drugs of this course are more often applied thereto.

Examination in the form of written review quizzes from time to time or at the end of the term, will be held, the student's final standing being made up of this and his daily quiz markings.

TEXT-BOOKS AND COLLATERAL READING.

*Materia Medica and Therapeutics.*

First year—

Pharmacopoea of the American Institute of Homeopathy.

Second year—

Hugh's Pharmacodynamics.

Third and fourth years—

Materia Medica Manual—Fahnestock.

Farrington's or Cowperwaite's Materia Medica Hahnemann's Organon.

Reference Books—third and fourth years—Allen's Hand-Book, Hering's Condensed Materia Medica, Dunham's Lectures.

PRACTICE OF MEDICINE

This course of lectures occupies two hours a week throughout the Junior and Senior years; the object aimed at is to acquaint the Student with the Pathological basis of the various diseases, their symptomatic course and the findings derived from the various methods of physical macro-and microscopical examination, so that with the complete picture of its diseased process and its possibilities, he may intelligently apply all known methods of relief, hydro-therapy, electrical deaction, dietetics, physiological and palliative medication, and above all may scientifically select the homeopathic remedy curative of the diseased process as conditioned by the peculiar susceptibility and idiosyncrasy of the individual to be treated.

TEXT-BOOKS AND COLLATERAL READING.

*Practice of Medicine.*

Goodno's Practice.

Raue's Therapeutics.

Lippe's Repertory.

Knerr's Repertory.

Pepper's System of Medicine.

DaCosta's Diagnosis.

Ander's Practice of Medicine.

PHYSICAL DIAGNOSIS.

The course on physical diagnosis consists of a series of twenty-four didactic lectures to the third year class, illustrated upon the healthy human subject, thus familiarizing the student with the normal appearances, feelings and sounds. These lectures are classified as follows: Introduction, general examination, respiratory system, circulatory system, digestive system, urinary system.

CLINICAL MEDICINE.

FOURTH YEAR CLASS.

For this course abundant material is found in the University homeopathic free dispensary, where clinics are held every day, and in the City hospitals of Minneapolis and St. Paul, where clinics are held each Monday morning.

In these clinics particular effort is made to supplement the course in physical diagnosis and to fully illustrate the application of the homeopathic law of therapeutics.

In order that the student may obtain as wide a view as possible in this all important branch, they receive instruction, not only from Professor Lupkin at the bedside in the City Hospital wards, but from the various members of the homeopathic staffs in the Twin Cities, attending the hospitals but not otherwise connected with the University.

In addition the dispensary furnishes many outside cases, which are treated in their own homes, by the members of the fourth year class, under the supervision of Professor Wilcox, thus enabling the student to acquire the self-reliance and confidence so necessary to the beginning practitioner.

*Physical Diagnosis, Clinical Medicine.*

Lilienthal's Therapeutics

Lippe's Repertory.

Farrington's Clinical Materia Medica.

Vierordt's Medical Diagnosis.

Abram's Manual of Clinical Diagnosis.

DaCosta's Diagnosis.

**SURGERY.**

The course in surgery is so graded to extend through Sophomore, Junior and Senior years. It consists of didactic lectures, clinical demonstration and actual work by the students of Senior and Junior classes, as they are given one month's work each or more in dispensary clinics every day under charge of attending professor, and are held responsible by him for all emergencies and dressings. They also give all anesthetics and attend to the post operative treatment. These advantages given our students cannot be excelled, and gives each member that opportunity of gaining for himself that valued knowledge and confidence which only comes by actual experience.

Two years ago the work in surgery enlarged. It now occupies two full years, the third and fourth, including the labors of four members of the college faculty. The work is divided into clinical and didactic surgery.

**EMERGENCIES AND BANDAGING.**

(1) A course of lectures on surgical emergencies and bandaging is given the students of the Sophomore year in consideration of the means in administering first aid to the injured, also laboratory instructions of how to apply dressings, bandages, splints and the materials used.

**GENERAL AND SPECIAL SURGERY.**

(2) The Juniors and Seniors are given two lectures each week on general and special surgery, during the entire two years, covering all the surgical diseases, and special technique in operative surgery, especial attention being paid to pathology, diagnosis and treatment of each disease from a surgical standpoint in conjunction with the valued homeopathic application of remedies. Besides this the Juniors are given a special course on surgical anatomy and the Seniors one on surgical pathology.

**OPERATIVE SURGERY.**

(3) During the Senior year the class will be instructed in the surgical laboratory in operations on the cadaver, in which the student is called upon to do the work under the special criticism of the professor in charge, thus perfecting themselves by actual practice with operations they will be called upon to perform in later years.

**CLINICAL SURGERY.**

(4) The work in clinical surgery consists in operations before the class in connection with clinical lectures given upon the cases presented. These occupy each Monday of the fourth year, which is set apart as the day for clinics. The third year class is required to attend the clinics, unless their regular class work interferes.

At the Clinics which are held at the City and County Hospital, St. Luke's and St. Joseph's Hospitals, of St. Paul, and the City Hospital and Free Dispensary, Minneapolis, are demonstrated the value of antiseptic treatment of wounds, the minute details of the application of surgical appliances and dressings and operative technique. Post-operative care for reaction, shock, etc., are considered.

Senior students are instructed in the practical use of anesthetics and are required to attend a number of surgical patients at their homes, carrying out post-operative detail under the direction of the professor.

The surgical department aims to give a complete and thorough course on the subject and its collateral branches.

It should be distinctly understood that examinations on the clinical and laboratory work, both sectional and at the end of the term, no matter by whom the teaching is done, are counted with the didactic course, the average of all combined constituting the student's standing in surgery for each year. The marks for the four years go to make up his graduation average.

**TEXT-BOOKS.**

Park's Surgery.

Treene's Operative Surgery.

Wyeth's General and Operative Surgery.

Surgical Technique, by Von Esmerch and Kowalzig.

## DIDACTIC COURSE.

The didactic course covers the entire field of the principles and practice of surgery. The lectures will occupy the third year class two hours and the fourth year class three hours each week. Demonstrations will be made upon the cadaver, aided by models and charts.

The lectures to the third class will include surgical pathology, inflammation, hemorrhage, surgical appliances, surgical emergencies, minor surgical operations, ligation of arteries, burns and scalds, surgical treatment of the anus and rectum, antiseptics, anesthetics, abscesses, ulcers, gangrene, hernia and the elements of the treatment of wounds, fractures, dislocations and amputation.

The lectures of the fourth year class will include the surgery of the bones, joints, genito-urinary organs, tumors, cysts, fractures, dislocations, amputations, syphilis, together with the operative surgery of the head, face, chest, abdomen, pelvis, skin, nerves and extremities.

All the lectures will aim to be comprehensive, practical, and in keeping with the best standards of advanced surgery.

## TEXT-BOOKS, DIDACTIC COURSE.

Parke's Surgery.  
Homeopathic Text-Book of Surgery.  
Mamline's American Text-Book of Surgery.  
Bradford & Lovett's Orthopaedic Surgery.  
Pye's Surgical Handicraft.

## ORTHOPAEDIA.

The course on this subject is both didactic and clinical. It consists of one lecture a week during the fourth year.

The whole subject of deformities, their etiology, pathology, course and treatment is carefully considered in detail. Charts and drawings are used to illustrate the work. The mechanical apparatus used in the treatment of such cases is exhibited and rules laid down for the improvising and applying temporary means and instruments. Recent progress in the knowledge of the underlying causes of bony, muscular and habit deformities, and their serious reflex effects, has led to great changes in the methods pursued to overcome them. The early recognition and treatment of such cases are of the utmost importance, and, hence, as they are usually first presented to the general practitioner, a full knowledge of this branch of surgery becomes exceedingly valuable in the Dispensary Clinics the student sees carried out the teachings of the didactic course.

The subjects discussed include functional and organic diseases of the bony spine, the several forms of club foot, joint inflammations and deformities, both simple and tuberculous and their sequelae, cleft-palate, hare-lip, etc.

## OBSTETRICS.

This subject is taught by lectures and recitations, thoroughly illustrated with charts, manikins and specimens. The course will be graded and divided between the third and fourth years.

During the third year subjects covered will embrace the anatomy and physiology of the female generative organs and the pelvis, the development of the embryo, the maternal changes of pregnancy, the diagnosis of pregnancy, the physiology, pathology and hygiene of pregnancy, the physiology and the course of normal labor, the physiology of normal labor and the management of the puerperium.

During the fourth year the following subjects are taught: the mechanism of labor, diagnosis and management of the various presentations, dystocia, complications of labor, physiology, pathology and the management of the puerperium, and obstetric surgery.

## CLINICAL OBSTETRICS.

This department instructs the fourth year students and applies practically the teachings of the department of obstetrics. An abundance of material is supplied by the dispensary and city hospitals of St. Paul and Minneapolis.

The student will be thoroughly educated to locate accurately the position and condition of the internal parts both in health and disease, the obstetric

points of the pelvis, as well as the diameters, planes and curves, the presentation and position of the child and the methods of diagnosis, the stages and mechanism of labor, the management of normal and abnormal labors, the application of the forceps and the necessary steps in performing version.

Each member of the class will be assigned at least three cases of pregnancy, which he will be required to attend under the immediate direction of the professor of the chair.

During the last month of pregnancy of a case as assigned, the student in charge will report to the professor the patient's name, address, age, number of previous labors, date of first birth and last labors, date of quickening, condition of uterus, heart, lungs, bowels, kidneys, etc., and a detailed statement regarding the appearance of the patient, location of the foetal heart, position of the child, character and size of the pelvis.

At the time of labor the student will be required to keep a record of the following facts:

Number of the case, date, name, address, condition of the osuteris, height of presenting part, pulse rate and quality (ante and post partum), rapidity of foetal heart beats and where heard most clearly, presentations, position and duration of the first, second and third stage.

Also the sex of the child, the diameters of its head, weight, and length. The post partum condition of the uterus, servix and perineum.

An operative course on the female cadaver will also be given, demonstrating the operative technique in symphysiotomy and Cæsarean section.

#### TEXT-BOOKS AND COLLATERAL READINGS.

Leavitt.

Lusk's Midwifery.

American Text-Book of Obstetrics.

Hirst's Text-Book of Obstetrics.

Grandin & Jarman's Midwifery

Playfair's Midwifery.

Bolsiniere, Obstetric Accidents.

Davis' Obstetrics.

#### DISEASES OF WOMEN.

This course will consist of one didactic lecture during the third and fourth years and two clinics a week during the fourth year.

In the third year, both semesters, the anatomy, physiology and pathology of the pelvic contents and perineum are carefully described. The preparation of the patient for surgical operation, together with the necessary steps taken, the various surgical procedures as well as the medical treatment of all pelvic diseases, will receive minute attention both semesters of the fourth year.

The medical and surgical diseases of women will be treated in didactic lectures and recitations. The entire field of gynecology will be covered in the lecture room. As cases present themselves in the city hospitals of St. Paul and Minneapolis, the subject thus described will be demonstrated on the living subjects.

*Gynecology.*

Wood, Text-Book of Gynecology.

#### DISEASES OF CHILDREN.

The course on this subject will consist of one lecture each week and three clinics to the fourth year students, and extending over two semesters. The clinics are full and afford an exceptional opportunity to study the common diseases of childhood. In the out door department many cases of exanthematous cases are treated by the members of the class.

The didactic course embraces a description of the normal development of infancy and childhood, natural and artificial infant breeding, signs and symptoms of hereditary syphilis, contagious and infectious diseases, tuberculosis, crsipelas, and the diseases of the respiratory and urinary organs; those of the circulatory, nervous and digestive systems, rachitis and diseases of the skin.

#### TEXT-BOOKS AND COLLATERAL READING.

Tooker's Diseases of Children.

Holt's Diseases of Children.

Fisher's American Text-Book of Diseases of Children.

Collateral reading—Cyclopedia of Diseases of Children.

### MENTAL AND NERVOUS DISEASES.

This course consists of twenty-eight didactic lectures, in the fourth year, and as many clinical demonstrations as material is presented at the dispensary and the City Hospital, Minneapolis. It is the aim of the chair to qualify the student to detect the earliest symptoms of insanity and diseases of the nervous system. During the session of 1905-6 each senior student spent 2 weeks in practical work among the insane at the Fergus Falls State Insane Asylum.

The anatomy and physiology of the brain and spinal cord are reviewed and particular attention is paid to the causes, development, characteristic symptoms and the pathological conditions of the diseases of the nervous system. The therapeutics, dietetics and direction of the personal care in each disease is especially elaborated.

Talcott's Mental Diseases.

Clouston's Mental Diseases.

Edinger's Anatomy of Central Nervous System.

Martin's Nervous Diseases.

Dana Text-Book Nervous Diseases.

Bigelow's System of Electro-Therapeutics.

Oppenheim's Diseases of the Nervous System.

Collateral reading—Hack Tuke's Dictionary of Psychological Medicine; Bevan Lewis Mental Diseases; Kirchoff's Handbook of Insanity; Ferrier's Localizations of Cerebral Diseases; Strumpell's Text-Book of Medicine; Hirt's Diseases of the Nervous System; Horseley's Brain and Spinal Cord.

#### Hygiene.

Coplin and Bevan's Practical Hygiene.

Park's Hygiene.

Collateral reading—Richardson's Preventive Medicine; Buck's Hygiene and Public Health.

### ELECTRO-THERAPEUTICS.

This subject will be carefully taught. The physics of electricity will be sufficiently considered to enable the student to understand the construction and manipulation of galvanic faradic, sinusoidal and static batteries. The application of every form of electricity will be practically demonstrated.

### MEDICAL JURISPRUDENCE.

The object of this chair is to familiarize the student with his duties, rights and responsibilities from a legal standpoint. The law on each subject discussed is carefully explained and illustrated, as far as possible, with adjudicated cases.

#### Medical Jurisprudence.

Taylor's Medical Jurisprudence.

Herold's Manual of Legal Medicine.

Collateral reading—Hamilton's American System of Legal Medicine; Withaus' and Becker's Medical Jurisprudence and Toxicology; Wharton and Stille's Jurisprudence.

### OPHTHALMOLOGY.

In the department of ophthalmology the endeavor is to give thorough instruction in those parts of the work which will ordinarily come into the hands of the general practitioner.

The course is supplemented by as much practical work as time allows, in the use of the ophthalmoscope for the study of intraocular troubles, whose recognition would aid in the diagnosis of various conditinal affections; and following a short didactic course given early in the year on the subject, practical work in the correction of the refraction is carried on at the dispensary during both semesters.

The clinical material provided in the department is very abundant, interesting and instructive cases, embracing all varieties of eye troubles calling for medical and surgical aid being presented to the students bi-weekly throughout the entire year.

The following schedule shows the subjects considered in the present course of lectures:

Anatomy and physiology of the eye; refractions and use of the lenses for the correction of its errors; diseases of the lids; conjunctiva; cornea; sclera; lachrymal apparatus; iris and ciliary body; lens choroid; retina and optic nerve; affections of the muscular apparatus of the eye and the general relationship between eye-strain and reflex and nervous disorders.

The didactic course consists of thirty-two lectures during the fourth year and ten during the third year.

*Ophthalmology.*

Norton, Buffum, Swanzy, Noyes.

Collateral reading—Fuch's Diseases of the Eye.

## DISEASES OF THE NOSE, THROAT AND EAR.

The course will consist of didactic lectures and clinical demonstrations.

One didactic lecture a week will be given to students of the third year. An understanding of the anatomy and physiology of the organs is presupposed, and but little time will be devoted to the review of the more important points in their bearing upon diseases of these organs. The lectures will enter upon the diseased processes in the nose—the various forms of acute and chronic catarrhal inflammation, their courses, developments, symptoms, consequences and treatment, both general and local, abnormal growths, affections of the septum and diseases of the accessory sinuses, finishing the course on the nasal cavities with the neuroses, functional and organic.

The diseases of the naso-pharynx are treated with special reference to their dependence upon nasal conditions and their influence upon the organ of hearing. The course includes acute and chronic catarrhal processes, adenoid vegetations and morbid growth.

Diseases of the pharynx are considered in their dependence upon alimentary disorders, acute and chronic inflammatory conditions, morbid growths and neurosis, together with the pharyngeal and tonsillar conditions incident to the exanthamata, diphtheria, typhoid fever, etc.

In the laryngeal disorders we become more closely associated with respiratory diseases: the various forms of laryngeal inflammation, morbid growths and nervous affections will be discussed—especial stress being put upon the early laryngeal manifestations of tuberculosis and the laryngeal disorders of voice users with the importance of proper vocalization and respiration upon all diseases of this organ.

Ear diseases resolve themselves into: Diseases of external canal and pinna, dermoid inflammation; diseases of the middle ear; mucous inflammation; diseases of the internal ear; serious and nerve inflammation.

The course to the fourth year students will be entirely clinical, the class being divided into sections for dispensary work; the aim will be to familiarize the students with the use of the various diagnostic means at their disposal and the appearance of the various abnormal conditions, together with the technique of the numerous operative procedures. The material for clinical demonstrations is abundant.

*Ear:* Barr.*Nose and Throat:* Kyle, Bosworth, Ivins, McDonald.*Nose, Throat and Ear:* Veshlaget & Hallett; McBride, Burnett.

## SKIN AND GENITO-URINARY DISEASES.

This course will consist of one didactic lecture and one clinic each week for students of the fourth year. It will include the diseases of the skin, syphilis and all genito-urinary affections.

The first semester will be devoted to a study of the diseases of the skin, the second to syphilis and venereal surgery. The dispensary clinics will be especially valuable in supplementing the work of the professor in the lecture room by familiarizing students with the appearance of the various forms of skin and venereal diseases. Each student is required to diagnose cases and treat patients under the supervision of the professor, thus giving him actual experience in administering remedies and using instruments. During the course of the year each student has personal charge of about fifty patients in this department.

## TEXT AND REFERENCE BOOKS.

*Dermatology:* Kippax, Stelwagon, Durhring, Dearborn.*Genito-Urinary:* Carlton, Hoyne, Franklin, American Text-Book, Bumstead and Taylor.

## HISTORY AND METHODOLOGY OF MEDICINE.

The lectures given in this chair are an exposition of the philosophy and art of medicine by the historical method. The student is taught to see how in each age practice of medicine has been the outgrowth of the beliefs current regarding the nature of man. Give to a student the theories held by a people regarding the constitution of matter, the nature of mind and force, and he can accurately

foresee the medical science such as people will accept. The unfolding of the world's thought in medicine sets homeopathy in its high place and gives the student an outlook much needed in the profession. The tendency of medicine has always been to over-estimate the material side of man's nature and to make innumerable hypotheses to explain disease. The conflicts in medicine have been the clashing, not of opposite sects, but of antagonistic systems of thought, and reconciliation is possible only on the grounds of higher science than that of mere sense knowledge. This ground is revealed in the history of the philosophy of medicine.

The course includes the medicine of the Egyptians, Persians, Indo-Chinese, Hebrews, Greeks, Arabians and of Europe down to the present.

One lesson each week during the freshman year.



## EXAMINATIONS.

Examinations will be conducted at the end of each year, upon subjects taught during the year, according to the schedule printed elsewhere. Attendance upon at least four-fifths of the lectures under each department is required in order that a student may be allowed to enter for final examination, or to receive a certificate of attendance. Ten per cent. of the graduating class will be recommended to receive the degree of doctor of medicine, "cum laude." The selection will be based upon the efficiency of the work of the student during the period of the entire course.

## LIBRARY OF MEDICAL DEPARTMENT

Thomas G. Lee, B. S., M. D., Librarian

The Library consists of (a) The General clinical and reference Collection of some 4,000 books and bound periodicals, and thirty-four current periodicals; (b) The College Collections of the College of Homeopathic Medicine and Surgery, the College of Dentistry and the College of Pharmacy; (c) The Departmental Libraries, being special collections of books and current periodicals belonging to the Laboratories of Anatomy, Chemistry, Histology and Embryology, Pathology, Bacteriology and Physiology. In addition, the Libraries of the Hennepin County Medical Society, some 3,800 volumes and 50 Journals, and that of the Ramsey County Medical Society, some 4,500 volumes and 150 Journals, are accessible to the Medical student for reference work and collateral reading.

Other Libraries of value to the Medical student are the General University and other departmental libraries of 110,000 volumes; the Minneapolis Public Library, 125,000 volumes; the St. Paul Library, 55,000 volumes.

## CLINICS

Every member of the faculty (with two exceptions) is a clinical teacher. Thus each professor demonstrates the application of his didactic work.

## DISPENSARY CLINICS

The dispensary, located at 1808 Washington avenue south, offers unusual facilities to the student for individual examination of patients. The location is within easy access of those whose means compel them to ask dispensary assistance, and presents ample opportunity for the study of all forms of disease usually met with in practice. Patients present themselves in large numbers daily (more than six thousand prescriptions having been made during the past year), and are assigned to particular departments, according to the na-

ture of their diseases. The classes are so divided and arranged as to afford every student abundant opportunity to familiarize himself with the best methods of diagnosis and treatment of the various maladies, medical and surgical, with which the clinic abounds. Each student is assigned for a definite period as clinical assistant in each department of the clinic. The college clinics are conducted throughout the entire year. Students and practitioners are invited to attend them at all times.

#### HOSPITAL CLINICS.

The college has unusual advantages in hospital clinics. In addition to calling upon students to assist the various professors in private cases regular clinics are provided in the city hospitals of both St. Paul and Minneapolis, and in St. Luke's and St. Joseph's Hospitals in St. Paul. Each Monday is devoted to clinics held in one of these hospitals by members of the faculty.

#### CITY HOSPITAL, MINNEAPOLIS.

The faculty of the college of homeopathic medicine and surgery is largely represented on the staff of this institution, where one-fifth of all the patients admitted are placed under care.

#### CITY HOSPITAL, ST. PAUL.

This hospital likewise has a full staff of homeopathic physicians and surgeons which includes all the St. Paul members of the college faculty. Each member of the staff has full charge of all cases coming into his department during his term of service and uses suitable ones for clinical purposes.

#### ST. LUKE'S HOSPITAL, ST. PAUL

This hospital has recently erected a new building thoroughly equipped with all modern facilities for caring for medical and surgical cases. It contains an amphitheatre in which clinical lectures are delivered. A number of the faculty are members of the visiting staff.

#### ST. JOSEPH'S HOSPITAL, ST. PAUL.

Through the addition to its staff of members of the college faculty, students have access to both surgical and medical cases upon exactly the same footing as the other hospitals.

#### GENERAL REMARKS.

In all hospital work students are given special bedside instruction in diagnosis, in "taking the case," in prescribing, in surgical dressing, in the after care of patients and all forms of accessory treatment.

## DEGREES.

The degree of doctor of medicine is conferred by the Board of Regents upon students who are recommended, by vote of the faculty, for graduation.

Candidates for the degree must possess the following essential qualifications:

- (1) Twenty-one years of age and upwards.
- (2) Good moral character.
- (3) A degree of preliminary education equivalent to that demanded by the examination for entrance to this college
- (4) Four full college years spent in the study of medicine; the fourth year, at least, in this university, and the remainder in this or some other recognized college of medicine.
- (5) Satisfactory examination passed in all branches in accordance with the foregoing rules.

## HOSPITAL APPOINTMENTS.

Graduates of this college are eligible for appointment to the position of interne in the Minneapolis City, St. Paul City and County Hospitals and St. Joseph's Hospital, St. Paul. Also to the staff of the State Hospital for Insane at Fergus Falls

## Dispensary Clinics

- MONDAY; Surgery, Dr. Ahrens; Internal Medicine, Prof Wilcox.
- TUESDAY; Internal Medicine, Dr. Smith; Gynaecology, Dr Cobb; Eye, Prof. Leavitt. Skin and genito urinary, Prof. Neill.
- WEDNESDAY; Internal Medicine, Prof. Wilcox; Surgery, Prof Matchen. Ear, Nose and Throat, Prof. Shipman
- THURSDAY; Internal Medicine, Dr. Skinner. Gynaecology, Prof. Turnstead. Children, Dr. Hamlin.
- FRIDAY; Internal Medicine, Prof. Wilcox. Surgery, Prof. Booth. Eye, Prof. Leavitt.
- SATURDAY; Internal Medicine, Prof. Horning. Children, Dr. Hamlin. Ear, Nose and Throat, Prof. Shipman. Surgery, Dr. Dawson. Physical Diagnosis, Prof. Lufkin.

The College hereby acknowledges favors extended by Prof. R. S. Copeland of Ann Arbor, Michigan, for delivering the opening address, and to Dr. G. O. Welsh and his assistants at the Fergus Falls Insane Asylum for practical instruction to the Senior Class in Mental Diseases.

All communications pertaining to the College of Homeopathic Medicine and Surgery should be addressed to the Dean, Eugene L. Mann, A. B., M. D., 694 Endicott Arcade, St. Paul, Minn.

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### THE ALUMNI ASSOCIATION

The Alumni Association of the College of Homeopathic Medicine and Surgery endeavors to keep in touch with the College work and needs and is ever alert to assist the Faculty in all ways possible. It has been a potent effort for good in the past and its work is appreciated by the Faculty.

Officers for the present year: A. E. Booth, M. D., President, Andrus Bldg., Minneapolis; G. G. Balcom, M. D., Vice President, Lake Wilson, Minn.; Annah Hurd, M. D., Secretary-Treasurer, Pillsbury Bldg., Minneapolis.

University Committee: Ida Mackeen, M. D., Masonic Temple, Minneapolis; J. F. Beck, M. D., 1551 Franklin Ave., Minneapolis; C. Arthur Dawson, M. D., 2½ West Lake St., Minneapolis.

## College Calendar, 1906-1907

The University year will hereafter open on the second Tuesday in September, and close on the second Thursday in June.

### FIRST SEMESTER.

SEPTEMBER	10	Matriculation begins.
"	10 to 17	Registration and assignment of seats, benches and lockers.
"	"	"
"	"	"
"	18	Classes called for regular work. Eighteenth annual session.
NOVEMBER	29	Thanksgiving Day. Recess three days.
DECEMBER	22	Holiday recess begins.
JANUARY	8	Work resumed in all departments.
"	28 to 31	Semester examinations.

### SECOND SEMESTER.

FEBRUARY	5	Second semester begins.
"	12	Lincoln's Birthday—holiday.
"	22	Washington's Birthday—holiday.
"	27	Examinations begin.

### COMMENCEMENT WEEK 1907.

SUNDAY	June 9	Baccalaureate Service.
MONDAY	June 10	Senior Class Exercises.
TUESDAY	June 11	Senior Promenade.
WEDNESDAY	June 12	Alumni Day.
THURSDAY	June 13	Commencement Day—The Thirty-fifth Annual Commencement.
FRIDAY	June 14	Summer Vacation Begins.

# The College of Dentistry

## FACULTY

- CYRRUS NORTHROP, LL. D., *President.*  
ALFRED OWRE, D. M. D., M. D., C. M., *Dean, Professor of Operative Dentistry and Metallurgy.*  
THOMAS B. HARTZELL, M. D., D. M. D., *Professor of Clinical Pathology, Therapeutics and Oral Surgery.*  
OSCAR A. WEISS, D. M. D., *Professor of Prosthetic Dentistry and Orthodontia.*  
JAMES O. WELLS, A. M., D. M. D., *Professor of Crown and Bridge-Work and Porcelain Art.*  
E. FRANKLYN HERTZ, D. M. D., *Professor of Dental Anatomy and Prosthetic Technics.*  
CHARLES A. ERDMANN, M. D., *Professor of Anatomy.*  
RICHARD O. BEARD, M. D., *Professor of Physiology.*  
THOMAS G. LEE, A. M., M. D., *Professor of Histology and Embryology.*  
FRANK F. WESBROOK, M. A., M. D., C. M., *Dean College of Medicine and Surgery, Professor of Bacteriology and Pathology.*  
GEORGE B. FRANKFORTER, M. A., Ph. D., *Dean of the School of Chemistry, Professor of Chemistry.*  
CHAS. F. SIDENER, B. S., *Professor of Chemistry.*  
EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry.*  
EVERHART P. HARDING, M. S., Ph. D., *Assistant Professor of Chemistry.*  
WINFIELD S. NICKERSON, Sc. D., *Assistant Professor of Histology, Chemistry Assistant.*  
FRANK R. WRIGHT, D. D. S., M. D., *Lecturer on Anaesthesia and Chief of Anaesthesia Clinic.*  
MARY V. HARTZELL, D. M. D., *Instructor in Comparative Dental Anatomy.*  
H. M. REID, D. D. S., *Instructor in Prosthetic Dentistry.*  
JAMES M. WALLS, D. M. D., *Instructor in Operative Technics, and Demonstrator of Operative Dentistry.*  
FRED S. YAEGER, D. D. S., *Instructor in Crown and Bridge-Work*  
J. FRANCIS SCHEFCIK, B. S., Ph. G., M. D., C. M., *Instructor in Materia Medica.*  
NORMAN J. COX, B. S., D. M. D., *Instructor in Operative Dentistry.*  
DON DUVELLO RIDER, D. M. D., *Instructor in Prosthetic Technics.*  
ARTHUR B. ALLEN, D. M. D., *Instructor in Operative Technics.*

- AMOS C. WELLS, B. A., D. D. S., *Assistant Demonstrator in Histology and Dental Anatomy.*
- ANDREW J. WEISS. *Instructor in Technics.*
- E. R. HARE, M. D. *Prosector of Anatomy.*
- M. RUSSELL WILCOX, M. D., *Demonstrator in Physiology.*
- GEORGE D. HAGGARD, M. D., *Instructor in Physiology.*
- IRA HARRIS DERBY, B. S., *Instructor in Chemistry.*
- LILLIAN COHEN, M. S., *Instructor in Chemistry.*
- ALBERT D. WILHOIT, B. A., *Instructor in Chemistry.*
- RODNEY WEST, B. A., *Instructor in Chemistry.*
- HAROLD M. NEWTON, *Instructor in Chemistry.*
- M. L. NICKERSON, A. M., M. D., *Instructor in Histology.*
- R. H. MULLIN, B. A., M. B., *Demonstrator in Pathology and Bacteriology.*
- FRANK W. SPRINGER, E. E., *Lecturer on Electricity and Its Uses in Dentistry.*
- H. V. MERCER, LL. M., *Lecturer on Jurisprudence.*
- A. L. MOORE, *Infirmery Clerk.*



## General Information, Rules and Regulations

Note: The College of Dentistry of the University of Minnesota is a member of the National Association of Dental Faculties, and its diplomas are recognized by the Dental Examining Boards of every state.

### MATRICULATION AND REGISTRATION.

After matriculating with the registrar of the University and payment of fees, students will be assigned seats, benches and lockers *in the order of their registration with the dean of the college.*

No one is recognized as a student of the school or permitted in the classes, until his receipts are presented to and countersigned by the Dean; this applies to both semesters.

Students shall have their registration completed *not later than the day previous to the day set for regular work to begin.*

### REQUIREMENTS FOR ADMISSION.

The requirements for admission to the College of Dentistry are graduation from an accredited four-year high-school course, or its equivalent, and a credit in manual training. Failing to have the latter, the prospective student will be required to demonstrate, by test, the possession of mechanical capability.

It is expected that the credits shall include at least one year's work in latin.

The "equivalent" of a high-school graduation will be twelve one-year credits; a "credit" representing the ground covered in a high-school study, for a course of at least thirty-six weeks, five recitations per week.

Students wishing to matriculate in this school, must present credentials signed by a city, county or state superintendent of schools, a principal of an accredited high school or academy, or the state high-school board.

A regulation blank, upon which to make out these certificates, will be found inside back cover of this Bulletin.

Students not having the above credentials, or an insufficient number of them, may take examinations before a committee appointed by the president, from the college of science, literature and arts, of the university.

Examinations are held only in the English language.

### ADVANCED STANDING.

Applicants for advanced standing must present satisfactory evidence

of possessing the preliminary educational qualifications required of the class they desire to enter.

They must also satisfy the professors of the branches from which they wish to be exempt, that the work pursued by them in other institutions was equal in scope and amount to that passed by the class they propose to enter.

No credits are accepted unconditionally, the Faculty reserving the privilege of examining any applicant when deemed necessary.

All certificates pertaining to advanced standing must be presented to the dean who will send them to the respective professors for acceptance or report of further requirements for acceptance.

Students coming from other schools must make up their technic conditions under supervision of the instructors of this school, *at the convenience of the instructor.*

One-year credit will be allowed graduates in medicine, but the dental technic branches of the first year must be taken and completed before advanced work in these branches can be entered upon, and the courses in dental pathology, dental histology and bacteriology taken as they occur in the curriculum.

When a student, for any cause, transfers from one college to another of the National Association of Dental Faculties, his certificate of attendance and standing must be verified by the dean of the school he withdraws from. This is done by correspondence between the executive officers of the two schools.

#### FEES.

The annual fee is one hundred and fifty dollars. (\$150.00). It includes all charges for matriculation, lectures, laboratory courses, dissections, technic materials, microscopes and graduation.

One-half of this fee will be payable when the student matriculates. The accountant's receipts for the portion will entitle the holder to take entrance examinations and to classify. The second half will be payable at the opening of the second semester. These receipts must be presented to, and countersigned by the Dean before entering upon the work of each semester.

A deposit of five dollars (\$5.00) will be required in addition to the first semester fee, to cover loss of and breakage or damage to college property. This will be returned at the end of the year, providing there is no charge against the student. This fee is to be deposited with the University accountant each year when the student matriculates.

If the applicant fails to pass the entrance examinations, his fee will be returned by the accountant.

After having entered upon the course of study, fees are not return-

able, and no rebate will be recommended should a student discontinue work, but the faculty may recommend the application of a part to the succeeding year

Students who fail to pass off conditions at the beginning of the year succeeding the one in which they were incurred, will be charged five dollars (\$5.00) for each examination thereafter until they are removed.

Senior students failing to graduate, will be required to pay a fee of fifteen dollars (\$15.00) for each branch examined in or taken subsequent to the close of the session in which the failure occurred. A fee of fifteen dollars (\$15.00) will also be charged for the completion of each branch of unfinished laboratory or practical work.

Special and graduate students will pay to the accountant a fee of thirty dollars per year for each study they elect to pursue, and additional fees, varying from ten to thirty dollars, for each laboratory course they may enter.

### CONDITIONS.

Examinations of conditioned students and of applicants for advanced standing, in the studies of the first and second years, will be held during the first week of the semester. No student, with an entrance condition, will be allowed to register for any junior subject.

Students will not be permitted to take advanced work in any graded study, until they have passed the lower branch.

No one can be classed as a Junior or Senior with more than two conditions.

Students who carry conditions into a succeeding year, may find a resultant conflict of study hours. In that event they will give preference to the unfinished studies of the lower or conflicting course.

No student will be eligible to final examinations in any year, who carries conditions of a previous year unremoved.

*Candidates for graduation who carry conditions in studies of previous years, must remove these conditions at the end of the first semester in order to be eligible for final examinations.*

### STANDING.

The standing of students is determined by the results of recitations, written examinations, laboratory and practical work. It is indicated by the terms (P), "passed"; (I), "incomplete"; (C), "conditioned"; or (F), "failed." The mark of "failed" indicates that the work must be taken over in class.

### ATTENDANCE AND DISCIPLINE.

Attendance upon all lectures, and infirmary and laboratory hours, as

scheduled, is obligatory. A complete record of each student's attendance is kept, and all absences and tardinesses are noted.

Students to be eligible for final examinations, must have a record of not less than eighty per cent. in attendance.

Habitual absence, continued indifference to study, or persistently poor scholarship, may subject the student to temporary or permanent suspension.

All laboratory courses must be taken in full and must invariably be entered during the first week in which they begin.

The connection of any student with this college, may be terminated at any time, without a return of fees, whenever such action may be advisable on the ground of immorality or disorderly conduct, or a failure to conform to any of the established rules.

Students detected in the use of outside help, as notes, etc., in quizzes or examinations, or of rendering assistance to other students during examinations, will be subject to suspension for the remainder of the semester. The possession of any secret aids while under examination, will be deemed presumptive evidence of guilt, and will subject the student to the same penalty as if detected in using them.

Any student detected in stealing, will be permanently expelled from the college, and be handed over to the civil authorities to be dealt with according to the law.

The practice of dentistry by students, except under the direct supervision of a preceptor, is prohibited by law in the state of Minnesota, and a rule of the National Association of Dental Faculties, to which this college belongs, reads as follows: "Students in attendance at colleges of this Association are required to obey the laws regulating the practice of dentistry in the various States, and, failing to do this, shall not be again received into any college of this Association." Any student detected in violating this rule will be suspended or expelled.

#### INSTRUMENTS, BOOKS, TOOLS AND MATERIALS.

All students are required to provide themselves with instruments, books, tools and materials as prescribed by the college.

#### BREAKAGE AND LOSS.

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give a receipt.

For apparatus and material attaching to his laboratory desk he will also be held responsible. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

A deposit of five dollars will be made with the accountant each year, by

## *The University of Minnesota.*

every student, at the time of enrollment as a caution fee. This fee is intended to cover the cost of unnecessary damage in the college buildings and of breakage and loss of laboratory apparatus and materials. It will be returned to the student at the close of each year, minus the cost of articles assigned to him, which are not returned in good condition, or of damage to college property for which he is individually responsible. If responsibility for such damage cannot be individually fixed, a pro rata charge upon all students will be made.

*For schedule of lectures, announcements, changes in college rules, etc., see bulletin board.*

*Rules and regulations of the infirmary and laboratories are posted in their respective places.*

### CURRICULUM.

The course in the college of dentistry leads to the degree of doctor of dental surgery. It covers a period of three years of collegiate study, each year representing nine months in actual attendance.

The studies are graded, so far as practicable, throughout the three years, and this grading is arranged with careful reference to the relation which the subjects naturally bear to each other, as follows:

#### FIRST YEAR.

Anatomy, dental anatomy, comparative dental anatomy, histology and embryology, physiology, chemistry, prosthetic technics.

#### SECOND YEAR.

Anatomy, materia medica, bacteriology and pathology, clinical pathology and therapeutics, operative dentistry, prosthetic dentistry, orthodontia, crown and bridge work.

#### THIRD YEAR.

Electricity, metallurgy, physical diagnosis, oral surgery, operative dentistry, prosthetic dentistry, orthodontia, crown and bridge work, dental jurisprudence.

### SIX YEARS COURSE.

Beginning with the year 1906-7, the University will offer an optional six years course of study. The first three years of the course to be given in the college of science, literature and the arts. The last three years to be given in the college of dentistry. It leads to the bachelors degree at end of the four first year and to the degree of doctor of dental surgery at the end of the six years course.

# Courses of Instruction

## ANATOMY.

### *Osteology.*

Lectures and recitations upon the human skeleton and supplementary work on the osteology of domestic mammals; three hours each week, for 10 weeks of first semester. Practical study of the skeleton, followed by recitations from the specimen, taken by the class, in sections; 2 hours each section, for 10 weeks, first semester. Required of all first year students.

### *Syndesmology.*

Lectures, recitations and laboratory demonstrations. Three hours each week, for 4 weeks, first semester.

### *Myology and angiology.*

Lectures and recitations covering the entire muscular and arterial systems of the human body, with a supplementary study of comparative myology; 3 hours each week, 16 weeks. Laboratory work consists in identifying the muscles of the human body on dissected preparations and showing their actions. Class, in sections, 4 hours each week for 5 weeks.

### *Splanchnology.*

Descriptive and topographical anatomy of the thoracic viscera, the alimentary and urino-genital organs. Lectures and recitations, 3 hours each week, for 10 weeks.

### *Descriptive and surgical anatomy.*

Head, neck, trunk and extremities. Lectures and recitations, 3 hours each week for 12 weeks.

### *The nervous system.*

Cerebro spinal axis and its membranes; the cranial and spinal nerves; the sympathetic nervous system, and the special-sense organs. Lectures and recitations, 3 hours each week for 8 weeks.

*Dissecting.* The work extends over a period of eight weeks, requiring 15 hours each week. The dissection of the entire human body is required. The method of work follows that laid down in Holden's Manual of Dissections.

## DENTAL ANATOMY.

The subject is taught by a thorough laboratory course, in which the student studies the teeth by dissection, modeling, carvings and drawings. In the study of dental anatomy, human and comparative, the definition, terminology, notation, form and arrangement of the teeth will be fully considered; also macroscopic and microscopic characteristics of sections, including the study of the relation of enamel to dentine and of the pulp canal.

In the study of structural anatomy, teeth will be selected and mounted upon wooden blocks. They will be filed down until the pulp chamber and canals are exposed, and drawings from actual measurements of the different aspects will then be made and carefully studied. Opportunity for the study of microscopic sections and lantern slides will also be afforded. The didactic instruction will be illustrated by "chalk talks," lantern slides, lectures, heroic models and skulls.

The standing of the student will be determined by marks given on the cutting of sections, models, drawings and recitations. Lectures and recitations, covering the influence of form and arrangement of the teeth upon caries will also be given.

## COMPARATIVE DENTAL ANATOMY.

The instruction in this subject embraces a comparative study of animal life, giving special attention to number, form and arrangement of teeth, and their

adaptation to food habits, ranging from the horny teeth of invertebrates, to the complex tooth-forms of the most highly specialized animals of the present time. The lectures will be illustrated with the stereopticon, casts, models and skulls.

#### HISTOLOGY AND EMBRYOLOGY.

This course will consist of lectures, recitations, laboratory work and demonstrations and will include a study of the structure and properties of protoplasm; the cell, its structure and properties, cell division, reproduction, ovum, spermatozoon and formation of blastoderm. A study of the structure and life history of certain type forms of unicellular animals and plants as amoeba, paramoecium, yeast, spirogyra, etc., simple metazoa, as hydra, etc.; consideration of the structure of vertebrates; the tissues, as epithelium, connective tissue, cartilage, bone, etc., muscle, nerve, blood and lymph; vascular and lymphatic system. The teeth, enamel, dentine, cementum, pulp, etc. A general outline of the development of the embryo; the formation of the head; development of the jaws, teeth, oral cavity, glands, etc.

N. B.—Recitations, four hours per week; laboratory, six hours per week.

#### PHYSIOLOGY.

The subject is taught by recitations and lectures illustrated by practical demonstrations. These embrace the discussion, and as far as possible, the observation of physiological ingredients of the animal body; of the physiology of cell life or the fundamental properties of the cell; the nutritive media, blood, lymph and chyle; of the elementary functions of the nervous system; of the muscular tissues; and the epithelial tissues; of the vascular mechanism; of the alimentary canal; of the organs of secretion, excretion and respiration.

#### CHEMISTRY.

##### *Course I. General Chemistry.*

PROFESSOR FRANKFORTER.

Lectures and laboratory work. The course includes a detailed study of chemical and physical properties of the non-metals and their more important compounds, with an introduction to organic chemistry.

##### *Course II. Inorganic Chemistry.*

PROFESSOR FRANKFORTER, MR. WEST AND MR. BADGER.

This course is arranged for those who have already had an elementary course in chemistry. The course includes an introduction to physical chemistry with special reference to the laws of solutions and electrolytic dissociation theory. This work is followed by a systematic study of the non-metals from the general standpoint of the periodic law. Special attention is given to the relationship between the different elements and their analogous compounds.

##### *Course III. Inorganic Chemistry. (Continuation of course II.)*

PROFESSOR FRANKFORTER, MR. WEST AND MR. BADGER.

This course consists of lectures, recitations and laboratory work on the metals. Considerable time will be devoted to those metals which are of special importance to the dentist.

##### *Course IV. Qualitative Analysis.*

ASSISTANT PROFESSOR NICHOLSON, MR. ANDERSON AND MR. WILHOIT.

Lectures, recitations and laboratory work. The course includes the general reactions of the metals and the qualitative separation and identification.

##### *Course V. Qualitative Analysis.*

ASSISTANT PROFESSOR NICHOLSON, MR. ANDERSON AND MR. WILHOIT.

Lectures, recitations and laboratory work. Reactions, separations and identification of the acids.

For work in other special or technical lines of chemistry, numerous courses are offered (see Bulletin of the School of Chemistry). Facilities for research work are also afforded in a large number of lines.

The analysis of the urine is dealt with under physiological chemistry in the Department of Physiology, in the pathology of the urinary system in the Department of Pathology and in the clinical laboratories in connection with the microscopy of the urine.

## MATERIA MEDICA.

This subject is covered as thoroughly as its importance demands. The writing and correct composition of prescriptions is an important feature. Particular attention is devoted to all therapeutic measures pertaining to dentistry. Practical work consists of the study of crude drugs and preparations, with demonstrations of all the pharmaceutical processes of importance.

## BACTERIOLOGY AND PATHOLOGY.

*Bacteriology.* Lectures, recitations and laboratory work, a short general survey of the problems brought to light by bacteriology, and general methods and technique involved, will be followed by special study of certain micro-organisms, such as pyogenic cocci, *B. tuberculosis*, *B. diphtheriae*, etc. These studies will be pursued by means of actual cultivation on the various media, the making and examination of microscopic preparation of pure culture, and both cultivation from and microscopic examinations of infected tissues and fluids of the body, by the students themselves.

*Pathology.* Lectures, recitations and laboratory work. Special study of inflammations and histological changes occurring in the tissues and fluids, constitute the major portion of this course. Some attention is given to the degenerations and the subject of tumors with special reference to the face and oral cavity. Students prepare and examine many of the specimens and receive loan slides of the rarer types, or those difficult of preparation.

## PATHOLOGY AND THERAPEUTICS.

The instruction in this branch will begin with a consideration of the terminology belonging to the subject, followed by the presentation of the lesions of inflammation, local and general, and the degenerate change in the tissues.

The general character of tumors, practical consideration of pathological dentition, interstitial gingivitis, (pyorrhoea alveolaris) pulpitis, pulp nodules, secondary dentine, periodontitis, alveolar abscess, caries of jaw and necrosis, dependent on a diseased condition of the teeth, the various inflammations of the oral cavity, including syphilis and tuberculosis, will all receive due attention.

*Therapeutics.* This course is given by lectures and recitations, and clinically. The student being instructed in the special therapeutics of dental and oral diseases; systematic treatment in cases requiring it, receives due consideration. New remedies that give promise of value are fully studied and put to practical test in the infirmary, under direct supervision. Antiseptic and disinfectant methods as well as dental hygiene, also receive due attention.

## ORAL SURGERY.

The subject of oral surgery will be taught clinically and didactically. The large amount of clinical material presented at the infirmary, furnishes ample opportunity for practical demonstration. Students are required to take charge of cases and carry them through under the advice of the instructor in charge. The didactic lectures will include a full consideration of all the surgical lesions of the oral cavity and associate parts, including oral tumors and the reflex neuroses connected with the fifth pair of nerves; fractures of the maxillae; cleft palate and hare-lip; caries and necrosis of the jaws from constitutional causes; adenoid growths and nasal polypi in their relation to oral surgery; supuration of the antrum; ulitis; epulis growths; fungoid pulp; ranula; exostosed teeth; ankylosis and dislocation, implantations, obturators, interdental and other forms of dental splints

Arrangements have been made with several clinicians connected with the different hospitals of the city to give several clinics. An abundance of material representing all the different forms of diseased conditions of the mouth and associate parts is to be found in the infirmary service, which will be assigned to students for treatment under direction of the professor of oral surgery.

Clinical lectures on the cases presented will be given from time to time. These cases include alveolo-dental abscesses; caries and necrosis of the maxillary bones; diseased conditions of the antrum; interstitial gingivitis; dislocations and ankylosis; facial neuralgias; tumors of the mouth and associate parts, hare-lip; cleft-palate; implantation cases and fractures.

## PHYSICAL DIAGNOSIS AND ANESTHESIA.

The subject of physical diagnosis will be taught didactically and practically,



and will have direct bearing upon the subject of anaesthesia and will be as complete as its importance demands.

A course in urinalysis will be given in connection with this course.

The technics of anaesthetics, both general and local, receive full consideration. All anaesthetics are administered in the clinic, and full instruction concerning their use is given. The members of the senior class are required, under direction, to administer them and extract teeth under these agents.

#### OPERATIVE DENTISTRY.

Work in this department comprises didactic, technical and clinical instruction.

*Didactic.* A course of illustrated lectures, covering the entire field of operative dentistry, is given in the junior year; the subject is again thoroughly gone over with quizzes and conference work in the senior year.

*Technical.* During the junior year a technic course is given, the object of which is to teach as much as possible of operative procedure prior to actual work on patient.

*Clinical.* A part of the junior and all of the senior year is devoted to clinical practice; there is an abundance of clinical material, and the student has the opportunity to perfect himself by practical work in all branches.

#### PROSTHETIC DENTISTRY.

The work of the first year is almost entirely technical; only such lectures and demonstrations being given as to enable the student to carry on his work in the laboratory intelligently. The work comprises a consideration of impression materials, taking impressions, and making casts and models, making upper and lower retaining plates for a fellow student's mouth; and after which the upper is broken and repaired; making partial upper plate with rubber base, comprising the making of trial plate, taking bite, mounting case in articulator, grinding and arranging teeth for proper articulation, flasking, packing, vulcanizing and finishing. Making full upper and lower sets of teeth upon rubber base, using plain teeth and arranging same in accordance with the Bonwill-law of articulation; making full upper and lower swaged metal plates, comprising the making of models, molding in sand, casting dies and counterdies; swaging plate to fit model, soldering rim and grinding and polishing metal. Making lower cast-metal plate, comprising the making of models and moulds, casting and polishing.

*Didactic.* Lectures and recitations of the second year will cover the preparation of the mouth for artificial dentures, choice of impression materials, the various base-plates, their composition and preparation. Porcelain teeth, their composition, form and color as related to temperamental types, and their forms as adapted to the various base-plates.

The various methods of retention, and the indications and uses of the different forms of partial plates is fully considered.

*Technical.* Making upper swaged plate of german silver, mounting plain teeth thereon to articulate with model of lower natural teeth. Making upper combination swaged metal and rubber plate, mounting gum-section teeth thereon to articulate with lower cast metal plate. Making partial swaged metal plate reinforcement and clasps. Making partial upper swaged metal plate with teeth attached by soldering. Making lower cast metal plate, casting metal around lingual side of teeth and forming gum upon labial and buccal sides with pink rubber. Making lower swaged aluminum plate with turned rim.

*Clinical.* The student enters the infirmary upon completion of the technic course, and there puts into practice the principles acquired.

#### PROSTHETIC DENTISTRY—ADVANCED COURSE.

*Didactic.* Lectures and recitations upon the use, construction and adjustment of obturators and artificial vela in the treatment of cleft-palate cases. Continuous gum-work, construction and uses, will be fully illustrated and demonstrated.

*Clinical.* An excellent clinic is provided, enabling each student to make not less than twelve dentures, covering the various conditions usually met with in general practice. Cases of unusual occurrence appearing in the clinic will be utilized as special clinics for the advantage of the entire class.

#### ORTHODONTIA.

The work in the first year of a two-years' course is technical, with such

lectures and demonstrations as will enable the student to perform the laboratory work. In addition to this, the student will be required to attend the lectures given the third year class, so that upon entering the senior year to carry on a clinical case, he will have a general idea of the practice of orthodontia.

The technic course is thorough and complete in its scope, it being deemed necessary that the student should have the requisite skill to make regulating appliances, in order to properly place them in the mouth; in other words, it requires no more skill to make appliances than should be possessed to correctly place and operate them.

Furthermore, no system of "ready-made" appliances is considered wholly adequate or best adapted for the correction of all irregularities, thus the necessity for making them.

The technic work in this year includes a consideration of material for regulating appliances. German silver, its properties, annealing and tempering; drawing wire, making tubing and band material; constructing band with screw; jack-screws of different forms, rotation and expansion appliances, retractors and retainers.

The properties of steels, forging, hardening, tempering and polishing, the making of excavators and chisels, band drivers, band removers and wrenches or keys. Making taps for threading nuts, etc. Each operation is performed by the student after a demonstration by the teacher.

#### ORTHODONTIA—ADVANCED COURSE.

*Didactic.* Lectures and recitations upon the classification of irregularities of the teeth; etiology, local and constitutional; evils arising therefrom; advisability of correction; methods of treatment, including a consideration of the positive or intermittent and constant forces.

The principles of application of force and anchorage are given special consideration, rather than appliances.

Retention and methods of accomplishing the same are fully considered.

*Clinical.* In this year an ample clinic affords opportunity for each student to treat cases of irregularity.

The correction of at least one case by each student is required. The student is also required to observe and inspect the cases of his classmates, thus enabling him to see a large variety of cases with their treatment.

The student will use such of the technic appliances as are adapted to the case in hand and make such new ones from the material left over from the previous year as the case may require.

#### CROWN AND BRIDGE-WORK.

*Didactic.* Lectures and recitations will cover the subject of crown and bridge-work. All forms of crowns and bridges will be taken up in order and considered from theoretical and practical viewpoints.

*Technical.* The technics are arranged so as to include all the fundamental principles of crown and bridge-work. Each student in completing the course will be required to make one of the more important forms of crowns and dummies and to assemble them in bridges.

#### ADVANCED COURSE.

*Didactic.* Lectures and recitations on the character, indication, and methods of handling porcelain in crowns and bridges.

*Technical.* The construction of porcelain crowns and bridges.

#### METALLURGY.

A course of lectures and laboratory instruction is given in the senior year upon the most important metals with special work upon those used in dentistry.

#### USES OF ELECTRICITY IN DENTISTRY.

A course of laboratory instruction will be given upon the different forms of batteries, dynamos and motors in use in dental practice. Their construction, use, care and operation. Electricity as used in surgery and for therapeutic purposes, including application of the x rays, will be made clear by laboratory demonstrations and practical application.

#### DENTAL JURISPRUDENCE.

A course of lectures will be given upon the special duties, obligations and

privileges of professional men, with respect to their patients, fellow practitioners and the general public. Laws relating to expert witnesses, cases of alleged malpractice, liabilities incurred from septic infection, etc., will have due consideration.

The enactments regarding the attainment of legal standing as practitioners in Minnesota and other states will also be fully explained.

#### DEGREES.

The degree of doctor of dental surgery is conferred by the Board of Regents upon the students who are recommended, by vote of the faculty, for graduation. Candidates for the degree must possess the following essential qualifications:

- (1) Twenty-one years of age.
- (2) Good moral character.
- (3) Three full college years spent in the study of dentistry; the third year, at least, in this University, and the remainder in this or other recognized schools of dentistry.
- (4) Satisfactory examinations passed in all branches of the curriculum.

**Text-books.**

- Quain's Anatomy, 10th Edn., Vol. II, part I and II.  
 Morris' Anatomy.  
 Edinger's Anatomy of the Brain and Cord.  
 Gray's Anatomy.  
 Cunningham's Anatomy.  
 Broomell's Anatomy and Histology of the Mouth and Teeth.  
 Black's Dental Anatomy.  
 Tome's Dental Anatomy.  
 Underwood's Comparative Anatomy.  
 Thompson's Comparative Dental Anatomy.  
 Stohr's Histology.  
 Foster's Physiology.  
 Remsen's Inorganic Chemistry.  
 Long's Dental Materia Medica, Therapeutics and Prescription Writing.  
 Ware's Practical Therapeutics II Edn.  
 Burchard's Dental Pathology, Pharmacology and Pathology.  
 Marshall's Oral Surgery.  
 Tyson's Physical Diagnosis.  
 Turnbull's Manual of Anaesthetics.  
 Evans' Crown and Bridge-work.  
 Kirk's American Text Book of Operative Dentistry.  
 Black's Operative Dentistry.  
 Johnson's Principles and Practice of Filling Teeth.  
 Essiz's American Text Book of Prosthetic Dentistry.  
 Gullford's Orthodontia.  
 Hodgen's Practical Dental Metallurgy.

**EXPENSES.**

	1st yr.	2d yr.	3d yr.
Tuition, Instruments, Tools and Books	\$200.00	\$350.00	\$175.00
Room, Board, Incidentals	200.00	200.00	200.00

This is a general average and few use more than \$1,500.00 for the entire three years.

**ALUMNI ASSOCIATION.**

An association of the graduates of the college has its annual meeting during commencement week.

## ANNOUNCEMENT.

In the organization of this college the Board of Regents has aimed to secure the co-operation of the pharmacists of the state. The character of instruction is of high order and every effort is made to comply with the demands of the profession in the Northwest, or elsewhere, in the maintenance of a course of instruction of the highest grade. The college is located on the University campus, in the Medical Science Laboratory building, and is one of the colleges of the department of medicine, but is distinct in the government of its affairs. The building and laboratories are on a par with the best, and their equipment is complete.

The work of the college, as outlined in the following pages, is conducted by means of lectures, recitations and laboratory exercises. Students find their time fully occupied. Those who feel unable to complete the work in two years may divide it in a manner to complete it in three years. Practising pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities, but their studies and time will be subject to regulation as special students.

# The College of Pharmacy

CYRUS NORTHROP, LL. D., *President.*

FREDERICK JOHN WULLING, Ph. G., Phm. D., LL. M., etc., *Dean: Professor of Pharmacology, Pharmaceutical Chemistry and Pharmaceutical Jurisprudence.*

HENRY MARTYN BRACKEN, M. D., *Professor of Materia Medica.*  
..... *Professor of Pharmacognosy.*

H. C. CAREL, B. S., *Professor of Chemistry; General, Medical, Analytical, Quantitative and Organic, Toxicology and Hygiene.*

CONWAY MACMILLAN, M. A., *Professor of Botany.*

FREDERICK K. BUTTERS, M. S., *Instructor in Botany and Practical Pharmacognosy.*

FRANK FAIRCHILD WESBROOK, M. A., M. D., C. M., *Professor of Bacteriology.*

GEORGE B. FRANKFORTER, M. A., Ph. D., *Professor of Organic Chemistry (Post-Graduate).*

GEORGE DOUGLAS HEAD, B. S., M. D., *Instructor in Clinical Microscopy.*

RICHARD OLDING BEARD, M. D., *Professor of Physiology.*

M. RUSSELL WILCOX, M. D., *Demonstrator in Physiology.*

G. D. HAGGARD, M. D., *Assistant in Physiology.*

..... *Instructor in Medical and Pharmaceutical Latin.*

ARTHUR L. PARSONS, B. A., *Instructor in Mineralogy.*

GUSTAV BACHMAN, Phm. D., *Instructor in Pharmacy and Laboratory Assistant.*

I. DERBY, B. S., *Assistant Professor of Chemistry.*

W. H. CONDIT, M. D., *Instructor in Materia Medica.*

C. N. MCCLOUD, Phm. D., M. D., *Lecturer on First Aids to the Injured.*

A. E. CARR, D. M. D., *Assistant in Pharmaceutical Chemistry.*

E. A. LOOMIS, B. S., *Assistant in Pharmaceutical Chemistry.*

# Courses of Instruction

**First Year.** History of pharmacy; metrology; physics of pharmacy, pharmaceutical processes; pharmacopœial preparations; mathematics of pharmacy; pharmacy quiz; identification; chemical philosophy; pharmaceutical chemistry of the non-metals and their preparations; the chemistry of the elements with special reference to organic materia medica; pharmacopœial inorganic salts and their official preparations; qualitative analysis; identification of salts; comparative morphology of the cryptogams; morphology and anatomy of the higher seed plants; micro-botany; materia medica, organic and inorganic; physiology and anatomy.

**Second Year.** Carbon compounds; toxicological chemistry; uranalysis; chemistry of hygiene; classification of organic compounds; U. S. P. organic compounds and their preparation; U. S. P. testing; quantitative analysis; manufacture of official salts; national formulary; incompatibility; dispensing; pharmaceutical assay; synthetic remedies; homeopathic pharmacy; identification of salts; pharmacognosy; powdered drugs; therapeutics; mineralogy and crystallography; bacteriology (optional); clinical microscopy; pharmaceutical jurisprudence; Minnesota pharmacy law; first aids to the injured.

**Third Year.** Students taking three years to do the work of the regular two-year course, will divide the work in an equitable way subject to the approval of the Dean. Students are urged to devote three years to the completion of the course.

## PHARMACY.

**I. History of Pharmacy,** including Pharmacopœias, Dispensatories, textbooks, works of reference. History of the U. S. Pharmacopœia through all its revisions.

Lectures, recitations and laboratory work, first semester, first year.

PROFESSOR WULLING.

**II. Metrology.** Weights and measures, including metric system; balances—construction, varieties, methods of weighing; specific gravity in detail; specific volume, alligation, etc.

Lectures, recitations and laboratory work, first semester, first year.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

**III. The Physics of Pharmacy.** Students are required to have had elementary physics before entering. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. Special attention is paid to heat.

**Specific heat; thermometers**—the various scales, testing and comparing thermometers; combustion of solids, liquids and gases in various kinds of furnaces, stoves and burners; application of heat in drying ovens, steam, hot-air and water ovens; drying closets, desiccators, blow-pipes, crucibles; baths for controlling and equalizing heat; water—salt—oil—glycerine—paraffine—hot air baths; evaporation—spontaneous, rapid, slow, in vacuo; ebullition—boiling points, fusion; sublimation, calcination, dehydration, torrefaction, roasting, reduction, oxidation, carbonization, deflagration, ignition, etc.

**Solution**—chemical, pharmaceutical, simple, chemical, saturated; circulatory displacement.

**Dialysis**—construction of dialyser, osmosis, endosmosis, exosmosis, crystalloids and colloids, etc.

Lectures, recitations and laboratory work, first semester, first year.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT

- IV. *Pharmaceutical Processes.* The processes not taken up in III constitute the subjects of this course. In part they are: drug grinding and powdering; comminution; contusion; trituration; sifting; elutriation; levigation; lixiviation; filtration—filtering medli, filtration of solutions, oils, syrups, rapid filtration, filtration in vacuo, hot filtration, colater; washing—displacement, continuous; decantation—the syphon and its uses; precipitation—methods, vessels, separating, drying, weighing; granulation—granular effervescent salts; desiccation; exsiccation; crystallization—water of crystallization deliquescence, efflorescence, methods of obtaining crystals, collecting, draining, washing, drying crystals, fractional, crystallization; distillation—stills, simple, fractional, destructive; extraction; maceration; expression; percolation—history, theories, percolators, exhaustion, repercolation, continuous percolation, fractional percolation; clarification; decolorization.

Lectures and laboratory work, first semester, first year.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

The work of I, II, III and IV aggregates: Lectures, 72 hours; recitations, 54 hours; laboratory work, 238 hours.

- V. *Pharmacopoeial Preparations.* This course includes the study and preparation of official bodies for which the U. S. P. gives formulæ and processes, and includes waters, solutions, syrups, mucilages, spirits, infusions, decoctions, tinctures, fluid extracts, vinegars, wines, liniments, oleates, ointments, cerates, resins, oleo-resins, honeys; glycerites, mixtures, emulsions, elixirs, collodions, pills, capsules, powders, suppositories, bougies, plasters, papers, cachets, etc.

Lectures, recitations and laboratory work, first semester, first year.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

- VI. *National Formulary.* This course includes the study of the National Formulary and the making of one or more members of each class of preparations.

Lectures and laboratory work, second semester, second year.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

- VII. *Homeopathic Pharmacy.* A brief exposition of the principles underlying homeopathic medication, with some laboratory work.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

- VIII. *Incompatibility.* Therapeutic, pharmaceutical and chemical incompatibility is taken up in lecture and recitation work preliminary to IX. Second semester, second year.

PROFESSOR WULLING.

- IX. *Dispensing.* The study of the prescription and practical work in dispensing upwards of one hundred typical prescriptions.

Lecture and laboratory work, second semester, second year.

PROFESSOR WULLING, MR. BACHMAN.

- X. *The Mathematics of Pharmacy.* While students are required to have a preparation in arithmetic and algebra before entering, they receive frequent drills at stated hours and as occasion requires or suggests throughout the entire course. Students are required to take a final examination in the subject at the end of the first year, at which examination they must attain a rating of at least eighty per cent.

- XI. *Pharmacy Quiz.* A thorough review of the work covered in II, III and IV. Two hours weekly, a second half of first semester and second semester of first year.

MR. BACHMAN.

- XII. *Identification of Official Preparations.* The study of the physical properties of official preparations.

First and second year.

MR. BACHMAN.

#### THE CHEMISTRY OF PHARMACY.

- I. *Chemical Philosophy.* This course is preliminary to all other work in chemistry. It treats of the principles underlying the science, and endeavors to elucidate chemical facts and phenomena. The subject is divided into—

*Chemical Statics*, embracing the study of the theories of atoms and molecules, atomic weights, atomic and molecular volume, quantivalence, molecular structure, ions, electric qualities, etc., and—

*Chemical Dynamics*, the study of reactions and their equations, thermics, chemical properties in general, etc.

Two hours weekly, first semester, first year.

PROFESSOR WULLING.



- II. The Pharmaceutical Chemistry of the Non-metals and their Preparations.** Two hours weekly, second half of first semester of first year.  
PROFESSOR WULLING.
- III. The Chemistry of the Elements,** with especial reference to inorganic materia medica.  
Lectures, recitations and laboratory work, eighteen hours weekly first half, second semester, first year.  
PROFESSOR CAREL AND MR. DERBY.  
ASSISTANTS: MR. CARR AND MR. LOOMIS.
- IV. Pharmacopoeial Inorganic Salts and their Official Preparations,** with especial reference to their description, properties and manufacture.  
Three hours weekly, second semester, first year.  
PROFESSOR WULLING.
- V. Qualitative Analysis.** Lectures and recitations and laboratory work in the qualitative determination of the metals and acids of pharmacy. This course follows and supplements course III.  
Eighteen hours weekly, second half, second semester, first year.  
PROFESSOR CAREL AND MR. DERBY.  
ASSISTANTS: MR. CARR AND MR. LOOMIS.
- VI. Chemistry of the Carbon Compounds.** A brief course dealing with those features of organic chemistry that are of especial medical and pharmaceutical interest, and which serve as an introduction to courses VII, VIII and IX.  
Lectures and recitations and laboratory preparation of some important organic bodies used in medicine. First semester, second year.  
PROFESSOR CAREL AND ASSISTANTS.
- VII. Urinalysis.** Qualitative and quantitative.  
Lectures, recitations and laboratory work, including the qualitative analysis of twenty specimens of normal and pathological urine, and the quantitative determination of sugar, albumen, chlorine, phosphates and urea and the standardization of reagents. First semester, second year.  
PROFESSOR CAREL AND MR. DERBY.  
ASSISTANTS: MR. CARR AND MR. LOOMIS.
- VIII. Toxicological Chemistry.** Organic and inorganic. The chemistry of poisons and their antidotes and a study of symptoms, treatment and post-mortem appearances, including the simulation of symptoms of certain diseases, animal parasites, animal and vegetable products, etc.; the physiological action of important poisons and their antidotes; toxicological examination of blood, urine and various organs.  
Lectures, recitations and laboratory work, first semester, second year.  
PROFESSOR CAREL AND MR. DERBY.  
ASSISTANTS: MR. CARR AND MR. LOOMIS.
- IX. Chemistry of Hygiene.** The chemistry of the atmosphere, water, soil, etc.; the sanitary examination of air and water.  
Lectures, recitations and laboratory work, first semester, second year.  
PROFESSOR CAREL.  
ASSISTANTS: MR. CARR AND MR. LOOMIS.  
The work of VI, VII, VIII and IX aggregates from eighteen to twenty-one hours weekly during the first semester of the second year.
- X. Classification of Organic Compounds.** A continuation and amplification of the theoretical chemistry of the carbon compounds begun in VI, serving as a fuller preparation for XI.  
Two hours weekly, second half first semester, second year.  
PROFESSOR WULLING.
- XI. Chemistry of the Pharmacopoeial Organic Compounds and their Preparations.** This course 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, glucosides, animal drugs and products, etc.  
Two to three hours weekly during the second semester of the second year.  
PROFESSOR WULLING.
- XII. Pharmacopoeial Testing.** A critical study of the identity, purity, limit and percentage tests of the Pharmacopœia and their application either wholly or in part to practically every official organic and inorganic salt and compound.  
Lectures, recitations and laboratory work, eight hours weekly, second semester, second year.  
PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

**XIII.—Quantitative Analysis of U. S. P. Salts and Preparations.** This course comprehends the study of the principles of quantitative determination, and includes the gravimetric volumetric and gasometric determinations of the U. S. Pharmacopœia, but not pharmaceutical assay work (xv). Lectures, recitations and laboratory work. Fifteen hours weekly during the first ten weeks of second semester of second year.

PROFESSOR CAREL AND ASSISTANTS.

**Manufacture of Official Organic and Inorganic Salts.** The preparation of from twenty to forty official salts as time permits.

Second semester, second year.

PROFESSOR WULLING AND MR. BACHMAN.

**XV. Pharmaceutical Assay.** The quantitative determination of active constituents of a number of the potent organic drugs and preparations.

Second semester, second year.

PROFESSOR WULLING AND MR. BACHMAN.

**XVI. Synthetic Remedies.** A study of the chemistry of synthetic remedies in medical use.

Second semester, second year.

PROFESSOR WULLING.

**XVII. Identification of Salts.** The study of the physical identity of the more important official inorganic and organic salts.

One hour weekly during second semester of first year and entire second year.

MR. BACHMAN.

**XVIII. Micro-Chemistry.** A brief course is provided for seniors if time permits.

Second semester, second year.

PROFESSOR WULLING.

**XIX. Physiologic Chemistry and Microscopy (Post Graduate).** Laboratory work and demonstrations. A practical study of the several classes of proteids; of carbohydrates, fats, muscle and bone; of gastric juice, saliva, pancreatic juice and bile in their respective digestions; of glycogen, and of blood lymph, chyle and milk. Microscopic study of the carbohydrates in vegetable and animal forms; of the physiologic emulsions of fat; of the crystalline waste products, and of the physiologic conditions of the blood cells and of blood crystals. Practical instruction is given during this course in the enumerations of the blood cells, in the estimation of hæmoglobin and of the corpuscles in mass, in the spectroscopic examination of the blood in the determination of blood tests, and in the use of the polariscope.

Twelve hours a week, first half of first semester, second year.

PROFESSOR BEARD, DRs. M. R. WILCOX AND G. D. HAGGARD.

#### PHARMACEUTICAL BOTANY AND MICROSCOPY.

**I. The Comparative Morphology of the Cryptogams.** The course embraces the comparative morphology of the cryptogams. Especial attention is paid to the green algæ, the foundation of the vegetable kingdom. The other groups of algæ and the fungi are briefly treated, particular stress being laid on their economic relations to other plants, to animals and to man. About one-half of the semester is devoted to the study of the archegoniate series of plants. Numerous examples of liverworts, mosses, ferns, and their allies are studied in the laboratory, and the line of development which leads from the algæ through the archegoniate series to the seed plants is emphasized.

First semester, first year.

MR. BUTTERS.

**II. The Morphology and Anatomy of the Higher Seed Plants.** In this course especial attention is paid to vegetable histology. The characteristic plant tissues are examined, and their arrangement is noted in roots, stems, leaves, fruits and seeds. The formation and occurrence of carbohydrates, glucosides, alkaloids, organic acids, resins, gums, gum-resins and oleo-resins are carefully studied.

Second semester, first year.

MR. BUTTERS.

**III. Micro-Botany.** Designed to furnish practical training in the use of the microscope, in the preparation of material for microscopic examination, including the use of micro-chemical reagents, and in the representation by drawings of all structures observed.

The work of this course is co-incident with that of II and III.

MR. BUTTERS

These courses occupy the equivalent of six and one-half hours a week throughout the junior year. They aim to give a comprehensive and scientific view of the vegetable kingdom to lay a broad foundation for the study of pharmacognosy, and throughout the course attention is frequently directed in the lectures to the wider relations of plants to one another and to animals, and to the discussion of the plant as a living unit, thus bringing before the class the fundamental problems of plant physiology and ecology.

The successful completion of the course in botany is prerequisite to the study of pharmacognosy.

The work of the three courses covers sixty-six hours lectures, and one hundred forty-four hours laboratory work, and is carried out by Mr. Butters under the direction of Professor MacMillan.

#### MATERIA MEDICA.

##### I. *Inorganic Materia Medica.*

##### II. *Organic Materia Medica.*

The work in inorganic and organic materia medica is based principally on the U. S. P., but unofficial and synthetic drugs are also studied. The course includes the study of the general characteristics of drugs and of their physiological action. Pharmacodynamics, including the study of the identity and quality of drugs, shares attention in the course of pharmacognosy.

Five hours weekly, second semester, first year.

DR. BRACKEN AND DR. CONDIT.

#### PHARMACOGNOSY.

##### I. *Crude Vegetable Drugs.*

The vegetable drugs of the United States Pharmacopœia are taken up in the following order: Roots, rhizomes, tubers and bulbs, woods, barks, leaves, herbs and flowers, fruits, seeds, plant exudations, resins, gum-resins, waxes and starches. Each drug is carefully examined, both macroscopically and microscopically. Students are also provided with specimens for home study. The lectures give, in compact form, the history and important features of each drug, with consideration of its importance to the pharmacist. The quizzes include careful drill on the constituents action and dose and official preparation of each drug considered. Identification receives careful attention and there are weekly tests of the student's ability. A short course is given in the microscopic examination of some of the more important alkaloids and glucosides, and of certain emulsions and inorganic salts, if time permits.

Text-books—Sayre's Organic Materia Medica and Pharmacognosy.

Reference Books—U. S. P., U. S. D., Fluckiger and Handbury's Pharmacographia, Tschirch's Atlas der Pharmacognosie, etc.

The drugs are considered in the following order:

**Roots**—Sarsaparilla (Mexican, Para and Honduras), senega, gentiana, taraxacum, pyrethrum, inula, lappa, apocynum, stillingia, sumbul, asclepias, phytolacca, althæa, belladonna, bryonia, calumba, rheum, glycyrrhiza (Spanish and Russian), ipecacuanha, pareira, krameria, rumex.

**Rhizomes**—Aspidium, zingiber (Jamaican, East Indian and African), calamus, veratum viride, iris, cypripedium, convallaria, triticum, sanguinaria, geranium, podophyllum, valeriana, arnica, serpentaria, spigelia, hydrastis, caulophyllum, cimicifuga, leptandra, gelsemium, menispermum.

**Tubers and Bulbs**—Jalapa, aconitum, colchicum, scilla, allium.

**Twigs and Woods**—Quassia, hæmatoxylon, santalum rubrum, gualacum, dulcamara.

**Barks**—Cinchona (Rubra et Flava), prunes virginiana, viburnum prunifolium, viburnum opulus, rubus, quercus alba, granatum, aspidosperma, frangula, rhamnus purshiana, juglans, xanthoxylum, mezereum, gossypii radix, euonymus, quillaja, ulmus, sassafras, cascarrilla, cinnamomum (Ceylon, Saigon and cassia).

**Leaves and Leaflets**—Pilocarpus, eucalyptus, uva ursi, senna (Alexandria and India), coca (Bolivian and Truxilla), belladonna, stramonium, hyoscyamus, tabacum, digitalis, matico, salvia, hamamelis, castanea, eriodictyon, chimaphila buchu (long and short), rhus toxicodendron.

**Herbs and Flowers**—Santonica, caryophyllus, sambucus, calendula, cusso, arnica, matricaria, anthemis, rosa gallica, rosa centifolia, crocus, zea, chondrus, cetraria, cannabis indica, pulsatilla, scoparius, eupatorium, grindelia, tanacetum, artemisia, absinthium, lobelia, mentha piperita, mentha viridis, melissa, hedeoma, marrubium, scutellaria, chirata, sabina, chelidonium.

**Fruits**—Humulus, piper (longum, nigrum et album), cubeba, pimenta, rhus glabra, capsicum, colocynthis, cassia fistula, chenopodium, illicium, cardamomum, vanilla, coriandrum, conium, anisum, carum, feniculum (Roman and German), macis, aurantii amari cortex, aurantii dulcis cortex, limonis cortex, prunum, tamarindus (East and West Indian), phytolacca, ficus, rubus.

**Seeds**—Physostigma, amygdala (dulcis et amara), pepo, myristica, sinapis (alba et nigra), nux vomica, staphisagria, ricinus, tiglium, stramonium.

**Miscellaneous**—Guarana, lactucarium, alce (Socotrina, Barbadosensis, et Capensis), catechu, kino (Malabar et Pallas), opium, elastica, manna, saccharum, saccharum lactis, mel, acacia, tragacantha, mastiche, gualacum, benzoinum, cambogia, asafoetida, ammoniacum, scammonium, myrrha, copalba, terebinthina, terebinthina canadensis, resina, pix (Burgundica et liquida), styrax, balsamum peruvianum, balsamum toluitanum, camphora, thymol, menthol, ergota (Spanish and German), sassafras medulla, galla (Aleppo et Chinensis), gossypium purificatum, kamala, lupulinum, lycopodium, amyllum, cetaceum, cera, cantharis, coccus, ichthyocolla, moschus, carbo animalis.

Besides the foregoing, a number of the more important unofficial drugs will also be discussed.

Eight hours weekly. Lectures, recitations and laboratory work. First and second semester, second year.

MR. BUTTERS.

## II. Powdered Drugs.

This course consists of laboratory work and occasional lectures. The more important vegetable drugs are examined microscopically, in powdered form. Especial attention is paid to the identification of unknown powders, and to the detection of the various forms of sophistication to which powdered drugs are subject.

Text-book—Schneider's Powdered Vegetable Drugs.

Reference Books—Koch's Drogenpulver, Møller's Pharmacognostischer Atlas.

Three hours weekly, second semester, second year.

MR. BUTTERS.

## ELEMENTARY PHYSIOLOGY AND ANATOMY.

- I. The work covers the study of the physiological properties of the cell, the nutritive media, the nervous mechanisms in general, muscular tissues, connective tissues and epithelial tissues. The subjects of anatomy and histology are touched upon sufficiently to lay the foundation for the proper understanding of physiological functions.

Special demonstrations are given upon animals and the living subject, illustrating the physiological functions in the muscular, nervous, vascular, respiratory and glandular systems, special attention being directed to the action of drugs and their effects upon the various systems.

Twenty-two lectures, first semester, first year.

DR. WILCOX.

- II. *Experimental Physiology.* (Post Graduate). Laboratory work and demonstrations. A study of physiologic apparatus, electric stimuli and methods of experimentation; the demonstration and performance of experiments which illustrate physiologic function in the muscular, nervous, vascular, respiratory and glandular systems; and the study of the cardiac areas, the heart and respiratory sounds, and of pulse tracings, including training in the use of sphygmograph, the stethoscope, phonendoscope, etc.

Six hours a week, second semester.

PROFESSOR BEARD, DRs. M. R. WILCOX AND G. D. HAGGARD.

## THERAPEUTICS.

In this course drugs are studied in groups, as governed by their physiologic action, and the therapeutic features of such groups are described. Remedial measures other than those depending upon drugs, are fully considered.

Lectures and recitations, four hours a week, first semester, second year.  
PROFESSOR BRACKEN.

## MINERALOGY AND CRYSTALLOGRAPHY.

I. *Mineralogy.* A study of the minerals, ores and other sources of pharmaceutical chemicals.

First semester, second year.

MR. PARSONS.

II. *Crystallography.* A study of the subject, with especial reference to the six systems.

Second semester, second year.

MR. PARSONS.

The work of I and II requires one hour weekly during second year.

## BACTERIOLOGY.

Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of bacteria will be dealt with. The classification of the various bacterial forms, the methods of isolation and culture and the composition and manufacture of culture media will be studied until a thorough knowledge of technique is acquired. General and special study of the various antiseptics, disinfectants and bactericidal substances and conditions will be undertaken.

Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, will be thoroughly carried out. Testing of various germicides—chemical and physical—and the use of bacteriological methods in the examination of drinking water will form an important part of the work. Eighteen hours per week during the last eight weeks of the second semester, second year.

PROFESSOR WESBROOK, DR. CHOWNING.

This course is optional with students of pharmacy at present, but may be made obligatory.

## CLINICAL MICROSCOPY.

Instruction includes (a) the macroscopical study of urine, its colors, sediments, and finer chemical tests; (b) the microscopical study of urinary sediments, including blood, pus, epithelial cells, casts, etc.; (c) the macroscopical and microscopical study of sputum, including the study of sputa from cases of pneumonia, pulmonary tuberculosis, asthma, chronic bronchitis, etc.

Lectures and laboratory work. Eight hours weekly; last third, second semester, second year.

DR. GEORGE DOUGLAS HEAD.

## PHARMACEUTICAL JURISPRUDENCE.

A course of lectures in this subject is provided and seniors are required to attend. The lectures introduce the subjects of contracts, agency, commercial paper, insurance, and discuss the liability of retail and manufacturing pharmacists, etc.

Twelve lectures, second semester, second year.

PROFESSOR WULLING.

## MINNESOTA PHARMACY LAW.

Several lectures fully elucidating the rights, duties, privileges and liabilities of pharmacists under the state law regulating the practice of pharmacy, are given by special lecturers near the close of the second year.

## FIRST AIDS TO THE INJURED.

A series of lectures designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician.

Eight lectures, second semester, second year.

DR. MCCLLOUD.

## TEXT AND REFERENCE BOOKS.

- Pharmacy:** U. S. Pharmacopœia, Remington's, Caspari's and Coblenz's Practice of Pharmacy, U. S. Dispensatory, National Dispensatory, Lyon's Pharmaceutical Assaying, Storer's Dictionary of Solubilities, Hager's Handbook of Pharmacy, Fluckiger and Hanbury's Pharmacographia, Era Formulary, American Pharm. Assoc. Proceedings, Berichte der Pharm. Gesellschaft, Peter's Ancient Pharmacy, National Formulary, Homeopathic Pharmacopœia, German Pharmacopœia, British Pharmacopœia, Volatile Oils, Kremer's Gldemeister & Hoffman, Dieterich's Manual, Ruddiman's "Whys in Pharmacy."
- Pharmaceutical Chemistry:** Wulling, Sadtler and Trimble, Attfield, Simon, Hoffman and Power's Examination of Medical Chemicals, Schmidt, Elsner.
- General Chemistry:** Carel, Remsen's Inorganic, Prescott and Johnson's, Watts' Fownes, Gmelin's Handbook, Roscoe and Schorlemmer, Watts' Dictionary, Fresenius, Sadtler's Industrial Organic Chemistry, Schimpf's Quantitative Analysis, Schimpf's Qualitative Analysis.
- Prescriptions:** Ruddiman on Incompatibility, Gerrish's Prescription Writing, Rice's Posological Tables, Scoville on Compounding, MacEwen on Dispensing.
- Mathematics:** Sturmer, Oldberg's Pharm. Problems, Weights and Measures, Mathematical Chemistry, Helm and Morgan's Metric System by Hamblin Smith, Stevens, Arithmetic of Pharmacy.
- Materia Medica:** U. S. Pharmacopœia, Sayre, Bracken, Malsch, U. S. Dispensatory, National Dispensatory, Culbreth, Bently and Trimen's Medicinal Plants.
- Pharmacognosy:** Sayre, Malsch, Rusby and Jelffe, Fluckiger, Huseman and Hilger's Pflanzenstoffe, Base on Vegetable Microscopy, Hanbury's Pharmacographic and Science Papers, Moeller's Atlas, Tschirch and Oesterle's Anatomischer Atlas der Pharmacognosie, Herlant's Micrographies des Poudres Officinales, Schnelder's Powd. Drugs.
- Botany:** Coulter, Strassburger Noll and Shimper's Bergen, Bastin, Vines, Bessey, Bentley, Gray, Cross and Bevan on Cellulose, Welsner's Rohstoffe, Strassburger and Hillhouse, Geddes, Zimmerman on Botanical Microtechnique, Warming and Posser, Koch's Drogenpulver.
- Urinalysis.** Tyson, Flint, Von Jaksch on Clinical Diagnosis, Simon's Clinical Diagnosis, Beale's Chart, Rieder's Atlas of Urinary Sediments, Hoffman and Ultzmann, Peyer's Atlas, Boston's Clinical Diagnosis.
- Mineralogy:** Dana.
- Physiology:** Kirk, American Text-book of Physiology, Simon's Physiological Chemistry, Martin's Human Body, Foster, Howell's American Text-book of Physiology.
- Bacteriology:** Schenck, Sternberg, Fraenkel, Abbott.
- Toxicology:** Reese, Taylor on Poisons.
- Latin:** Robinson's Latin Grammar of Pharmacy, Jones, Harkness.
- Miscellaneous:** Gill's Oil Analysis, Mandel's Bio-Chemistry, Leffmann and Beam's Analysis of Milk, Wing's Milk and Its Products, Lassar and Cohn's Chemistry in Daily Life, Park's Hygiene and Sanitary Science, Stewart's Pocket Dose-Book.

THE WORK OF THE JUNIOR YEAR COVERS 1,130  
HOURS, AS FOLLOWS:

Chemical Philosophy .....	Lectures & Recitations	64
Pharmaceutical Chemistry and Chemical Philosophy .....	Lectures .....	66
	Recitations .....	54
	Laboratory .....	238
Physiology and Anatomy .....	Lectures .....	22
	Lectures .....	72
Botany and Microscopy .....	Laboratory .....	144
	Lectures .....	60
The several junior courses constituting Chemistry .....	Recitations .....	15
	Laboratory .....	158

Qualitative Analysis .....	{ Lectures .....	12
	{ Recitations .....	6
	{ Laboratory .....	140
Materia Medica .....	Lectures & Recitations	64
Identification .....	Laboratory .....	16

Total —.....1,139

If students do not bring credits for Latin and physics they will be required to take in addition:

Latin .....	72
Physics.....	72

THE WORK OF THE SENIOR YEAR COVERS 1,276 HOURS AS FOLLOWS:

Mineralogy and Crystallography .....	Lectures .....	36
Pharmacognosy .....	{ Lectures .....	54
	{ Laboratory .....	162
Identification .....	Laboratory .....	72
Organic Pharmacy .....	Lectures .....	48
Organic Chemistry .....	{ Lectures .....	36
	{ Recitations .....	15
	{ Laboratory .....	70
Urinalysis Chemical .....	{ Lectures .....	20
	{ Recitations .....	10
	{ Laboratory .....	70
Toxicology .....	{ Lectures .....	32
	{ Recitations .....	15
	{ Laboratory .....	60
Chemistry of Hygiene .....	{ Lectures .....	20
	{ Recitations .....	10
	{ Laboratory .....	20
U. S. P. Quantitative Analysis .....	{ Laboratory .....	120
	{ Lectures .....	14
	{ Recitations .....	10

Pharmaceutical Laboratory includes U. S. P. Testing, Making of U. S. P. Salts, Assay, National Formulary Preparations and Homoeopathic Pharmacy.

	Lectures .....	54
Ditto .....	Laboratory .....	126
Dispensing .....	Lectures and Laboratory .....	96
Clinical Microscopy .....	Lectures and Laboratory .....	48
Jurisprudence .....	Lectures .....	12
Therapeutics .....	Lectures and Laboratory .....	40
First Aids .....	Lectures .....	8

Total .....

Special lectures from 6 to 12 during the year.  
Bacteriology, optional.

## JUNIOR LECTURE AND LABORATORY SCHEDULE.

## FIRST SEMESTER 1906-1907

MONDAY:	8:30 to 10:30	Chemical Philosophy.
	10:30 to 11:30	Botany: Lecture.
	11:30 to 12:30	Physiology: Lecture.
	1:30 to 5:00	Botany: Laboratory.
TUESDAY:	9:30 to 10:30	Pharmaceutical Chemistry.
	10:30 to 11:30	Pharmacy: Quiz.
	11:30 to 12:30	Physiology: Lecture.
	1:30 to 5:00	Pharmacy: Laboratory.
WEDNESDAY:	8:30 to 12:30	Pharmacy: Laboratory.
	1:30 to 4:30	Botany: Laboratory.
THURSDAY:	8:30 to 9:30	Pharmacy: Quiz.
	9:30 to 10:30	Chemical Philosophy.
	10:30 to 12:30	Botany: Lecture.
	1:30 to 5:00	Pharmacy: Laboratory.
FRIDAY:	8:30 to 12:30	Pharmacy: Laboratory.
	1:30 to 4:30	Botany: Laboratory.

## SECOND SEMESTER, 1906-1907

MONDAY:	8:30 to 9:30	Materia Medica.
	9:30 to 10:30	Pharmaceutical Chemistry.
	10:30 to 12:30	Pharmacy: Recitation.
	1:30 to 5:00	Chemistry: Laboratory.
TUESDAY:	9:30 to 10:30	Chemistry: Recitation.
	10:30 to 11:30	First Aids.
	11:30 to 12:30	Special Lecture.
	1:30 to 4:30	Chemistry: Laboratory.
	4:30 to 5:30	Latin.
WEDNESDAY:	8:30 to 9:30	Materia Medica.
	9:30 to 12:30	Botany: Laboratory.
	1:30 to 4:30	Chemistry: Laboratory.
THURSDAY:	8:30 to 9:30	Materia Medica.
	9:30 to 10:30	Pharmaceutical Chemistry.
	10:30 to 11:30	Botany: Lecture.
	11:30 to 12:30	Chemistry: Lecture.
	1:30 to 5:00	Chemistry: Laboratory.
FRIDAY:	8:30 to 10:30	Materia Medica.
	10:30 to 11:30	Chemistry: Lecture.
	11:30 to 12:30	Botany: Lecture.
	1:30 to 4:30	Chemistry: Laboratory.
	4:30 to 5:30	Latin.



## SENIOR LECTURE AND LABORATORY SCHEDULE

## FIRST SEMESTER 1906-1907

MONDAY:	8:30 to 9:30	Therapeutics.
	9:30 to 10:30	Pharmacognosy: Lecture.
	10:30 to 11:30	Identification.
	11:30 to 12:30	Organic Chemistry: Lecture.
	1:30 to 5:00	Organic Chemistry: Laboratory.
TUESDAY:	8:30 to 10:30	Pharmacognosy: Laboratory.
	10:30 to 11:30	Crystallography and Mineralogy.
	11:30 to 12:30	Organic Chemistry: Lecture.
	1:30 to 5:00	Organic Chemistry: Laboratory.
WEDNESDAY:	8:30 to 9:30	Organic Pharmacy: Lecture.
	9:30 to 10:30	Therapeutics.
	10:30 to 12:30	Pharmacognosy: Laboratory.
	1:30 to 5:00	Organic Chemistry: Laboratory.
THURSDAY:	8:30 to 10:30	Organic Pharmacy: Lecture.
	10:30 to 11:30	Crystallography and Mineralogy.
	1:30 to 5:00	Organic Chemistry: Laboratory.
FRIDAY:	8:30 to 9:30	Therapeutics.
	9:30 to 12:30	Pharmacognosy: Laboratory.
	1:30 to 5:00	Organic Chemistry: Laboratory.

## SECOND SEMESTER 1906-1907

MONDAY:	8:30 to 12:30	Pharmaceutical Laboratory.
	1:30 to 5:00	Quantitative Analysis.
TUESDAY:	8:30 to 12:30	Pharmaceutical Laboratory.
	1:30 to 5:00	Quantitative Analysis.
WEDNESDAY:	8:30 to 12:30	Dispensing.
	1:30 to 4:30	Pharmacognosy Laboratory.
THURSDAY:	8:30 to 12:30	Dispensing.
	1:30 to 5:00	Quantitative Analysis.
FRIDAY:	9:30 to 10:30	Pharmacognosy Lecture.
	10:30 to 12:30	Organic Pharmacy.
	1:30 to 5:00	Quantitative Analysis.
SATURDAY:	9:00 to 12:00	Pharmaceutical Laboratory is open for the benefit of students who may be behind in any of their work.

Pharmaceutical laboratory work includes U. S. P. Testing, National Formulary Preparations, Manufacture of U. S. P. Salts, Assay, Homeopathic Pharmacy, etc.

Quantitative Analysis includes gravimetric, volumetric and gasometric estimation.

Quantitative Analysis is completed about the middle of April, when the work in Clinical Microscopy and Jurisprudence takes its place.

## ENTRANCE REQUIREMENTS.

*A.—To the Two-Year Course.*

While nearly all students enrolled in this college are graduates of full four-year high school courses, such a training prior to entrance is not obligatory at the present time. The requirements, however, are being raised gradually in such a way that beginning with the school year 1909 they shall be a full high school preparation or an equivalent, *i. e.*, a preparation in six one-year credits in addition to English, algebra, geometry, physics and Latin as per list in III.

- I. *Minimum requirements applying to all candidates seeking admission to the 1906-'07 course.* Applicants may be admitted without examination if they bring certificates of graduation from, or standing in, institutions of the collegiate grade or present other credentials showing that they have successfully completed the branches of study embraced in a full four-year high school course, or an equivalent, provided that among the branches completed are:

English, two years, including the principles of composition and practice in written expression.

Algebra, one year, elementary, up to beginning of higher algebra.

Geometry, one year, elementary.

Physics, one year, elementary.

Latin, two years: Grammar, one year, Caesar, (four books), one year.

- II. Other applicants must pass examinations in the branches above specified, *i. e.*, in English, algebra, geometry, physics and Latin, or present satisfactory evidence of having completed these branches, for which substitutes cannot be accepted.

Students will be allowed to carry not more than one condition which, however, must be removed before the final examinations in the first year subjects.

- III. *Minimum requirements applying to candidates seeking admission to courses beginning respectively 1907, 1908, and 1909.*

Applicants for admission in 1907, 1908 and 1909, respectively, must present, in addition to the five subjects enumerated in I., evidences of preparation in respectively two, four and six one-year credits chosen from the following list or their equivalents:

Latin .....	}	Cicero: One year.
		Virgil: One year.
Greek .....	}	Grammar: One year.
		Anabasis: One year.

German .....	{	Grammar: One year. Literature: One year.
French .....	{	Grammar: One year. Literature: One year.
Spanish .....	{	Grammar: One year. Literature: One year.
English .....	{	Latin element: One year. Literature: One year.
History .....	{	Greek and Roman: Half year. English: Half year. Medieval: Half year. Modern: Half year. Senior American: Half year.
Civics .....		Half year.
Political Economy .....		Half year.
Chemistry .....		Half year.
Botany .....		Half year or one year.
Zoology .....		Half year.
Astronomy .....		Half year.
Geology .....		Half year.
Solid Geometry .....		Half year.
Higher Algebra .....		Half year.
Physiography .....		Half year.
Commercial Geography .....		Half year.

Students may enter with two one-year conditions or three half-year conditions.

Applicants whose preparatory course of study has not conformed precisely to the requirements above enumerated will be allowed to offer, in lieu of a portion of these requirements, equivalent preparation in similar branches of study; and if they show, by examination, or by other evidence, that their preparation has been substantially equivalent, such branches will be accepted as substitutes for those omitted.

The examinations for entrance are conducted by the faculty of the college of pharmacy, in the pharmacognosy rooms, beginning at 9:00 a. m., on Tuesday, September 18, 1906. Lecture work begins as soon as possible after the examinations, usually the following day.

IV. All applicants are required to furnish a certificate of good moral character.

#### *B.—To the Three-Year Course.*

The minimum requirements for admission to the three-year course beginning in 1906, and to that beginning in 1907, are the same as those for admission to the two-year course II., with the exception that students may carry as conditions not more than three of the entrance subjects among which English cannot be. Students must pursue the branches

in which they are conditioned during their first year and pass examinations in them or present evidence of having satisfactorily completed the branches. The subjects are not taught at the college, but may be taken at the Academy near by, or at the city high schools or with private tutors. The University Y. M. C. A. usually establishes courses for the benefit of students conditioned in entrance branches.

For the school year 1908-09 applicants cannot enter with more than two conditions. After that year the requirements for entrance upon the three-year course will be the same as those for admission to the regular two-year course, *i. e.*, a full high school preparation with the privilege of two conditions.

### LIBRARY.

Students have free access to all the library facilities of the University and of the city. The medical and pharmaceutical library contains, in addition to about twenty-four hundred volumes of a technical nature, the more important American and European medical and pharmaceutical periodicals.

### LENGTH OF COURSE.

The complete course extends over two years of nine months each. Students may arrange their work so as to take the course in three years, without additional expense to them. It is quite possible that three years' attendance will be required of students in this college in the near future.

The fifteenth annual course begins Tuesday, September 11, 1906, at 9:00 a. m., at which time registration commences in the Dean's office. Registration closes on Tuesday, September 18. Regular work begins the following day.

The college year is divided into two semesters; the second beginning February 5, 1907.

### REGISTRATION.

All applications for admission to the regular courses must present to the Dean not later than September 18, their school or high school certificates, diplomas or such other credentials as they may wish to offer toward meeting in whole or in part the entrance requirements. If these are found satisfactory the applicant will register in the office of the University registrar, who will issue a card to the University accountant to whom the applicant will pay the tuition and breakage fees and microscope rental and receive receipts therefor. Registration is completed by depositing these receipts in the office of the Dean. The student is then classified.

## PROFESSIONAL EXAMINATIONS.

Examinations are held at the end of the regular school year and during the last week of the first semester, and are supplementary to the written recitations and quizzes that are held at frequent intervals during the term, and with them form the basis of final determination of fitness for promotion or graduation. Students are rated throughout the year, and all students who have a standing of ninety per cent, or more, in certain of the branches, may not be required to take the final examination in those branches.

Students are not required to write graduating theses, but instead, they keep complete records of all their laboratory work. The records are to be kept in substantially bound books, to be approved by the faculty. The respective professors call for the records for inspection and rating once a month or oftener. Duplicates of records are to be furnished the college by the students. The college provides the paper.

## ATTENDANCE.

In order to become eligible for final examinations, students are required to attend at least four-fifths of the lectures in each course. This rule is not intended for the benefit of those who seek admission after the opening of the college year, but is designed to cover cases of sickness or unavoidable absence. It does not apply to laboratory courses which must be taken in full and must be entered during the first week in which they begin.

## CONDITIONS.

Students having conditions in more than one major or in more than two minor subjects of the first year, cannot enter upon the second year's work. All entrance conditions must be removed before the next spring examination. Candidates for graduation must have removed all conditions before entering upon the second semester of the graduating year.

Condition examinations are held during the first week of the course in September. The dates are posted in June. 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.

All who carry a condition and fail to remove it within one year will be charged an extra examination fee.

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.

### STANDING.

The standing of students is determined by the results of recitations, written examinations, laboratory work and attendance. It is indicated by the terms "passed," "conditioned," "incomplete," or "failed." Conditions may be removed as indicated above. Incomplete work must be made up before the final examinations of the following year.

### 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, and must present themselves at the above date and pass the examinations of all departments in which they wish to be exempt, if such examinations are deemed necessary by the professors in charge of the various departments. Students will not be permitted to substitute private work in any branch for the regular course work.

### DEGREE.

This college confers the degree of pharmaceutical chemist, (Ph. C.), upon the graduates of the regular course.

### REQUIREMENTS FOR GRADUATION.

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 required number of exercises.

Every person upon whom the degree is conferred must be of good moral character, and must be at least twenty-one years old; must have attended two full lecture and laboratory courses, the last at this college, and must have passed a successful examination in the subjects required for graduation.

Drug store experience is not a requirement for graduation.

Those who fail to appear for examination after having paid their diploma fee, or those who do not pass satisfactorily, will be permitted to present themselves at any subsequent examination, upon payment of an additional fee of five dollars, and complying with all other requirements.

### GRADUATE COURSE.

In addition to the regular course this college offers two graduate courses, the first continuing through one college year and leading to the

degree of "master of pharmacy," and the second continuing through an additional year or longer, and leading to the degree of "doctor of pharmacy." The first graduate course, the one leading to the master's degree, is now in operation. It is intended that the curriculum shall include higher pharmaceutical chemistry, pharmaceutical assaying, higher organic chemistry, proximate and ultimate analysis, chemistry of food, spectroscopic work, therapeutics, and bacteriology, and a thesis of at least 3,000 words, embodying the results of original work, but this curriculum may be changed by the faculty if occasion or experience require.

The requirements for admission are a diploma from a Minnesota high school of the first grade, or an equivalent; a diploma from a college of pharmacy whose curriculum, extent and kind of work and length of under-graduate course are equal to those of the under-graduate work of this college; an acquaintance with either German or French sufficient to enable the student to read and understand the scientific literature of those languages, and a certificate of registration as pharmacist from any state board of pharmacy. The fees for this course will be seventy-five dollars, and, upon graduation, an additional fee of ten dollars for diploma. The rules relating to damage, waste and breakage in laboratories are the same as those applying to the undergraduate course.

The course leading to the doctor's degree will begin as soon as there are sufficient applicants.

#### BREAKAGE AND LOSS.

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give receipt. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

All apparatus lost or damaged will be charged to him, and must be paid for before he can receive credits for his course, or take his annual examinations.

#### CAUTION FEE.

A deposit of ten dollars will be made with the accountant each year, by every student, at the time of enrollment as a caution fee. This fee is intended to cover the cost of unnecessary damage to or in the college buildings and of breakage and loss of laboratory apparatus and materials. It will be returned to the student at the close of each year, minus the cost of articles assigned to him, that are not returned in good condition, or of damage to college property for which he is individually responsible. If responsibility for such damage cannot be individually fixed, a pro rata charge upon all students will be made.

## GENERAL STATEMENT.

Those who do not pass the entrance examinations, may enter and complete their course in three years, provided they pursue the subjects required for admission, in addition to the professional work that may be assigned to them, and pass their entrance examinations, before the end of the first year. There are a number of preparatory schools in the neighborhood of the University, where the subjects required for admission may be pursued.

Students are permitted to use their own crude drugs for the making of preparations, provided such material is approved by the Dean of the college as suitable to demonstrate the lesson in hand. Finished products from such material, if of satisfactory quality, are at the disposal of the student, unless made with the tax-free alcohol belonging to the college.

Absence will not be excused, unless satisfactory reasons are given to the professor in charge. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension. Students are earnestly requested to be present at the beginning of the school year. Special students, however, may enter at any time; they will not be rated on their work, nor will they be examined unless they make special request therefor. Any of the facilities for work in the University are open to the students of this college, subject to the approval of the Dean. Opportunity is afforded to do advanced work in all branches. Text-books may be obtained after coming to the University.

Rooms and board convenient to the college can be obtained at prices ranging from \$3.00 to \$5.00 per week, according to accommodations and furnished rooms without board, from \$5.00 to \$10.00, and unfurnished rooms from \$4.00 to \$7.00 per month.

A list of rooms and boarding places is kept by the secretary of the University Y. M. C. A., to whom inquiries or applications may be addressed.

## FEES

## TWO YEAR COURSE

First year.....	\$75.00	
Second year.....	90.00	
		\$165.00

## THREE YEAR COURSE

First year.....	\$45.00	
Second year.....	55.00	
Third year.....	65.00	
		\$165.00

There are no other fees in the regular course. Fees are payable at the



time of registration. Those desiring to take special work will be required to pay fifteen dollars a subject in the didactic courses and twenty-five dollars in the laboratory courses.

Students will be charged for laboratory material if used unreasonably. At the end of laboratory courses students will be required to pay for breakage and damage to utensils in their care. If a student is careful this charge need not amount to more than two or three dollars. Students are to provide themselves with a designated set of metric weights, a set of apothecary's weights and steel spatulas. The expense of these is within three dollars. Students using platinum crucibles are charged for same. Upon the return of the crucible in the original condition the charge is canceled; if the crucible is in any wise damaged the full value is collected from the student. A rental of two dollars per college year is charged for the use of a microscope. All money is payable to the accountant of the University, who will give receipts which must be deposited in the Dean's office.

Fees will not be returned, except in case of discontinuance for sufficient reason before the student has been assigned to a place in the laboratory.

#### STATE BOARD OF PHARMACY.

The Board meets at the college four times each year. For information concerning the Board address the Secretary, Mr. Chas. J. Moos, 502 Bank of Commerce Building, Minneapolis, Minn.

#### COLLEGE OF PHARMACY ALUMNI ASSOCIATION.

The Alumni Association meets annually in the college building the day before commencement, at 3 p. m. Every member of the Association is urgently requested to report change of address to the secretary.

#### COMMUNICATIONS.

Address communications to the Dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minn.

# Degrees Granted in 1905

TOTAL, 547.

## THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

BACHELOR OF ARTS, 1906.

Abbott, John Steele, St. Paul.  
Adams, Charles Edwin, Minneapolis.  
Aldrich, Addie Rumsey, Minneapolis.  
Aldrich, Harry, Minneapolis.  
Alexander, Anne Frances, Lake City.  
Alexander, Ida Mary F., Carver.  
Alexander, Sara, Lake City.  
Allyn, Anna Louise, St. Paul.  
Anderson, Abbie Mathilde, Wells.  
Anderson, Deborah M. E., Minneapolis.  
Austin, Caroline Isabel, St. Paul.  
Bakke, Anna Helen, Minneapolis.  
Bank, Albert M., Minneapolis.  
Beck, Maud Gertrude, Ashland, Wis.  
Belden, Antoinette Griffith, Austin.  
Belden, Mabel Perle, Spring Valley.  
Bell, Margaret George, Minneapolis.  
Bell, Mary Elizabeth Dewey, St. Paul.  
Best, Sarah, Fargo, N. D.  
Blaisdell, Arthur, Fairmont.  
Bolstad, Alfred C., Dawson.  
Boutwell, Emily L., Blue Earth.  
Boutelle, Louisa Elizabeth, Marshall.  
Boyce, Jessie Wadleigh, Minneapolis.  
Brockway, Hart Leebert, Balaton.  
Brooks, Jessie, Renville.  
Browne, Isabelle Victoria, Minneapolis.  
Buell, Pearl, Hudson, Wis.  
Burnham, Chilo Webb, Carrington, N. D.  
Caldwell, Grace Ferne, Mankato.  
Campbell, Robert Henry, Burkeville, Va.  
Carlson, Lillian Elizabeth, Minneapolis.  
Case, Ethel, Minneapolis.  
Clark, Louise Campbell, St. Paul.  
Clarke, Helen, Algona, Ia.  
Coffin, Samuel David, Lyndale.  
Cole, Marion Alice, Minneapolis.  
Conway, Estelle, Minneapolis.  
Cornwell, Georgie F., Little Falls.  
Cox, Elizabeth Jennings, Minneapolis.  
Craig, Carrie Swift, Minneapolis.  
Cramer, Margaret Ethel, Minneapolis.  
Crounse, Ella Dix, Minneapolis.  
Davenport, Murray Taylor, Minneapolis.  
Davis, Irma Lee, Minneapolis.  
DeBell, Florence, Rosebud Agency, S. D.  
DeMeules, Sophie Clara, Minneapolis.  
Devaney, John P., Lake Mills, Ia.  
Doolittle, Leroy Edson, Luverne.  
Dow, Don Carlos, Worthington.  
Dredge, Belle, Lake Crystal.  
Drum, Jennie, Waseca.  
Eaton, Mabelle, Minneapolis.  
Einarson, Sturla, Duluth.  
Everett, Elsie Nettleton, Minneapolis.  
Fairchild, Frederick Tracy, Minneapolis.  
Faunce, Carroll Seth, Minneapolis.  
Finkle, Kate Talbot, Moorhead.  
Fish, Helen Jennings, Minneapolis.  
Foot, Laura Adella, Red Wing.  
Frank, Sylvia Stern, Minneapolis.  
Frelin, Julius T., Minneapolis.  
Gallagher, Richard, Anoka.  
Garbett, Louise, Minneapolis.  
Gearing, Maud Parthena, St. Paul.  
Gibson, May, Stillwater.  
Gilmore, Charles Edwin, Lake Crystal.  
Gippe, Hilda Marie, Watson.  
Goodrich, Lois E., Minneapolis.  
Gray, Raymond Hulbert, Elk River.  
Greaves, Grace Ethel, Minneapolis.  
Grindeland, Synneve, Warren.  
Gunckel, Kathleen Elizabeth, Minneapolis.  
Haas, Virginia Gertrude de, St. Paul.  
Hagen, John, Minneapolis.  
Harden, Elizabeth Carleton, Minneapolis.  
Harding, Rowena, Minneapolis.  
Harrington, Josephine M., Minneapolis.  
Healy, Bessie Olivia, Minneapolis.  
Heilman, Julius A., Naperville, Ill.

- Hill, Charles Warren, Minneapolis.  
 Hiscock, Jennie Isabelle, Minneapolis.  
 Hollinshead, Cornella, St. Anthony Park.  
 Holmes, Myrtle Evangeline, Mankato.  
 Holt, Charles Mead, Minneapolis.  
 Ives, Agnes Sherwin, Minneapolis.  
 Jacobson, Walter Jacob, Luverne.  
 Janes, Susie Isabelle, Pipestone.  
 Johnson, Anna Carolyn, Minneapolis.  
 Johnson, Herman Adolph, Minneapolis.  
 Johnson, Adella T., Minneapolis.  
 Johnson, Andrew William, New Richland.  
 Johnson, Rose Mathilda, St. Paul.  
 Jorgenson, Laurids, Staplehurst, Neb.  
 Joyce, Arthur Reamy, Minneapolis.  
 Kapp, Katharine, Dubuque, Ia.  
 Kelsey, Inez Adele, Anoka.  
 Kendall, Rita Harriet, St. Paul.  
 Kennedy, Amy Annie, Clear Lake, Ia.  
 Kennedy, Helene, Minneapolis.  
 Kinnard, Bertha Clay, Minneapolis.  
 Kraft, Arthur William, Groton, S. D.  
 Lagerstrom, Ansgar Thelander, Minneapolis.  
 Lamphere, Eugene M., St. Paul.  
 Lange, Mary Rena, Minneapolis.  
 Larsen, Ida Mathilde, Minneapolis.  
 Lauderdale, Mildred, Minneapolis.  
 Leach, Helon Edwin, Spring Valley.  
 LeBeau, Henry Charles, Little Falls.  
 Leeds, Bessie Geraldine, Sioux City, Ia.  
 Lenz, Emma Augusta, Minneapolis.  
 Linkfield, Alice Ernestine, Minneapolis.  
 Love, Harry D., Lisbon, N. D.  
 Luiten, Navier Edward, Glencoe.  
 Lundgren, Hilda Eugenia, Alexandria.  
 McDonald, Mabel Harriet, Minneapolis.  
 McFadden, Esther, Fergus Falls.  
 McGrath, William H., Minneapolis.  
 McIntyre, Mary Elizabeth, Eden Valley.  
 McKittrick, Carrie Hildegarde, Minneapolis.  
 McNeill, Edwin Ruthven, Jr., Onawa, Ia.  
 McPartin, Catharine, Glencoe.  
 Magnusson, Leifur, Duluth.  
 Mahaffy, Mary, Minneapolis.  
 Mahle, Florence Edna, St. Paul.  
 Malgren, Helma Ethel, Minneapolis.  
 Manus, Albert Herman, South Freeport, Ill.  
 Marr, Gibson Atherton, Washington, D. C.  
 Mendelson, A. Oscar, Minneapolis.  
 Miller, Laura Ernestine, Minneapolis.  
 Mitchell, Harry Sewall, Minneapolis.  
 Monson, Letitia, St. Paul.  
 Morgan, George Wagner, Minneapolis.  
 Myron, Olin Cornell, Vermillion, S. D.  
 Nell, Hazel, Kenneth.  
 Newberg, Oscar, Edina.  
 Norris, Anna Laura, Sauk Center.  
 Oberg, Marie Josephine, Litchfield.  
 Olsen, Mabel Juliet, Minneapolis.  
 Olson, Frederick Adolf, Wells.  
 Paddock, Medora Althea, Minneapolis.  
 Parker, Alice M., Minneapolis.  
 Patterson, Helen Jeanette, St. Paul.  
 Peterson, Henry Philip, Maple Plain.  
 Plummer, Bessie Taylor, Minneapolis.  
 Potter, Grace Ruth, St. Paul.  
 Pratt, Prudence Emily, Minneapolis.  
 Pratt, Robert Henry, Minneapolis.  
 Puffer, Howard Albert, Bird Island.  
 Quigley, Eleanor Florence, Bird Island.  
 Rank, Hattie, Browns Valley.  
 Rank, Minnie Louise, Browns Valley.  
 Rawson, Fannie Maria, Wadena.  
 Reed, Robert Ray, River Falls, Wis.  
 Rich, Bertha Elizabeth, Sauk Center.  
 Robertson, Jessie Anne, Minneapolis.  
 Robinson, Ellis Astor, Ostrander, O.  
 Rosenthal, Rose Bronie, St. Paul.  
 Ruger, Thomas Wright, Devils Lake, N. D.  
 Salisbury, Carolyn T., St. Paul.  
 Sanborn, John Benjamin, St. Paul.  
 Sandvall, Ruth Josephine, Minneapolis.  
 Sanford, Roscoe Frank, Faribault.  
 Schouten, Charles Pearsall, Lisbon, N. D.  
 Schureman, Winnifred, Minneapolis.  
 Sharpe, Mabel Lovejoy, Minneapolis.  
 Smallwood, Justin Thomas, Worthington.  
 Smith, Lillian Mae, Minneapolis.  
 Stanley, Lucy Mabel, Chippewa Falls Wis.  
 Steichen, Victoria A., Minneapolis.  
 Stene, Isabelle Caroline, Minneapolis.  
 Steward, Maud Harriet, Minneapolis.  
 Stromswold, Joseph Christian, Bellingham.  
 Sullivan, Mary Elane, Minneapolis.  
 Sutton, Cora Olive, Prior Lake.  
 Taft, Laura J., Minneapolis.  
 Tennant, Lois Agnes, Minneapolis.  
 Thompson, Willard Eeles, Algona, Ia.  
 Thomson, Eva F., St. Paul.  
 Upson, Arthur, Minneapolis.  
 VanBergen, Margaret Phipps, Minneapolis.  
 Vaustron, Frederick Wilhelm, Dawson.  
 VanWert, Mary C., Minneapolis.  
 Walker, George Thompson, Devils Lake, N. D.

Warrington, Helen Louise, Minneapolis.	Williams, Fred Mortimer, Elk River.
Webster, Milo DeLancey, Minneapolis.	Willson, Laura Blanche, Rochester.
Whited, Oric Ogilvie, Jr., Minneapolis.	Wirth, Frederick A., Minneapolis.
Whittier, Bessie Mabelle, Minneapolis.	Wold, Claudia Emilie, Minneapolis.
	Wold, Ethel Amella, Austin.
	Woodward, Ruth, St. Cloud.
	Wright, Charles Rolla, Fergus Falls.
	Wynne, Janet Isabella, St. Thomas, N. D.

## BACHELOR OF SCIENCE—1.

Weyrens, Joseph Peter, St. Nicholas.

## CERTIFICATE OF PROFICIENCY IN \_\_\_\_\_ ;—1.

Burnham, May D., Minneapolis.

## MASTER OF ARTS—14.

Alexander, Hugh S., St. Paul. B. A., '99, Macalester. Major—Astronomy; Minors— Physics and Hebrew.	Manheimer, Elsa, St. Paul. B. A., '04. Major—English; Minors—Rhetor- ic and Pedagogy.
Daly, Alice, St. Paul. B. A., '04. Major English; Minors—Rhetoric and Pedagogy.	Peabody, Eunice D., Minneapolis. B. A., '04. Major—Philosophy; Minors—Psy- chology and Embryology.
Foerster, Alma, St. Paul. B. L., '01. Major—German; Minors—English and Philosophy.	Perkins, Minnie Arabella, Minneapolis. B. L., '93. Major—English; Minors—History and Spanish.
Hodnefield, Jacob J., Minneapolis. B. A., '02. Major—Political Science; Minors English and History.	Smith, Mildred Alice, Minneapolis. Major—English; Minors—French and Rhetoric.
Johnson, Mrs. Julia M., Holyoke, 1885. Major—English; Minors—Latin and Philosophy.	Sunne, Dagny, Minneapolis. B. A., '01. Major—Philosophy; Minors—Latin and Psychology.
Kells, Lucas C., Sauk Center. B. A., '04. Major—History; Minors—Eco- nomics and Politics.	Thayer, M. May, Minneapolis. B. L., '98. Major—Latin; Minors—Politics and Archaeology.
Lippold, William H., Minneapolis. B. A., '04. Major—Cytology; Minors—Ento- mology and Social Pathology.	Warner, Cecil E., Minneapolis. B. A., '04. Major—Political Science; Minors —History and Law.

## DOCTOR OF PHILOSOPHY—3.

Deinard, Samuel N., Minneapolis. B. A., DePauw University; M. A., University of Chicago. Thesis—"The New Year's Day and Day of Judgment of the Jewish Calendar."	Thesis—"The Seed-Fungus of Lobium Temulentum, L. The Darnel."
Freeman, Edward M., Minneapolis. B. S., '98; M. S., '99.	Vikner, Edward J. W., Minneapolis. B. A., '00; M. A., '02. Thesis—"A study of Romanticism and the Romantic School in Swedish Literature."

## THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

### CIVIL ENGINEER—16.

Bisbee, Elmer, Madelia.	Jensen, John Arthur, Fergus Falls.
Brockway, Roydon Ray, Luverne.	Johnson, Nels, Preston.
Burke, Roy L., Minneapolis.	King, Wesley Eugene, Minneapolis.
Cutler, Alvin S., Minneapolis.	McMillan, Franklin R., Luverne.
Feyder, William Henry, St. Paul.	Mattison, Oliver, Minneapolis.
Finley, Joseph Edward, Janesville.	Mueller, Henry John, Hamburg.
Gillette, George Lewis, Minneapolis.	Nelson, Oscar B., Minneapolis.
Hopeman, Albert Manus, Preston.	Smith, Donald Tidd, Chicago, Ill.

### MECHANICAL ENGINEER—13.

Andrews, George L., Minneapolis.	Johnson, Ernest Prescott,
Bates, Albert Henry,	Albert Lea.
St. Louis Park.	Lewis, Edward B., Willmar.
Cliffell, Carroll Dale, Minneapolis.	Pancratz, Alexander J., Perham.
Cutter, Francis Charles, St. Paul.	Rydeen, Francis G. A., Gibbon.
Gerrish, Harry Eldon, Minneapolis.	Sperry, Leonard Boyd, Wasioja.
Harris, Sigmund, Minneapolis.	Tuck, George Albert, Minneapolis.
Johnson, Austin G., Minneapolis.	

### ELECTRICAL ENGINEER—20.

Adams, William Charles,	Minneapolis.	Jackson, Earle Daniel, Minneapolis.
Anderson, Emil, Minneapolis.		Jones, Raymond Leslie, Minneapolis.
Billau, Lewis Scoville, St. Paul.		Kochendorfer, Milton J., South Park.
Boman, Carl Emanuel, Cokato.		LeBlond, Edmond J., Minneapolis.
Coleman, Frank D., Ellendale, N. D.		LeTourneau, Edward Harold, Duluth.
Davis, Charles Asa, Minneapolis.		Lundquist, Ruben A., Red Wing.
Fly, Irving Robinson, Milbank, S. D.		Morris, Robert, Greenleafton.
Frankovitz, John Joseph,	Fergus Falls.	Ryan, William Thomas, Joice, Ia.
Gibson, Charles B., Minneapolis.		Simmon, Karl Albert, Jr., St. Paul.
		Smith, Clinton Besly, Minneapolis.
		Wood, John William, Stewartville.

### BACHELOR OF SCIENCE (In Engineering)—1.(In Engineering)

Gregg, Tresham Dames, Minneapolis.

## THE SCHOOL OF MINES

### ENGINEER OF MINES—15.

Angst, Harry Hugo, Minneapolis.	Keller, Orrin Edwin Martin,
Boyd, Robert Russell, St. Charles.	Minneapolis.
Cadwell, Wilfred Chauncey,	Loye, Henry Edward, Red Wing.
Le Sueur.	Lytzen, Walter William, St. Paul.
Colhoun, Allan Banatyne,	McKay, Henry Sinclair, Brainerd.
Minneapolis.	Merriam, Robert Stanley,
Curry, Duncan E. H.,	Minneapolis.
Spring Valley, Wis.	Minder, Emil George, St. James.
Field, Thorold Farrar,	Schrader, Erick Julius, St. Paul.
New York City.	Ziesmer, Ralph A., Fergus Falls.
Gulick, Hervey J., Oronoco.	

## THE SCHOOL OF CHEMISTRY

## ANALYTICAL CHEMIST—7.

Borrowman, George L., Stillwater.	Longworth, Fred James, Ortonville.
Dahlberg, Arnold V., Minneapolis.	Pennock, Edward McMaster,
Frary, Francis Cowles, Minneapolis.	Minneapolis.
Jackson, Myron Bangs, St. Paul.	Poore, Charles Delos, Bird Island.

## THE COLLEGE OF AGRICULTURE

## BACHELOR OF SCIENCE (In Agriculture)—4.

Boerner, Emil G., Buffalo.	Wilson, Archie Dell,
Jehle, Robert Andrew, St. Paul.	St. Anthony Park.
Parker, Edward C., St. Paul.	

## BACHELOR OF SCIENCE (In Forestry)—1.

Cuzner, Harold, Minneapolis.

## BACHELOR OF SCIENCE (In Home Economics)—1.

Van Slyke, Letitia A., Northfield.

## MASTER OF AGRICULTURE—2.

Gaumnitz, Daniel Asher, B. Agr.,	Swanson, C. O., LaFayette, Ind.
St. Anthony Park.	

## COLLEGE OF LAW

## MASTER OF LAWS—10.

Bruce, Olof Ludwig, LL. B.,	Olson, Hans M., LL. B.,
Minneapolis.	Minneapolis.
Burns, John A., LL. B., St. Paul.	Oppenheimer, William Henry, LL. B.,
Furber, Fred N., LL. B.,	St. Paul.
Minneapolis.	Wait, Jason E., LL. B., St. Paul.
Kercher, Alice Louise, LL. B.,	Waters, Edwin A., LL. B., St. Paul.
Minneapolis.	Wood, Benjamin William, LL. B.,
Lyche, Charles A., LL. B.,	New Richland.
Barnesville.	

## BACHELOR OF LAWS—97.

Aaker, Casper D., Ridgeway, Iowa.	Andre, Charles Johnson,
Anderson, Alvin F.,	Prairie Farm, Wis.
New Richmond, Wis.	Austin, Harry Hart, Minneapolis.
Anderson, Carl Fanny, Wheaton.	Bailey, Seavey Moor, Minneapolis.
Anderson, Don Cameron,	Baird, LaRoy, River Falls, Wis.
Minneapolis.	Barney, Harry C., Mankato.
Anderson, William Howard,	Barrows, Earle Marsh, Minneapolis.
Maple Hill, Ia.	Bartlett, Joseph B., Minneapolis.

*The University of Minnesota.*

Boo, Benjamin Carlton, Stillwater.  
 Bowe, Dennis E., Minneapolis.  
 Boyd, Leon Higginson, St. Paul.  
 Brady, Harry Louis, Blue Earth.  
 Brown, Robert Kenschaw, Janesville.  
 Burnquist, Joseph Alfred Arner,  
 Minneapolis.  
 Burns, Leo Arthur, Wells.  
 Carroll, Charles Millburn,  
 Miller, S. D.  
 Caswell, Irving Albert, Minneapolis.  
 Chase, Josiah Hook, Minneapolis.  
 Chinnock, James Thornton,  
 Portland, Ore.  
 Cotton, Isaac F., Minneapolis.  
 Couper, Walter T., Minneapolis.  
 Courtney, T. Frank, Minneapolis.  
 Courtney, Henry Alexis, Maple Plain.  
 Current, John Rees, Sleepy Eye.  
 Davies, Otto N., Winona.  
 Dieson, Elmer O., Heron Lake.  
 Drake, Benjamin, Jr., Maple Plain.  
 Eckstrom, Andrew N., St. Peter.  
 Evans, Maurice V., Mankato.  
 Fosmark, Alexander, Fergus Falls.  
 Frankel, Hiram David, St. Paul.  
 Gallagher, Michael William,  
 St. Paul.  
 Gardner, George Harold, Brainerd.  
 Gilman, Charles Lewis, St. Cloud.  
 Goldsbury, Maud, Cherokee, Ia.  
 Gregg, Kenneth Philbrick,  
 Minneapolis.  
 Hoff, Enoch Arnold, Ashby.  
 Ives, Henry Swift, St. Paul.  
 Janausek, Joseph C., Grafton, N. D.  
 Kay, Spencer Bryant, St. Paul.  
 Keith, M. R., Minneapolis.  
 LaDue, Blanche Waggoner,  
 Janesville.  
 Lamb, Manton J., Grundy Center, Ia.  
 Livesey George, St. Paul.  
 McGivern, Frank Charles,  
 Brainerd.  
 McWhorter, Harry Frank, St. Paul.  
 Manderfield, Hilger Henry, New Ulm.  
 Marshall, W. Frank, Pipestone.  
 Martin, Charles, Spring Valley, S. D.  
 Moe, Waldemar John, Minneapolis.  
 Morken, Gilbert T., Krognos.  
 Newton, Walter Hughes, Minneapolis.  
 Paddock, George Arthur,  
 Minneapolis.  
 Peter, Henry, Minneapolis.  
 Peterson, Ira Curtis, Tacoma, Wash.  
 O'Donnell, John Thomas,  
 Minneapolis.  
 O'Gorman, Thomas F., Minneapolis.  
 Osterberg, Arthur G., St. Paul.  
 Prueher, Joseph George,  
 Bloomer, Wis.  
 Randall, Clarence Brewster,  
 Hamline.  
 Ricks, William Leonidas,  
 Minneapolis.  
 Ripley, Edwin A., Oakfield, Wis.  
 Sanford, Edward, Minneapolis.  
 Sanford, Roland George, Faribault.  
 Schendel, Julius, Campbell,  
 Schweitzer, Frederick R.,  
 Alma, Wis.  
 Semling, C. Knute, Halstead.  
 Sinness, Torger,  
 Minnewaukan, N. D.  
 Smith, James LeRoy, Minneapolis.  
 Soderberg, Nathaniel F., Dawson.  
 Stamm, Albert Gottfried, St. Paul.  
 Stanbery, Ralph Stanley,  
 Mason City, Ia.  
 Steenson, Jesse G., Eden Prairie.  
 Stephens, Ralph Brown, Minneapolis.  
 Sterrett, Lillian Josepha, Minneapolis.  
 Stevens, Homer William, Loman.  
 Stoughton, Herbert Leonard,  
 Osage, Ia.  
 Stuart, Robert Kincade,  
 Minneapolis.  
 Sullivan, Dennis P., Waterville.  
 Sullivan, John Francis,  
 Cedar Rapids, Ia.  
 Swee, John Peter, Roscoe.  
 Thelen, John Nicholas, Minneapolis.  
 Thompson, Albert C., Minneapolis.  
 Thompson, Arthur McCall,  
 Minneapolis.  
 Thompson, William Edward,  
 Hastings.  
 Thoreson, Ole, Woodville, Wis.  
 Warner, Lee Frost, St. Paul.  
 Wartenbe, Charles Sumner,  
 Minneapolis.  
 White, Clyde Roy, Minneapolis.  
 Wildey, Herbert L., Minneapolis.  
 Osterberg, Arthur G.,  
 Minneapolis.  
 Williams, James Von, Marshall.  
 Willoughby, Harold Armond,  
 Colborne, Ont.  
 Zielke, John J., Oakfield, Wis.

THE DEPARTMENT OF MEDICINE

Degree of Doctor of Medicine—78.  
 College of Medicine and Surgery—74.

Alley, Albert G., Buffalo.  
 Anderson, Carl Adolph, Deer Creek.  
 Argue, Hiram S., Bathgate, N. D.  
 Aronsohn, David M., St. Paul.  
 Arneberg, John G.,  
 Grand Forks, N. D.  
 Hammerel, Ambrose Louis,  
 Minneapolis.  
 Haugen, Gilbert, Maynard.  
 Holland, John William,  
 Minneapolis.

- Arzt, Phillip Garfield, St. Paul.  
 Austin, Wilford J., Milbank, S. D.  
 Benoit, Frank Tancrede, Crookston.  
 Benson, Oscar Theodor, Appleton.  
 Brandt, Albert Mortimer, Forest City.  
 Branton, Berton Jay, Minneapolis.  
 Brigham, Frank T., St. Cloud.  
 Brown, Paul F., Pipestone.  
 Brush, Fred Heman, Amboy.  
 Bryant, Oliver R., Minneapolis.  
 Burns, Robert Michael, St. Paul.  
 Campbell, Daniel Ray, St. Paul.  
 Campbell, Robert Wilson, Tracy.  
 Chambers, Winslow C., Owatonna.  
 Chase, E. Frank, Greeley, Ia.  
 Dawson, Albert M., Minneapolis.  
 Durand, Jay Isaac, Crookston.  
 Dyar, Burt Alvano, St. Charles.  
 Frasier, George Wellington, Minneapolis.  
 Freeman, George Herman, Hector.  
 Gans, Edward Mathias, St. Cloud.  
 Gauger, Edward C., St. Paul.  
 Goehrs, Henry William, Minneapolis.  
 Griffin, Miriam E., St.  
 Hendrickson John Frederick, Montevideo.  
 Hilger, Andrew William, St. Paul.  
 Hilger, David Daniel, St. Paul.  
 Jacobs, Johannes C., Spicer.  
 Jacobson, Leonard Harold, Luverne.  
 James, Ralph Chamberlain, Mankato.  
 Johnson, Nimrod Augustus, Winthrop.  
 Johnson, Oscar V., Carver.  
 Kane, Joseph P., Minneapolis.  
 Kelly, Severin Mathias, Madelia.  
 Kibbe, Orel Anson, Hampton, Ia.  
 Klein, Henry N., St. Paul.  
 Kranz, Martin, Lake Crystal.  
 Kuhlmann, August, Melrose.  
 Lynde, Roy, Ellendale, N. D.  
 Maschger, Albert Panchot, St. Paul.  
 Mathieu, Albert Louis, Faribault.  
 Matthews, Justus A., Ortonville.  
 Meyer, Ette Lawrence, Minneapolis.  
 Morrill, Robert Allen, Byron.  
 Nessa, N. J. Mabel, Minneapolis.  
 Nicholson, Elmer Joseph, Strout.  
 Nickerson, Winfield S., Minneapolis.  
 Nyquist, Jacob Erik, St. Paul.  
 Parsons, George Earl, Elk River.  
 Pearce, Nay Osborne, Duluth.  
 Peterson, Olaus Lewis, Cokato.  
 Porter, Oliver M., Willmar.  
 Ramaley, Louis, St. Paul.  
 Reynolds, James S., New Hampton, Ia.  
 Richmond, Charles Daniel, Windom.  
 Rogers, James Lee, Minneapolis.  
 Rothschild, Harold Jay, St. Paul.  
 Rosseau, Victor, French Lake.  
 Smith, Arthur Edward, Minneapolis.  
 Smith, Frank Dale, Rochester.  
 Sogge, Ludwig L., Jackson.  
 Thompson, Albert, Sacred Heart.  
 Trutna, Thomas J., Silver Lake.  
 Tuohy, Edward L., Chatfield.  
 Weishaar, Charles Henry, Osseo.  
 Will, William Wallace, Mapleton.

## COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY—4.

- Ballou, Harry Burchard, Minneapolis.  
 Jordan, Michael Matthew, Wayzata.  
 King, Herbert Volney, St. Paul.  
 Waller, Joseph Dawes, Minneapolis.



## THE COLLEGE OF DENTISTRY

## DOCTOR OF DENTAL SURGERY—52.

- Baker, Henry W., Wells.  
 Bancroft, Merton Eugene,  
     Delton, Wis.  
 Barton, Harry Elijah, Flint, Mich.  
 Bennett, Charles Edward,  
     Granite Falls.  
 Bittner, Arthur Hugo, St. Peter.  
 Borgendale, Edward,  
     Lac Qui Parle.  
 Bowe, John Francis, Waseca.  
 Brastad, Olaf William,  
     Minneapolis.  
 Brown, Thomas Andrew,  
     Lake City.  
 Bugbee, Clyde S., Minneapolis.  
 Burgan, Frederick Preston,  
     Minneapolis.  
 Burt, Leonard Henry, Chokio.  
 Carr, Alvin Eugene, Minneapolis.  
 Casselman, Don, Tracy.  
 Corson, Walter Hartley, Ada.  
 Curtin, James, Henderson.  
 Deering, Joseph William,  
     West Superior, Wis.  
 Ditmarsen, John E., Irving.  
 Doyle, Milo Hayden,  
     Winnebago City.  
 Foster, Charles White, St. Paul.  
 Gillam, Clarence Gifford, Windom.  
 Hamlon, Chauncy Wilford,  
     Jackson.  
 Hanson, Henry Alexander,  
     Fergus Falls.  
 Ihle, Edward Anthony,  
     Eau Claire, Wis.  
 Ingalls, Raymond Eugene, St. Paul.
- Johnson, Alfred C., Winthrop.  
 Kubat, William, Blooming Prairie.  
 LaDue, Thomas Irving, Fertile.  
 Lukkason, Joseph, Bratsburg.  
 Lyon, Harry David, Minneapolis.  
 Maves, Herman Albert, St. Peter.  
 McIntyre, Ralph Emerson,  
     River Falls, Wis.  
 Miller, Charles Warren, St. Peter.  
 Moran, M. A., Pine Island.  
 Moskau, Gilbert, Mayville, N. D.  
 Nelson, Charles, Glencoe.  
 Nelson, Elof, Amor.  
 Newgord, Harry Clarence,  
     Minneapolis.  
 Olsen, Theodore J., Minneapolis.  
 Porter, Harold Ferdinand, Willmar.  
 Putney, Charles A., Moorhead.  
 Remele, Henry William,  
     Sleepy Eye.  
 Sheehan, Thomas V., Minneapolis.  
 Shellman, Joseph Frederick,  
     Fergus Falls.  
 Staples, Forest Edward,  
     Howard Lake.  
 Strang, Cassius Clinton, Duluth.  
 Sweeney, Eugene Sylvester,  
     Garfield.  
 Taylor, William Knox,  
     Minneapolis.  
 Vandersaal, William, Pomeroy, Pa.  
 Wallace, Robert, Minneapolis.  
 White, Frank Denton,  
     Minneapolis.  
 Youngberg, Everett LeRoy,  
     Cannon Falls.

## COLLEGE OF PHARMACY.

## PHARMACEUTICAL CHEMIST—16.

- Adams, Carleton C., Elgin.  
 Bowman, Edgar Sheldon,  
     Hawleyville, Ia.  
 Chelgren, Victor D. E.,  
     Cannon Falls.  
 Crowe, John William,  
     Clermont, Ia.  
 Essen, Anton Ernst, Renville.  
 Foote, Florence May,  
     Cumberland, Wis.  
 Haines, George Edmond,  
     New Paynesville.
- Herbert, Luther Miner,  
     Sauk Center.  
 Hoffman, Edward Louis,  
     Rochester.  
 Jones, William Mulford,  
     Spencer, Iowa.  
 Lyders, Edward O., Sacred Heart.  
 Mueller, Albert Herman,  
     Springfield.  
 Ostrander, Arthur Beach, Wadena.  
 Phelps, Alvah Gilbert, Minneapolis.  
 Robitshek, Irving H., Minneapolis.  
 Vaughn, Patrick H., Morris.

X  
STUDENTS

# Students

## GRADUATE SCHOOL, 110.

- Adams, Cynthia.  
Anderson, P. J.,  
Andrews, S. W.,  
Balrd, Roy,  
Bass, Lillian.  
Bates, Wm. Earl, L. L. M.,  
Beeler, L. H., M. A.,  
Beggs, Mr.  
Bell, Elizabeth, M. A.,  
Bell, Margaret G.,  
Brooke, Helen M. A.,  
Brooke, W. E.,  
Brady, Eva W., M. A.,  
Brown, C. W.,  
Buenger, Theodore,  
Butters, Fred K.,  
Burrill, P. C.,  
Byrnes, Mary,  
Carlson, Philip,  
Cheyney Edward,  
Conway Estelle, M. A.,  
Cooper, W. T.,  
Dalaker, H. H.,
- Denegre, James D.,  
Ellinger, George H.,  
Erickson, H. A.,
- Faunce, Carroll, M. A.,  
Fisher, Jas.,  
Frary, Francis C., M. S.,  
Fugleskjel, O. O., M. A.,  
Funk, Henry D. M. A.,  
Gates, F. W.,  
Gaumnitz, Daniel, M. Agr  
Goldman, Sara,  
Graves, Ethel,  
Griggs, Robt., M. A.  
Grimsby, W. H., Ph. D.,  
Hall, Jennie,  
Hanson, Peter,  
Harholdt, Marie, M. A.,  
Hayward, Thomas E.,  
Harrington, Miss,  
Harvey, Elizabeth, M. A.,  
Hatton, R.,  
Hendrickson, H. N., M. A.  
Henry, Laura,  
Herman, Arthur L.,  
Hohn, C. G.,
- Holmstedt, Victor,  
Huff, Ned, M. A.,  
Kovarik, A.,
- Love, Harry D., M. A.,
- Geology and Mineralogy.  
German.  
Elec. Measure. of Precision.  
Law.  
French, English, Greek.  
Law.  
Political Science.  
Greek.  
Philology, English.  
German.  
German.  
Theoretical Mech. and Math. Physics.  
History.  
Physics.  
Greek, Latin.  
Geology and Mineralogy.  
Physics, Astronomy, German.  
History.  
Political Science.  
Forestry, English, German.  
German, History.  
History.  
Astronomy, Theor. Mechanics and  
Math. Physics.  
Law.  
German.  
Physics, Astronomy, Theoretical Me-  
chanics and Math. Physics.  
German.  
Chemistry, Physics.  
Electro Chemistry.  
Scandinavian.  
History, Philology.  
Astronomy.  
Botany, Agriculture.  
History.  
History.  
Geology and Mineralogy.  
Scandinavian, History.  
German, Geology and Mineralogy.  
Sociology, Mun. Govt., R. R. Transp.  
Philology, German.  
German.  
Latin.  
Philosophy and Psychology.  
Economics, Political Science.  
Latin, Pedagogy.  
German.  
Law.  
Economics, Political Science,  
Philology.  
History.  
Geology and Mineralogy, German.  
Theor. Mechanics and Math. Physics.  
Astronomy, Physics.  
German, Latin, Greek.

McCurdy, Pearl,	Electrical engineering.
McClintock, W. M.,	Latin.
McLaughlin, Eliz.,	History.
McElmeel, B. C.,	History.
McKey, Jos. A., M. A.,	English, French, German.
Magnusson, Leifer, M. A.,	French.
Maley, Linda,	History.
Mattson, Rev., P., Ph. D.,	Scandinavian.
Mehan, James E.,	Law.
Melby, Gustav, M. A.,	Scand., Philology. Semitic Lang
Melom, Carl,	French.
Mercer, Hugh V.,	Law.
Middleton, Miss, M. A.,	Spanish, French.
Miller, F. C. Ph. D.	Pol. Sci., Hist., Geol.
Moore, Albert R.,	Law.
Moore, Edith, M. A.,	History.
Myron, O. C., M. A.,	Philosophy and Psychology, History.
Nelson, E. A.,	History.
Nixon, Lillian M. A.,	French.
Northrop, Jessie,	History.
Oglevee, Nannie G.,	German.
Olds, Bessie,	Drawing Design.
Oleson, Peter, M. A.,	German, History.
Orsborn, H. E.,	Geology.
Osterberg, Arthur G.,	Law.
Peabody, Eunice,	Philosophy and Psychology.
Pehcushek, Charles,	German.
Peterson, G. A., Ph. D.,	Philology, Scand.
Potter, Frances S.,	French.
Random, Gilbert R.,	Physics.
Rechert, Rev. C.,	Political Science
Riece, A. A.,	History, German.
Ringstad, Edw., C., M. A.,	Scandinavian, Philology.
Rollefson, Edw., M. A.,	German.
Safstrom, John,	Philosophy and Psychology.
Sandvall, Ruth, M. A.,	Latin, Greek, German.
Severson, Sam,	Philosophy and Psychology.
Sheldon, Eleanor,	German.
Shellenberger Emma,	History, French.
Shimizu, Tomesabura,	Law.
Shumway, R. R.,	Theor. Mechanics and Math. Physics.
Skinner, S. A., M. A.,	Botany, Zoology, Chemistry.
Smith John W.,	Law.
Stevens, Homer Wm,	Law.
Stuart, Robert Kincade,	Law.
Swanson, Anna, M. A.,	Philology.
Thompson, Eva,	History, Geology and Mineralogy.
Thompson, Wm. E.,	Law.
Thorson, N. Anton,	German.
Truesdell, W. H., M. S.,	Geology and Mineralogy.
Tucker, Florence,	German, Latin.
Urseth H. A., M. A.,	Philology.
Warrington, Helen, M. A.,	German, History
West, Ruth,	German, History
Wilhoit, A. D., M. A.	Chemistry, Metallurgy.
Willis, Hugh E.,	Law.
Yardley Mary, M. A.,	German, Latin.
Zeleny, A., Ph. D.,	Theoretical Mech. and Math. Physics.

## THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

### SENIORS—222.

Abbott, Jessie, Minneapolis.	Atterbury, Marie, Anoka.
Aldrich, Alma, Minneapolis.	Austin, Hattie, Minneapolis.
Anderson, Adolph A.	Aygarn, Magnus, Choice.
Langford, S. D.	Bachtle, Carrie A., Mapleton.

- Baier, Florence Jeanette,** Minneapolis.  
**Ball, Frank Morris,** Minneapolis.  
**Barnes, Arthur R.,** Campbell.  
**Barquist, Elsie,** Minneapolis.  
**Barrows, Vera,** Minneapolis.  
**Bergstrom, Walter,** Minneapolis.  
**Beyer, Wilhelmina S. C. St. Paul.**  
**Blasdel, Eva M.,** Minneapolis.  
**Blekre, Julia,** Minneapolis.  
**Bliss, Maude Stewart,** Minneapolis.  
**Bonsteel, Belle V.,** Minneapolis.  
**Bowne, Gertrude, Sheldon,** Iowa.  
**Broberg, Martha,** New London.  
**Buenger, Theodore,** St. Paul.  
**Bullard, Marjorie,** St. Paul.  
**Bullard, Polly Caroline,** St. Paul.  
**Bullock, Bernice V.,** Minneapolis.  
**Burgess, Florence,** Minneapolis.  
**Burwell, Louise,** Minnetonka.  
**Card, Evelyn May,** Minneapolis.  
**Campbell, Georgina,** Princeton.  
**Carlson, Philip E.,** Cannon Falls.  
**Castor, Florence,** Waseca.  
**Christianson, Theo.,** Dawson.  
**Chase, Van R.,** Minneapolis.  
**Clarke, Stephens G.,** Stillwater.  
**Clutter, Guy, E.,** Anoka, Minn.  
**Cockburn, Ethel C.,** Minneapolis.  
**Constantine, Earl G.,** St. Paul.  
**Crogan, Ida,** Minneapolis.  
**Crooks, Harriet M.,** St. Paul.  
**Currer, Alice I.,** LeSueur.  
**Dansingberg, Paul,** Minneapolis.  
**Davidson, Raymond G.,** Minneapolis.  
**Dawson, Jennie,** Minneapolis.  
**Dawson, William,** St. Paul.  
**Dickinson, Florence A. St. Paul.**  
**Diether, Mary,** St. Paul.  
**Dolan, Francis M.,** St. Paul.  
**Dunn, Isabel S.,** Minneapolis.  
**Earl, Geo. A.,** Minneapolis.  
**Eastburg, Luther J.,** Minneapolis.  
**Elliott, Nellie,** Fergus Falls.  
**Everhard, Frank T.,** Minneapolis.  
**Feller, Elizabeth,** St. Paul.  
**Fitzgerald, Sadie M.,** Minneapolis.  
**Flegelman, Fannie,** Minneapolis.  
**Flinders, O. B.,** Sutherland, Ia.  
**Frisbee, Willis H.,** Sheldon, Ia.  
**Funk, Anna,** Minneapolis.  
**Garbett, Edith May,** Minneapolis.  
**Geary, Mollie,** St. Paul.  
**Goff, Mary C.,** Minneapolis.  
**Goldman, Sarah M.,** St. Paul.  
**Goodrich, Mabel,** Anoka.  
**Gordon, Mildred,** Minneapolis.  
**Gove, Helen R.,** Minneapolis.  
**Graves, Maud,** Minneapolis.  
**Greaves, Edna L.,** Glencoe.  
**Greaves, Glenn H.,** Glencoe.  
**Greene, Elizabeth,** Sheldon, N. D.  
**Griebenow, Frederick F.,** Alexandria.  
**Grygla, Grace,** Minneapolis.  
**Hagen, Harriet,** Minneapolis.  
**Halverson, John O.,** Madelia.  
**Hanson, Tillie,** Alden.  
**Hanson, Verna M.,** Rochester.  
**Hatch, Elizabeth, La. Mollie.**  
**Haynes, Ruth,** Minneapolis.  
**Hazzard, Martha,** Minneapolis.  
**Hellman, Ernest,** Redwood Falls.  
**Heily, P. R.,** Graceville.  
**Hellberg, Charles F.,** Owatonna.  
**Herum, Bertha,** Hudson, Wis.  
**Heyd, Nellie C.,** St. Paul.  
**Hill, Jessie B.,** Minneapolis.  
**Holway, Ruth,** Minneapolis.  
**Horn, Jessie,** Minneapolis.  
**Hubbard, Helen,** Lake Elmo.  
**Hudson, Irving,** Benson.  
**Huelster, Luella,** St. Paul.  
**Huelster, Mildred E.,** St. Paul.  
**Hunter, Eva,** Anoka.  
**Hunter, Mildred,** Tracy.  
**Huxley, Fred R.,** Minneapolis.  
**Huyck, Ethel,** Minneapolis.  
**Irmen, Louise,** Minneapolis.  
**Ives, Mary,** Minneapolis.  
**Jackson, Genevieve,** Minneapolis.  
**Johnson, Charles E.,** Minneapolis.  
**Johnson, Edward,** New Richland.  
**Johnson, Ida A.,** Minneapolis.  
**Jones, D. M.,** Wabasha.  
**Jordan, Lois M.,** Minneapolis.  
**Kaercher, Minnie,** Minneapolis.  
**Kaull, Hazel,** Redfield, S. D.  
**Kinnard, Blanche,** Minneapolis.  
**Knowlton, Anna,** St. James.  
**Koch, Albert C.,** Minneapolis.  
**Kramer, Arrol O.,** Preston.  
**Kummerer, Hettie,** Minneapolis.  
**LaGrange, Myron H.,** Minneapolis.  
**Lamphere, Adelaide,** St. Paul.  
**Larson, Lewis,** Atwater.  
**Lauderdale, Hazel,** Minneapolis.  
**Leonard, Elsie P.,** Minneapolis.  
**Lester, Horace,** Minneapolis.  
**Lewis, Lucretia,** Cannon Falls.  
**Linkfield, Edith,** Minneapolis.  
**Litowitz, Anna,** Minneapolis.  
**Lockerby, Avis,** Minneapolis.  
**Loe, Eliza,** Minneapolis.  
**McIntyre, Ethel,** Minneapolis.  
**Mackall, H. C.,** Minneapolis.  
**McMillan, Corinne,** Minneapolis.  
**Markus, Leola,** Duluth.  
**Martinson, Ida,** Maynard.  
**Marvin, Adelaide,** Pine Island.  
**Marvin, Hattie E.,** Zumbrota.  
**Mason, Kittybelle,** Minneapolis.  
**Millar, Catherine,** Minneapolis.  
**Millisack, Roy S.,** Minneapolis.  
**Miner, Claude,** Blue Earth.  
**Moe, Carl H.,** Minneapolis.  
**Moran, Sarsfield G.,** Graceville.  
**Moreland, Marie,** St. Paul.  
**Morris, Alice,** Minneapolis.  
**Morse, Guy M.,** Minneapolis.  
**Nebbergall, J. Z.,** Sioux Falls, S. I.  
**Nellson, Clarence,** Minneapolis.  
**Nelson, Clara,** Litchfield.  
**Neumann, Wilhelmina,** Little Falls.

Newkirk, Iris B., Minneapolis.  
 Newton, Fay, St. Paul.  
 Nyquist, Anna, Eagle Lake.  
 Okkelberg, Peter, Goodhue.  
 Olson, Theresa, Minneapolis.  
 Organ, Mary, Minneapolis.  
 Palmer, Ethel, Minneapolis.  
 Palmstron., Florence, Hastings.  
 Papst, Grace, Minneapolis.  
 Partridge, Jarvis, Grand Rapids.  
 Pattee, Sidnee, Minneapolis.  
 Patterson, M. Irene, St. Paul.  
 Payne, Fred W., Lakefield.  
 Peterson, Art. L., Benson.  
 Pettijohn, Earle, St. Paul.  
 Phillips, Ruby, Minneapolis.  
 Pihlgren, Martin, Harris.  
 Pomeroy, Alice, Minneapolis.  
 Putnam, Fred W., Red Wing.  
 Radcliffe, Irene, Minneapolis.  
 Rahlie, Florence, Minneapolis.  
 Reed, Edith, Minneapolis.  
 Ripley, Emma D., Minneapolis.  
 Rowe, Wm. H., Minneapolis.  
 Ruble, Harry E., St. Peter.  
 Running, Albert, St. James.  
 Ruscoe, Ella C., Minneapolis.  
 Sanborn, Charlotte, Minneapolis.  
 Schaefer, Will C., St. Paul.  
 Schnell, Eleonora, St. Charles.  
 Schoch, Alice B., St. Paul.  
 Sewall, Harriet, St. Paul.  
 Sinclair, Arthur, Minneapolis.  
 Sinclair, John F., Minneapolis.  
 Slaven, Estella, Austin.  
 Smith, Carroll N., Minneapolis.  
 Smith, Helen, Minneapolis.  
 Smith, Pearl, Minneapolis.  
 Smith, Roy H., Shakopee.  
 Spence, Effie, Harman.  
 Spooner, Paul, Morris.  
 Stakman, Elvin, Brownston.  
 Stephan, Verene, Egin.

Stewart, Alice, Mankato.  
 Stewart, Mark, Mabel.  
 Stocking, Mabelle, Minneapolis.  
 Stratton, Paul D., Granite Falls.  
 Stroud, Arthur, Mabel.  
 Sublette, Io, Minneapolis.  
 Sundt, Mathias, Minneapolis.  
 Sutton, Chas. S., Prior Lake.  
 Swanson, Elaine, Minneapolis.  
 Taney, Katherine, St. Paul.  
 Taylor, Kenneth, St. Paul.  
 Tennon, Agnes, Monticello.  
 Thompson, Alice, Minneapolis.  
 Thompson, Antoinette, Minneapolis.  
 Thompson, C. R., Minneapolis.  
 Thompson, Gladys, Minneapolis.  
 Thompson, Nellie, Minneapolis.  
 Thompson, Stuart, Minneapolis.  
 Tierney, Charles, Farmington.  
 Tillotson, Mary, Moorhead.  
 Tressman, Conrad, Mayer.  
 Troutfether, A., Windom.  
 Truesdell, Eloise, Minneapolis.  
 Tucker, Bessie, Minneapolis.  
 Utley, Lillian E., Preston.  
 Vallentyne, Lydia, Minneapolis.  
 Van Bergen, Hattie, Minneapolis.  
 Van Rickley, Nellie, Minneapolis.  
 Vickery, Roy, Minneapolis.  
 Ward, Hazel, Glenwood.  
 Watson, Agnes, St. Paul.  
 Way, Lucile, Minneapolis.  
 West, Rodney M., Minneapolis.  
 Weum, Anna, Minneapolis.  
 Wheeler, Mabel, Minneapolis.  
 Whitcomb, Esther, Atwater.  
 Whitney, Anna M., Rochester.  
 Williams, Vesta, Brooklyn Center.  
 Wilson, John J., Minneapolis.  
 Wiseman, Lucy, Pine City.  
 Yeager, Floyd, Minneapolis.  
 Young, Hattie, St. Paul.

## Juniors—269.

Albrecht, Lella H., Minneapolis.  
 Anderson, Ella M., Hibbing.  
 Atwater, Florence Fay, St. Paul.  
 Babcock, Donald C.,  
 Grand Forks, N. D.  
 Bacon, Lora D., Minneapolis.  
 Bahr, Arnold C., Waseca.  
 Barnes, Katherine, Minneapolis.  
 Barrett, Edith M., Stillwater.  
 Bearnse, Clara H., Minneapolis.  
 Bearnse, Julia G., Minneapolis.  
 Berger, Edla G., St. Anthony Park.  
 Berget, Herman, Boyd.  
 Bicknell, Blanche L., Minneapolis.  
 Blackburn, Nathan B.,  
 Salem, Mass.  
 Blegen, Carl W., Minneapolis.  
 Bliss, Margaret S., Minneapolis.  
 Bogart, Madge T., Mound.  
 Bowler, Edna B., Minneapolis.

Brackett, Alice R., Minneapolis.  
 Brooberg, Ethel S., Minneapolis.  
 Brooks, Pearl M., Minneapolis.  
 Brown, Montreville J., Minneapolis.  
 Burgan, Essie M., Minneapolis.  
 Burton, Buelah I., Minneapolis.  
 Bush, Ethel E., Minneapolis.  
 Butler, Anna, Minneapolis.  
 Bush, Carrie, Minneapolis.  
 Butler, Marietta, Minneapolis.  
 Calhoun, Frederic D., Minneapolis.  
 Campbell, Alma B., Minneapolis.  
 Campbell, Anna J., Hopkins.  
 Campbell, Carl G., Burkeville, Va.  
 Carleton, Henry G., Minneapolis.  
 Casey, Martin J., Jordan.  
 Chadwick, Eugene E.,  
 LeSueur Center.  
 Chamberlain, Frances,  
 Minneapolis.

- Chapman, Emily K.,  
Sioux Falls, S. D.
- Clark, F., Mildred, Minneapolis.  
Clark, William G., Minneapolis.  
Coapman, Wall G., Columbus, Wis.  
Cockburn, Edna G., Minneapolis.  
Cograve, Pansy B., Minneapolis.  
Cole, Vera V., Minneapolis.  
Cooper, Florence, Minneapolis.  
Cooper, Helen, Mankato.  
Copley, Mary E., St. Paul.  
Cox, Ella G., Cloquet.  
Cressy, Earl H., Minneapolis.  
Crossman, Rose A., Minneapolis.  
Crounse, Agnes R., Minneapolis.  
Dahl, Anna D., Minneapolis.  
Dahlberg, Effie H., Minneapolis.  
Dart, Izella M., Litchfield.  
Dart, Raymond, Litchfield.  
DeVeau, Katherine L., Minneapolis.  
Dewart, Richard H.,  
St. Thomas, N. D.
- Dickinson, Grace, Buffalo.  
Diether, Althea, St. Paul.  
Donovan, Kathrynne, Clontarf.  
Dowdall, Augustus S., Minneapolis.  
Dunn, M. Irene, St. Cloud.  
Dyar, Ralph E., Winona.  
Fostberg, Luther J., Bird Island.  
Haston, Dana M., Warren.  
Ebert, Michael H., Glencoe.  
Eichholzer, Rupert, Owatonna.  
Ellefson, Elven T., Jackson.  
Ellison, Culver, Minneapolis.  
Elmer, Edna, Minneapolis.  
Engdahl, J. Louis, Minneapolis.  
Enright, Mollie C., St. Paul.  
Erwin, May, St. Paul.  
Evans, Gertrude S.,  
Miles City, Mont.
- Fairfield, Elizabeth P., Minneapolis.  
Frey, Bernice V., Minneapolis.  
Frye, Lucius A., St. Paul.  
Gallup, Helen T., St. Cloud.  
Garrison, Oliver E., St. Paul.  
Gaus, Mildred B., Minneapolis.  
Gee, Gertrude L., Monticello.  
Gibbs, Mabel H., Waterville.  
Gleason, John L., Minneapolis.  
Gleason, Mary F., Minneapolis.  
Gould, Edna H., Minneapolis.  
Green, Elberta, Minneapolis.  
Gregg, Mabel, Minneapolis.  
Griegs, Richard L., Virginia.  
Grime, Florence L., Minneapolis.  
Grindeland, Clarice, Warren.  
Guthrie, Florence K.,  
Blooming Prairie.
- Hall, Edward S., Red Wing.  
Hall, Orrin I., Zumbrota.  
Hammond, Lola, Minneapolis.  
Hansen, Mabel J., Alden.  
Hare, Howard M., Minneapolis.  
Hartgering, Constance,  
Rapid City, S. D.
- Hartson, Daisy J., Minneapolis.  
Hathorn, Irma, Minneapolis.  
Heffner, Corinne, Minneapolis.  
Heffron, Gussie B., Bemidji.
- Helson, Mary C., St. Paul.  
Hicks, Frances, St. Paul.  
Higbee, Marie A., Minneapolis.  
Higgins, Adele L., Minneapolis.  
Higgins, Fannie, Minneapolis.  
Hill, Helen, St. Cloud.  
Hill, Louise, Minneapolis.  
Hill, Ruth H., Minneapolis.  
Hille, Clara E., Fergus Falls.  
Hills, Minnie L., St. Paul.  
Hodgson, Frank C., Minneapolis.  
Hofflin, Florence L., Hopkins.  
Honnold, John G., LeMars, Ia.  
Hubbard, Dorothy B., Lake Elmo.  
Hubbard, William A., Minneapolis.  
Huntley, Earl W., Spring Valley.  
Jaquess, Agnes, Minneapolis.  
Jedlicka, Alex I., Vesta.  
Jefferson, Charlotte C.,  
Bingham Lake.
- Johnson, Annie M., Minneapolis.  
Johnson, Ida A., Rochester.  
Johnson, Maud V., Minneapolis.  
Jones, Myrtle M., Minneapolis.  
Josephson, Chester A., Red Wing.  
Kampf, Viola M., Minneapolis.  
Keating, Monica C., St. Paul.  
Kelley, Esther B., St. Paul.  
Kiehle, Edith B., Minneapolis.  
Kjelland, Andrew A., Rushford.  
Knappen, Elizabeth E., Minneapolis.  
Knoblauch, Louise, Minneapolis.  
Kremer, Ada A., Grand Rapids.  
Kremer, J. E., Winona.  
Kutnewsky, Walter K.,  
Redfield, S. D.
- La Due, Eva, Minneapolis.  
Lagerstedt, Albert, Gibbon.  
Lane, Cora M., Minneapolis.  
Latimer, Homer B., Minneapolis.  
Lee, Oliver J., Clarkfield.
- Linder, Lotta E., Mankato.  
Loftus, Mary F., Minneapolis.  
Loomis, Floyd S., Owatonna.  
Lovell, Helen S., Minneapolis.  
Low, Lois R., St. Paul.  
Lydiard, Eva A., Long Lake.  
Lyon, Frank S., Minneapolis.  
McCauley, Ethel N.,  
McCauleyville.
- McDonald, May C., Minneapolis.  
McGregor, May, Minneapolis.  
McKay, Natalie R., Brownton.  
McLennan, Winnifred G.,  
Crookston.
- McPartlin, Ellen E., Glencoe.  
Marchant, Lura E., Minneapolis.  
Marsh, Elizabeth, Stillwater.  
Marshall, Sara, Minneapolis.  
Mason, Adelaide E., Pine Island.  
Matcham, Roy W., Minneapolis.  
Maynard, Pearl, Long Prairie.  
Meyer, Mrs. Ethel M., Minneapolis.  
Miller, Harry H., Grove City.
- Miller, Margaret C., Sheldon, Ia.  
Misz, Alice M., St. Paul.  
Michener, Carroll K., Spring Valley.  
Monette, Mabelle S., Minneapolis.

- Moore, Harriet D., St. Paul.  
 Moran, Sadie V., Graceville.  
 Morris, William B., Winona.  
 Moulton, Dora H., Dawson.  
 Moulton, Roy J., Dawson.  
 Muir, Robert W., Hunter, S. D.  
 Nelson, Hattie R., Minneapolis.  
 Nesta, Elmira, Minneapolis.  
 Newell, Agnes F., Morris.  
 Oakes, Reuben W., Worthington.  
 Oliver, Amy S., Eau Claire, Wis.  
 O'Neill, Edward J., Graceville.  
 Palmer, Rilla Wood, St. Paul.  
 Pederson, I. Alice, Rothsay.  
 Perkins, Claude C., Pine Island.  
 Peterson, Adolphus, Minneapolis.  
 Peterson, Annie, Minneapolis.  
 Peterson, Cora A., Elbow Lake.  
 Phelps, Aura, Minneapolis.  
 Phelps, Edith M., Minneapolis.  
 Pihlgren, Martin, Minneapolis.  
 Pitts, Clara P., Alton, Ia.  
 Plummer, Lillian, Minneapolis.  
 Pohlman, Edward J., Minneapolis.  
 Poppe, Walter H., Minneapolis.  
 Powell, Archie O., St. Paul.  
 Powell, Frederick C., St. Paul.  
 Powers, Mary N., Granite Falls.  
 Preston, Sara, Minneapolis.  
 Quackenbush, Harry C.,  
     West Concord.  
 Randall, Claude D., Minneapolis.  
 Randall, Harry L., Minneapolis.  
 Reed, Fred E., Decorah, Ia.  
 Rich, Elizabeth, Minneapolis.  
 Rittle, Rose D., St. Paul.  
 Robertson, Alvin J., Sleepy Eye.  
 Rockwood, Ethel, Minneapolis.  
 Ross, Clara E., Springfield.  
 Rossman, Arthur G., St. Paul.  
 Rossman, Claude W., Minneapolis.  
 Roth, Margaretta E., Robbinsdale.  
 Runey, Madge, Minneapolis.  
 Ryan, Anna C., St. Paul.  
 Ryan, Margaret A., Duluth.  
 Sachs, Gustav M., New Prague.  
 Sage, L. C., Dennison, Ia.  
 Sahlbom, Eureka, Worthington.  
 Sanborn, Lottie E., Minneapolis.  
 Schaller, Rose Marie, Hastings.  
 Schmitt, Lillian, Mankato.  
 Schuknecht, John R., Minneapolis.  
 Schummers, Will A., Caledonia.  
 Schuyler, Florence T.,
- Siebke, George B., Beaver Falls.  
 Skinner, Frances E., Minneapolis.  
 Smith, Carrie H., Minneapolis.  
 Smith, Daniel D., Cleveland, N. D.  
 Smith, Grace I., Minneapolis.  
 Smith, Irene, Miles City, Mont.  
 Smith, Irma P., Minneapolis.  
 Solie, Simon, Delavan.  
 Sparks, Hannah D., Minneapolis.  
 Spooner, Ethel B., Minneapolis.  
 Stamm, Frieda L., St. Paul.  
 Starrett, Edward C., Minneapolis.  
 Stanley, Charles P., Waupaca, Wis.  
 Stebbins, Mary S., Minneapolis.  
 Stenberg, Theodore T., Ormsby.  
 Stevens, Charlotte I., Minneapolis.  
 Stevens, Helen, Minneapolis.  
 Stinchfield, Minnie, Rochester.  
 Stinson, Blanch, Sheldon, Ia.  
 Swenson, Edward F., Luverne.  
 Swenson, Freda E., St. Paul.  
 Swenson, Sabra S., New London.  
 Swenson, Swen W., Minneapolis.  
 Switzer, Harriet P., Minneapolis.  
 Switzer, Mabel E., Minneapolis.  
 Taafe, Agnes K., Minneapolis.  
 Taft, Wilbur R., Monticello.  
 Theisen, Elnora B., Minneapolis.  
 Tomlinson, Mary, Le Sueur.  
 Towler, Edna E., Minneapolis.  
 Trepp, David M., Lewiston, Mont.  
 Triefloff, Alma J., Carver.  
 Tubbs, Florence M., Minneapolis.  
 Vance, Marjorie E., Minneapolis.  
 Walker Adele F., Minneapolis.  
 Wallace, Edna V., Minneapolis.  
 Wallace, Jennie E., Humbolt, Ia.  
 Walston, Genevieve, Minneapolis.  
 Watson, Emma L., St. Paul.  
 Watts, James T., Mankato.  
 Weltzel, Grace E., Minneapolis.  
 Wennerlund, Camilla, Willmar.  
 West, Margaret, Minneapolis.  
 White, Grant, Luverne.  
 Whitney, Helen, Minneapolis.  
 Wilk, Jacob, Minneapolis.  
 Williams, Anna E., St. Paul.  
 Williams, Geo. E., Randolph, Wis.  
 Williams, Gertrude H.,  
     Minneapolis.  
 Wilson, Ruth E., Minneapolis.  
 Woodward, Clara E., St. Paul Park.  
 Yager, Mary, Minneapolis.

## Sophomore Class—285.

- Amble, Florence L., Minneapolis.  
 Applebee, Inez A., Anoka.  
 Armstrong, Mary E., Minneapolis.  
 Aygarn, Edwin, Choice.  
 Aylmer, Albert R., Baltimore, Md.  
 Balley, Katherine D., Minneapolis.  
 Barber, Marion L., Minneapolis.  
 Bardwell, Elmer E., Excelsior.  
 Beckman, Emma A., Minneapolis.
- Bedford, Clayton D., Rushmore.  
 Benz, Laura, St. Paul.  
 Berg, Mrs. Ingborg, Minneapolis.  
 Best, Emir, Minneapolis.  
 Bicknell, George J., Minneapolis.  
 Billings, Vera D., St. Paul.  
 Blanchard, Naneen M., St. Paul.  
 Bland, Guy C., Anoka.  
 Blanding, Ethel H., Detroit.



- Blossom, Nina M., St. Paul.  
 Breen, Elizabeth M., St. Paul.  
 Brewster, Grace, Mankato.  
 Brock, Emma L., St. Paul.  
 Broom, Edna M., Minneapolis.  
 Brown, Mildred, Minneapolis.  
 Bruckholtz, Elizabeth C., Minneapolis.  
 Buchanan, Margaret McD., Minneapolis.  
 Bush, Maude G., Minneapolis.  
 Cannon, R. Cassius, Watertown, S. D.  
 Casey, Catherine, Lanesboro.  
 Chambers, Agnes L., Owatonna.  
 Chapman, Esther J., Minneapolis.  
 Clark, Miriam S., Minneapolis.  
 Cliff, Howard J., Ortonville.  
 Clough, Lee, Minneapolis.  
 Cole, Wallace, St. Paul.  
 Colgrove, Vivian G., Minneapolis.  
 Colter, Lillian E., St. Paul.  
 Colter, Ruth M., St. Paul.  
 Colyer, Robert G., Morris.  
 Cooke, Lucie A., St. Paul.  
 Cowles, Hazel D., Minneapolis.  
 Cox, Irene M., Cloquet.  
 Crawford, W. Howard, Hampton, Ia.  
 Crever, Goldie, Worthington.  
 Crosby, Emily N., Minneapolis.  
 Crosby, Walter B., Willmar.  
 Cummings, Helen S., St. Paul.  
 Cummings, Marguerite M., St. Paul.  
 Juzner, Fay, Minneapolis.  
 Davis, George E., Minneapolis.  
 Davis, William E. C., Minneapolis.  
 Day, Juanita H., St. Paul.  
 Day, Lillian, Minneapolis.  
 Deal, Florence D., Minneapolis.  
 Deering, Harold C., Minneapolis.  
 Deering, Robert L., Minneapolis.  
 DeGroot, Oliver H., Humboldt, Ia.  
 Dibble, Edmund D., St. Paul.  
 Doherty, Michael J., LeSueur.  
 Dougherty, Kathryn, Mankato.  
 Drum, Elizabeth, Waseca.  
 Duxbury, Lloyd L., Caledonia.  
 Ebeltoft, Carl T., Lake Park.  
 Edwards, Majorie, Minneapolis.  
 Eklund, Edwin G., Minneapolis.  
 Elliott, Charles W., Minneapolis.  
 Elliott, Grace J., Minneapolis.  
 Elmquist, Elmer W., St. Paul.  
 Elwell, Margaret A., Minneapolis.  
 Ervin, Harry C., St. Cloud.  
 Evans, Albert G., Duluth.  
 Faegre, Minnie L., Flandreau, S. D.  
 Fagundus, Aimee J., Minneapolis.  
 Feeny, Agnes E., St. Paul.  
 Fellows, Murlen, Minneapolis.  
 Finkle, Lillian S., Minneapolis.  
 Firmin, Kate M., Minneapolis.  
 Fisher, Irving L., Sauk Centre.  
 Fleming, Lou B., St. Paul.  
 Fleming, M. Beryl, St. Paul.  
 Fletcher, Ruby H., Minneapolis.  
 Fletcher, Victor W., Farmington.  
 Fligelman, A. Leah, Minneapolis.  
 Roland, Grace W., Benson.  
 Frazier, Earl H., Verndale.  
 Frissell, E. C., Minneapolis.  
 Gaghagen, Grace L., Minneapolis.  
 Jessell, Walter J., Heron Lake.  
 Gilbert, Royce W., Minneapolis.  
 Gleason, Caroline J., Minneapolis.  
 Godley, Florence H., Minneapolis.  
 Gooding, Lora, Minneapolis.  
 Gordinier, Fannie E., St. Paul.  
 Gould, Mary, Winona.  
 Gray, Mary L., Sioux Falls, S. D.  
 Jreeley, Kate E., Stillwater.  
 Green, Alice E., Minneapolis.  
 Hansen, Thorwald, Benson.  
 Harter, Clarence M., Minneapolis.  
 Hengstler, W. Howard, Minneapolis.  
 Higgins, Emmagene E., St. Paul.  
 Hille, Julie, Fergus Falls.  
 Hillesheim, Emma M., Sleepy Eye.  
 Hitchings, Vinnie, Sutherland, Ia.  
 Hobart, Inez M., Minneapolis.  
 Hoffman, Minnie C., St. Paul.  
 Hokanson, Nels M., Aitkin.  
 Holen, Julia A., Argyle.  
 Holliday, Mary E., Minneapolis.  
 Hollister, Mabel F., Duluth.  
 Holton, Ethel L., Lanesboro.  
 Hopkins, Lorena, Chinook, Mont.  
 Howe, Ida E., St. Paul.  
 Hull, Mabel B., Litchfield.  
 Hutchinson, Lucie I., Minneapolis.  
 Hutchinson, Lura C., Minneapolis.  
 Ingls, Rewey B., Minneapolis.  
 Jacobs, Orpha M., St. Paul.  
 Jenks, Florence K., Minneapolis.  
 Johnson, Anna J., Minneapolis.  
 Johnson, Guy C., Minneapolis.  
 Johnson, Jay G., Granite Falls.  
 Johnson, L. Eldora, Casselton, N. D.  
 Johnson, Marie, Minneapolis.  
 Johnson, Olga, Blackduck.  
 Johnson, Ruth, Minneapolis.  
 Jones, Florence, Gaylord.  
 Jones, William M., Lisbon, N. D.  
 Jordan, Martin L., Minneapolis.  
 Kennedy, Anne, St. Paul.  
 Kingsley, Grace, Minneapolis.  
 Klimenthagen, Olive E., St. Paul.  
 Knight, Ralph T., Minneapolis.  
 Knoell, Walter E., Tacoma, Wash.  
 Koessler, Rudolf F., Heron Lake.  
 LaDue, Mabel, Minneapolis.  
 Larkin, Chandler C., Minneapolis.  
 Larson, Swan A., Minneapolis.  
 Lauderdale, Henry W., Minneapolis.  
 Lawton, George T., Minneapolis.  
 Laybourn, Hortense, Minneapolis.  
 Leavenworth, Louise, Minneapolis.  
 Leland, Rosamond E., Minneapolis.  
 Lewis, Margolee, St. Paul.  
 Lewis, Sada, Minneapolis.

- Lillehel, I. L., Minneapolis.  
 Linnan, Margaret E., St. Paul.  
 Linton, Katherine B., Minneapolis.  
 Lougee, Clare L., Minneapolis.  
 Lucas, Mary A., Minneapolis.  
 Luehrs, Lillian H., Worthington.  
 Luehrs, Opal E., Worthington.  
 Lumbey, Stella M., Minneapolis.  
 Lyon, Mabel E., Hastings.  
 Lyon, Maude H., Hastings.  
 McCune, Robert H., Benson.  
 McEwan, S. W., Alexandria.  
 McGrew, Charles D., Howard Lake.  
 MacKenzie, Harriet M., Minneapolis.  
 McKenzie, Jessie G., Wild Rice, N. D.  
 MacMillan, Lillian F., Minneapolis.  
 Magnuson, Louise J., St. Paul.  
 Mallory, Walter, St. Paul.  
 Manning, Vinon R., Cannon Falls.  
 Mansfield, Mabel, Minneapolis.  
 Marsh, Jessie M., Claremont.  
 Matthews, Ralph F., St. Paul.  
 Meech, Robert Lyon, Mandan, N. D.  
 Mikesh, James S., Minneapolis.  
 Miller, Hilda, St. Paul.  
 Miller, Lillian, Minneapolis.  
 Miller, Lula M., Minneapolis.  
 Millie, Mabel F., Minneapolis.  
 Morse, Arthur A., Minneapolis.  
 Morse, Clayton H., Livermore, Ia.  
 Mosher, Robert M., Albert Lea.  
 Mottley, Frank W., Minneapolis.  
 Nelson, Anna L., Minneapolis.  
 Nelson, N. Frank, Heron Lake.  
 Nestaval, Stephen J., Montgomery.  
 Newton, Mary, M., St. Paul.  
 Newton, Willis T., Minneapolis.  
 Nordburgh, Marione, Minneapolis.  
 Nordin, Charles G., Minneapolis.  
 Nordin, Elsa R., St. Paul.  
 Norlander, Inez J., St. Paul.  
 O'Brien, Emma F., St. Paul.  
 O'edal, Sverre, Minneapolis.  
 O'Gordon, Mellvilene K., Minneapolis.  
 Olson, Newell R., Atwater.  
 Osia, Catherine, Humboldt, Ia.  
 Otis, Cecelia E., St. James.  
 Ott, Hildegard L. E., Minneapolis.  
 Page, Stella E., Alexandria.  
 Palmer, Andrew H., Minneapolis.  
 Papez, James W., Minneapolis.  
 Paul, Florence E., Minneapolis.  
 Peebles, Thomas, Jr., Minneapolis.  
 Pennington, Hazel M., Minneapolis.  
 Peterson, Albert S., Wheaton.  
 Pickler, Alfred A., Faulkton, S. D.  
 Pinkerton, Arthur R., Waupaca, Wis.  
 Ponthan, Marie W., St. Paul.  
 Pope, Alice G., Minneapolis.  
 Porcher, Lillian, Minneapolis.  
 Putnam, Alice E., Minneapolis.  
 Quigley, Catherine C., Bird Island.  
 Randall, Robert C., Minneapolis.  
 Rankin, Mary A., Minneapolis.  
 Ray, John H., Mankato.  
 Reimbold, Henrietta M., St. Paul.  
 Remer, Charles F., Waconia.  
 Rheem, George S., Minneapolis.  
 Richmond, Margaret S., Minneapolis.  
 Rittenhouse, Catherine, Minneapolis.  
 Robb, W. C., Minneapolis.  
 Rollins, Walter E., Minneapolis.  
 Rosdahl, Signe, Wheaton.  
 Rossman, Harold, St. Paul.  
 Rouse, Honor V., Minneapolis.  
 Rowberg, H. C., Hanley Falls.  
 Saby, Rasmus S., Minneapolis.  
 Safford, Orren E., Aitkin.  
 Sallsbury, Maurice E., Minneapolis.  
 Sanford, LeRoy, W., Minneapolis.  
 Sawyer, Alma P., Minneapolis.  
 Schaetzel, Mina L., Minneapolis.  
 Schmidt, Pauline S., Minneapolis.  
 Schneiderhan, Albert G., Jordan.  
 Schons, Emily, St. Paul.  
 Schow, Susie S., Minneapolis.  
 Schroeder, Florence C., Perham.  
 Seaman, Susie, Minneapolis.  
 Sevaton, Ella, Windom.  
 Shanley, Helen M., St. Paul.  
 Shaver, Gertrude A., Excelsior.  
 Shaw, Wilbur D., Minneapolis.  
 Shiely, Mary E., St. Paul.  
 Simerman, Helen M., St. Paul.  
 Sly, Florence A., Minneapolis.  
 Smith, Adah P., Pataskala, O.  
 Smith, Anna M., Minneapolis.  
 Smith, Harriet L., Minneapolis.  
 Smith, J. Russell, Minneapolis.  
 Smith, Winifred R., Duluth.  
 Soderstrom, Ida, Hutchinson.  
 Southworth, Mira M., Minneapolis.  
 Spooner, Kathryn, Minneapolis.  
 Stake, Alma L., Anoka.  
 Stewart, Dorothea, Minneapolis.  
 Stewart, Edna, Minneapolis.  
 Swan, James E., Mankato.  
 Sweet, Lottie V., Hopkins.  
 Switzer, Abbie D., Minneapolis.  
 Tallman, Kate E., St. Paul.  
 Taylor, Donald W., St. Paul.  
 Thompson, Della F., Minneapolis.  
 Thompson, Gertrude M., Minneapolis.  
 Thompson, Marjorie, Minneapolis.  
 Thompson, Samuel J., Minneapolis.  
 Thornton, George, Minneapolis.  
 Thorson, Ella B., Winthrop.  
 Thurley, Arthur D., Winona.  
 Trimble, Margaret H., Minneapolis.  
 Tripp, Gertrude A., Red Wing.  
 Tuthill, William M., Anoka.  
 VanRhee, George J., Milaca.  
 Waddell, Mamie E., St. Louis Park.  
 Walker, Margaret E., Minneapolis.  
 Warren, E. L., St. Paul.  
 Watson, Alice A., St. Paul.  
 Welch, Louise M., St. Paul.

Wheaton, Faith M., Minneapolis.  
 Whittier, Albert A., Red Wing.  
 Whittle, Sadye, Minneapolis.  
 Wiggen, Charlotte A., Red Wing.  
 Wilder, Susan Z., Minneapolis.  
 Williams, Beatrice L., Minneapolis.  
 Williams, Mary L., Cedar Lake.

Willits, Nettie, Sioux Falls, S. D.  
 Wilson, Chester S., Stillwater.  
 Winter, Alice, Minneapolis.  
 Wolfe, Elizabeth, Ruthton.  
 Woodke, Luella M., Le Mars, Ia.  
 Yerxa, Elizabeth, Minneapolis.

## Freshman Class—435.

Acomb, Marie R., Minneapolis.  
 Ahlquist, Perry K., St. Paul.  
 Anderson, Arnold, Atwater.  
 Anderson, Axel M., Anderson.  
 Anderson, Carl A., Hutchinson.  
 Anderson, Herbert I., Goodhue.  
 Angst, Alice D., Minneapolis.  
 Arvold, Henry M., Minneapolis.  
 Auerbach, Will., Havre, Mont.  
 Austin, Alice A., Minneapolis.  
 Austin, Florence C., St. Paul.  
 Babcock, Fager M., Minneapolis.  
 Backus, Clinton J., St. Paul.  
 Bagley, Fayre M., Minneapolis.  
 Baillif, Matilda V., Osakis.  
 Bamber, Carlotta, Rochester.  
 Bardsley, Myrtle B., Minneapolis.  
 Bardwell, Maurice F., Excelsior.  
 Barnes, Eugene B., Minneapolis.  
 Batterton, Lyle K., Minneapolis.  
 Barnum, George G., Minneapolis.  
 Beals, James B., St. Paul.  
 Beck, Clara L., St. Paul.  
 Beedy, Norman J., Minneapolis.  
 Bell, Grace M., St. Paul.  
 Bennett, John P., Fosston.  
 Bennett, Lillian, Madison.  
 Berchem, Pauline J., St. Paul.  
 Berger, Nanda M., St. Paul.  
 Bibb, Frank L., Minneapolis.  
 Birkenhauer, Mary G., Minneapolis.  
 Bishop, Howard, St. Paul.  
 Blair, Frederic H., Minneapolis.  
 Blanchett, Fred, Minneapolis.  
 Bleifuss, Grace A.,

St. Paul.  
 Sioux Falls, S. D.  
 Bly, Herbert A., Minneapolis.  
 Borchardt, William A., Sherburne.  
 Brearley, Harriet H., Minneapolis.  
 Brey, Frank, Lafayette.  
 Briggs, Florence Mayfred, St. Paul.

Brink, Irma, Minneapolis.  
 Brown, Mayme E., Granite Falls.  
 Buck, Florence, Minneapolis.  
 Buell, Grace H., Livermore, Ia.  
 Burgan, Myrle E., Minneapolis.  
 Burleigh, Alice D., Minneapolis.  
 Burns, Margaret F., Graceville.  
 Buswell, Claire, St. Paul.  
 Cahill, Thomas, Mabel.  
 Cain, Jennie K., Lake City.  
 Caltr, Louise K., St. Cloud.  
 Cant, Harold G., Duluth.  
 Carlson, Charles E., Albert Lea.  
 Carlson, Helen, St. Paul.  
 Carson, Helen D., St. Paul.  
 Casserly, B. A., Elkton, S. D.  
 Cassidy, Anna C., Eyota.  
 Chamberlain, Raymond, Minneapolis.

Chase, Marjorie, Minneapolis.  
 Child, Emily, Minneapolis.  
 Child, Sherman W., Minneapolis.  
 Christianson, Andrew, St. Paul.  
 Clark, Maurine, Mankato.  
 Clarke, Bertha J., Richfield.  
 Collins, Melva A., St. Paul.  
 Condit, L. Irving, Minneapolis.  
 Conway, Ethelwyn, Marshall.  
 Coughlin, Edward D., Mankato.  
 Counter, John, Milbank, S. D.  
 Covey, Louise S., Minneapolis.  
 Critchfield, Burke H.,

Hunter, N. D.  
 Crosby, Adelaide, Minneapolis.  
 Crozier, Lulu H., Minneapolis.  
 Cull, Gertrude M.,

St. Thomas, N. D.  
 Dahleen, Harry W., Maynard.  
 Dale, Ludvig D., Willmar.  
 Daniels, Winifred C., Benson.  
 Danielson, Jessie L., Litchfield.  
 Dart, Flora L., St. Paul.  
 Daubney, Dora E., Lakefield.  
 Davenport, Julia, Minneapolis.  
 Davidson, Hazel, Minneapolis.  
 Davies, Marion, Minneapolis.  
 Davis, Alfred, Buffalo.  
 Day, Constance, St. Paul.  
 Degnan, John P., Winona.  
 Dellinger, Virginia E., St. Paul.  
 Deming, Portia, Minneapolis.  
 Denny, Charles E., Kasson.  
 Denny, F. William, Kasson.  
 Dewart, Clement, St. Paul.

Diamond, Lewis S., Mankato.  
 Dickerson, Helen, Minneapolis.  
 Dietrichson, Gerhard, Minneapolis.  
 Dinsmoor, Viola C., Austin.  
 Disen, Helga A., Minneapolis.  
 Douglas, Leila, Minneapolis.  
 Downs, Germaine G., St. Paul.  
 Doyle, Anastasia, St. Paul.  
 Dresser, Eva L., Minneapolis.  
 Duffy, Francis E., Excelsior.  
 Duvigneau, Nellie, St. Paul.  
 Duvigneaud, Jeannette A., Minneapolis.

Minneapolis.  
 Dvorak, Joseph W., Renville.  
 Eastman, Welles, St. Paul.  
 Eddy, Beatrice E., Minneapolis.  
 Edgerton, Blanche, Minneapolis.  
 Edson, Elizabeth C., Minneapolis.  
 Eickemeyer, Herbert, Winona.  
 Engle, Marguerite L., Minneapolis.  
 Engson, Edward, Hallock.  
 Engstrom, Lillian F., Minneapolis.  
 Erdall, Agnes R., St. Paul.  
 Erickson, Jennie S., Anoka.

- Evans, E. Winton, Winona.  
 Fancher, Harlan R., Minneapolis.  
 Felsted, Jessie M., Minneapolis.  
 Forbes, Robert S., Minneapolis.  
 Ford, Gertrude, St. Paul.  
 Foulke, Robert W., St. Paul.  
 Franken, Wanda I., Minneapolis.  
 Francis, Helen E., Minneapolis.  
 Franklin, Laura G., Blue Earth.  
 Freleigh, Wilfred P., Stillwater.  
 Frenzel, Rose M., St. Paul.  
 Frise, D. C., Hamilton, N. D.  
 Gardner, Alice, Minneapolis.  
 Gilbert, Grace, St. Paul.  
 Gilbertson, Albert N., Willmar.  
 Gilchrist, James B.,  
     Watertown, S. D.  
 Goeffert, Roy D., Watertown, S. D.  
 Goodrich, Louise A., Kasson.  
 Gould, Marian R., Minneapolis.  
 Graham, R. D., West Duluth.  
 Grant, Royal C., Duluth.  
 Gray, Callista G., Minneapolis.  
 Grimes, Gordon, Minneapolis.  
 Grinstead, Grace A., Minneapolis.  
 Grove, Arthur F., Plainview.  
 Haldeman, Horace K., St. Paul.  
 Hall, Ruth K., Minneapolis.  
 Hallock, Mary J., Duluth.  
 Hamilton, John A. J.,  
     Carrington, N. D.  
 Hanaford, A. Ruth, Monticello.  
 Hanson, Bertha M., Minneapolis.  
 Harding, Fred A., Hudson, Wis.  
 Hart, Una M., Anoka.  
 Hartzell, Mary K., Minneapolis.  
 Hawley, Jess B., Minneapolis.  
 Hazard, Rowland M., Minneapolis.  
 Hebard, Irma, Mondovi, Wis.  
 Haddenly, Earl F., Minneapolis.  
 Held, Jay H., Kenyon.  
 Helson, Alice L., St. Paul.  
 Herum, Helen, Hudson, Wis.  
 Hewitt, Marie A., Minneapolis.  
 Hield, C. C., St. Paul.  
 Hillman, Frank M., Owatonna.  
 Hixon, Agnes, Minneapolis.  
 Hoag, Richard L., Minneapolis.  
 Hoffman, Elizabeth G., Hopkins.  
 Hoffman, Arthur C., Minneapolis.  
 Holcomb, Dora M., Warren.  
 Holt, Blanche M., Minneapolis.  
 Holt, Mabel, Minneapolis.  
 Hoovel, Violet D., Jackson.  
 Houck, Norman A., Minneapolis.  
 Hovey, Albert P., Minneapolis.  
 Hovey, Inez L., Alexandria.  
 Hubbard, Katherine D., Mankato.  
 Hudson, Dorothy R., Minneapolis.  
 Hudson, Neva B., Minneapolis.  
 Hull, Gertrude R., Minneapolis.  
 Hunt, Thomas F., LeSueur Center.  
 Hutchinson, Clement J., Faribault.  
 Jackson, Mabel C., St. Paul.  
 Jamison, Neil C., Minneapolis.  
 Jenness, Maurice V., Willmar.  
 Jensen, Carl A., Minneapolis.  
 Jensen, Louise E., Minneapolis.  
 Johnson, Esther C., Minneapolis.  
 Johnson, Jennie C., Excelsior.  
 Johnson, Jense, Lake Crystal.  
 Johnson, Judith T.,  
     Dell Rapids, S. D.  
 Johnson, May J., Minneapolis.  
 Johnson, Thekla, Lake City.  
 Jones, Anna R., Minneapolis.  
 Kadlec, Edward J., Winona.  
 Kearney, Mabel A., Minneapolis.  
 Kelley, Frances R., Minneapolis.  
 Kelly, Maude H., Minneapolis.  
 Kesting, Herman, Boyd.  
 Kief, Alphonso E., Montevideo.  
 Kimball, Ruth A., Minneapolis.  
 Klatt, Albert G., Waconia.  
 Kline, Gertrude E., Austin.  
 Knopp, Harold F., St. Paul.  
 Knowlton, Edith V., Minneapolis.  
 Korlec, Edward J., Winona.  
 Kreider, Lorena, Minneapolis.  
 Krueger, Richard G., Bellingham.  
 Lambert, Percy, Sauk Centre.  
 Lambie, Ethel L., Minneapolis.  
 Landberg, Louis L., Marine Mills.  
 LaRue, Beth B., Minneapolis.  
 Lathrop, Elsie L., Minneapolis.  
 Lawrence, James G., Wabasha.  
 Lees, Millicent, Minneapolis.  
 Leonard, Elva L., Minneapolis.  
 Leonard, Harold J., Minneapolis.  
 Leuthold, Walter M., Spring Valley.  
 Leveroos, Ethel S., Minneapolis.  
 Levings, William S., Minneapolis.  
 Leviston, Alice M., St. Paul.  
 Lewis, E. Genevieve, Minneapolis.  
 Lewis, Jessie O., St. Paul.  
 Linton, Roy, V., Billings.  
 Lippitt, Dunbar, Duluth.  
 Lochren, William A., Minneapolis.  
 Longstaff, William H., Huron, S. D.  
 Lovejoy, Lillian A., Minneapolis.  
 Lovejoy, Marjorie, Minneapolis.  
 Lowenthal, Max, Minneapolis.  
 Loyhead, Tom, Jr., Faribault.  
 Lycan, Donna M., Crookston.  
 Lyford, Elizabeth, Minneapolis.  
 Lynch, Helen, St. Paul.  
 McBride, Alice L., Austin.  
 McClatchie, Gertrude E.,  
     Minneapolis.  
 McFetridge, Auverne, St. Paul.  
 McIvor, Helen, St. Paul.  
 McKennan, Pearl G., Minneapolis.  
 Machen, Jane E., Savanna, Ill.  
 Maland, Joseph O., Elmore.  
 Marden, Irene E., Barnesville.  
 Martin, Pearl M., Austin.  
 Mathewson, Grace, Minneapolis.  
 Matson, Charlotte, Minneapolis.  
 Matthews, Alvah I., Minneapolis.  
 Matthews, Charles A., Minneapolis.  
 Maul, Earle C., Minneapolis.  
 Mayer, Pearl, Hudson, Wis.  
 Mecklenburg, George, Cedar.  
 Melin, E. Luther, Minneapolis.  
 Merrill, Robert C., Minneapolis.  
 Mills, Edith A., Minneapolis.

- Mittelstaedt, Frank A., Minneapolis.
- Moffett, James H. C., Minneapolis.
- Mollet, Marie E., St. Paul.
- Mooney, Florence H., Duluth.
- Moore, Albert P., Balaton.
- Moore, Edna, St. Paul.
- Morgan, Louie B., Tonka Bay.
- Morgan, Marion, Zumbrota.
- Motl, Charles L., Minneapolis.
- Mouser, Carl B., Huron, S. D.
- Mousley, Josephine, Minneapolis.
- Mueller, Otto H., Norwood.
- Munroe, Edna N., Minneapolis.
- Murra, Flm, Minneapolis.
- Murray, Bessie L., Minneapolis.
- Myers, James I., Great Falls, Mont.
- Nash, Alvin L., Lime Springs, Ia.
- Naylor, Edward J., Owatonna.
- Neal, Florence M., Minneapolis.
- Nelson, Elizabeth, Minneapolis.
- Nelson, Owen N., St. Paul.
- Nelson, Robert, Minneapolis.
- Ness, Sever, Ostrander.
- Nielsen, Marie B., St. Paul.
- Norellus, William, Luverne.
- Norris, Sadie A., Minneapolis.
- Nye, Marguerite, Minneapolis.
- Nystrom, Hilda, Minneapolis.
- O'Brien, Clarence B., Winona.
- Olsen, Clare, Minneapolis.
- Olsen, Charles A., St. Paul.
- Olson, Maude E., Rock Rapids.
- Oppegaard, Lawrence S., Madison.
- Palmer, Alice H., Minneapolis.
- Palmer, Porteus B., St. Paul.
- Palms, Edith, Hudson, Wis.
- Parish, Eva I., Rushford.
- Peterson, Celius, Mabel.
- Peterson, Sigurd H., Minneota.
- Petricka, Frank J., Oltvia.
- Pfaff, Miriam, St. Paul.
- Pfau, Mary, Mankato.
- Phelan, Mary F., Graceville.
- Pidgeon, Vernon C., Minneapolis.
- Pierce, Viola, Minneapolis.
- Pitblado, Annie, Minneapolis.
- Plummer, John F., Fairbault.
- Potter, Zenas L., Minneapolis.
- Power, Charles E., St. Paul.
- Prosser, Eugene, Minneapolis.
- Puffer, Anna M., Minneapolis.
- Putnam, Gladys, Minneapolis.
- Putnam, Leslie R., Carrington, N. D.
- Quigley, Alice R., Bird Island.
- Quinn, Mary H., Kokomo, Ind.
- Reely, Stella A., Minneapolis.
- Rehmkc, Edgar B., Kenvon.
- Reid, Harry C., Sleepy Eye.
- Rheem, Royal A., Minneapolis.
- Rice, Mary G., Minneapolis.
- Richards, Grace E., Minneapolis.
- Richardson, Wayne, Thief River Falls.
- Ries, Joseph A., Fairfax.
- Riheldaffer, Helen, Minneapolis.
- Ringdahl, Robert, Lisbon, N. D.
- Robbins, Darwene, Minneapolis.
- Robertson, Norman D., Crookston.
- Robinson, Helen, St. Paul.
- Rockwood, Edith, Minneapolis.
- Rogers, Caroline E., Minneapolis.
- Rogers, Fred C., Fort Snelling.
- Roverud, Nora G., Caledonia.
- Rowse, Herbert W., St. Paul.
- Rowley, Hugh, Billings, Mont.
- Ruger, Rosa C., Devils Lake, N. D.
- Sanaker, Otto, H., Minneapolis.
- Sanford, Robert W., Fairbault.
- Savage, George F., Minneapolis.
- Saxton, Robert H., Minneapolis.
- Sayre, Wayne M., Odebolt, Ia.
- Schaller, Karl A., Hastings.
- Scharf, A. L., Lake City.
- Schneider, Edwin H., St. Paul.
- Schriber, Alice E., St. Paul.
- Schroeder, Anna T., Perham.
- Seddon, Barbara, St. Paul.
- Seevers, Mary, Minneapolis.
- Seham, Max, Fergus Falls.
- Sell, Erna, Fairfax.
- Serum, Phillip C., Jackson.
- Shadewald, Lily E., Minneapolis.
- Shea, Edward M., Perham.
- Sheld, Marcellus C., Winona.
- Shirley, John B., Breckenridge.
- Shonts, Mary O., Fergus Falls.
- Shook, Margaret M., Grand Rapids.
- Sigafoos, Ernest A., Excelsior.
- Simmons, Juliet F., Hunter, N. D.
- Simms, Marjorie, Minneapolis.
- Simpson, Jessie, Minneapolis.
- Sinclair, Catherine E., Fairmont.
- Sleeper, Raymond A., Sheldon, Ia.
- Sly, Gertrude B., Minneapolis.
- Smart, Anna A., Minneapolis.
- Smiley, William Y., LeMars, Ia.
- Smith, Alfred C., Huron, S. D.
- Smith, Audrey N., Minneapolis.
- Smith, Corinne J., Minneapolis.
- Smith, E. Pauline, Minneapolis.
- Smith, Marjorie E., Minneapolis.
- Smith, Marlon B., Austin.
- Smith, Rollin L., Minneapolis.
- Snelde, Ole J., Benson.
- Snyder, Mabelle, Minneapolis.
- Solon, Helen L., Minneapolis.
- Sorenson, Della, Kasson.
- Sowle, Merton W., Minneapolis.
- Spear, Florence H., Minneapolis.
- Stegner, Hope A., St. Paul.
- Sterling, Faith, Minneapolis.
- Stone, George H., Tower.
- Stork, Allen B., Harmony.
- Strate, Clara, Moorhead.
- Strelow, Laura, Minneapolis.
- Stromgren, Lucia J. M., Center City.
- Strouse, Marie I., Minneapolis.
- Sturtevant, Abby, Minneapolis.
- Sunwall, Agnes, Minneapolis.
- Sveegan, Peter A., Red Wing.
- Svensrud, Ida, Minneapolis.

Swan, Arthur, Zumbrota.  
 Sykes, Ruth, Minneapolis.  
 Tallant, Ruth, Minneapolis.  
 Taney, Clara McB., St. Paul.  
 Tennesen, May C., Minneapolis.  
 Terriere, Margery, Minneapolis.  
 Terry, Leslie, St. Paul.  
 Thayer, Majorle, Minneapolis.  
 Thorson, Elizabeth, Minneapolis.  
 Tileston, Elsie T., St. Cloud.  
 Tisdale, Mary V., Slayton.  
 Todd, Erma E., Minneapolis.  
 Tollefson, Annie, Windom.  
 Toomey, Mary L., St. Paul.  
 Trask, Bertha M., Bemidji.  
 Treat, Albert M., Blooming Prairie.  
 Tunwall, Agnes, Minneapolis.  
 Turnbull, Lody W., Glencoe.  
 Tyrrell, Alfred, Waterville.  
 Ueland, Elsa, Minneapolis.  
 Uzzell, Thomas, Morgan Park, Ill.  
 Van Bergen, Fred S., Minneapolis.  
 Vance, Stanley M., Winona.  
 VanSlyke, Lois M., Minneapolis.  
 Victor, Albin F., Lindstrom.  
 Vidall, James H., Minneapolis.  
 Walte, Camella, Minneapolis.  
 Wales, Geneve, Minneapolis.  
 Wales, Gertrude, Minneapolis.  
 Ware, Grace, Minneapolis.

Warren, Marguerite, Minneapolis.  
 Watson, William, Milbank, S. D.  
 Webber, Hazel, Austin.  
 Wedge, Vera E., Zumbrota.  
 Weese, Asa O., Hutchinson.  
 Weinstein, Freda, Minneapolis.  
 Weitbrecht, Robert, St. Paul.  
 Weld, Helen, Minneapolis.  
 Welsh, Clarke T., Shelbyville, S. D.  
 Wentzel, Charles B., Warren.  
 Weston, L. Helen, Minneapolis.  
 Weston, Pearl E., Minneapolis.  
 Whaley, Amanda, St. Paul.  
 White, Gladys, St. Paul.  
 White, Renee C., Minneapolis.  
 Whittle, Anna, Minneapolis.  
 Wigforss, Nanna H., Red Wing.  
 Wilberton, George L., Winona.  
 Wilcox, Rhea L., Orange City, Ia.  
 Williams, D. Bertyn, Minneapolis.  
 Williams, Edna, Lake Crystal.  
 Williams, Mabel R., Minneapolis.  
 Wilson, Clyde H., Minneapolis.  
 Wolsey, Leona, Ft. Dodge, Ia.  
 Wolsted, Ole A., Harmony.  
 Woodcock, Anna L., Minneapolis.  
 Wright Elsie L., Fergus Falls.  
 Yates, Fannie A., St. Paul.  
 Yeaton, Walter J., Livingston,

## Unclassed Students—96.

Alley, Villa M., Webster, S. D.  
 Anderson, Anetta A., Minneapolis.  
 Bacheller, Dora G., Minneapolis.  
 Ballentine, Emma, Minneapolis.  
 Barnum, Harriet, Minneapolis.  
 Benjamin, Mary, Minneapolis.  
 Bowne, Mabel, Sheldon, Ia.  
 Benton, Mrs. Elma, Minneapolis.  
 Blodgett, May A., St. Paul.  
 Blythe, Maude, Minneapolis.  
 Braydon, George H., Minneapolis.  
 Brooks, Ellen R., Minneapolis.  
 Brorby, Mrs. Eda S., Minneapolis.  
 Bruer, Minna, Minneapolis.  
 Carlson, Charles G., Mankato.  
 Carlton, Henry G., Minneapolis.  
 Christensen, Amelia, St. James.  
 Churchill, Alta, Reedsburg, Wis.  
 Cogswell, Robert A., Minneapolis.  
 Cole, Isabel McM., Chatfield.  
 Corson, Helen H., Minneapolis.  
 Craven, Jennie G., Faribault.  
 DeGroot, Oliver, Humboldt, Ia.  
 Dockstader, Bessie D., St. Cloud.  
 Ellison, Sabra M., Minneapolis.  
 Erickson, Peter W., Minneapolis.  
 Ferraby, Mary H., Minneapolis.  
 Fleming, May A., Minneapolis.  
 Garlock, Mrs. W. H., Minneapolis.  
 Gates, Fred W., Minneapolis.  
 Gloor, Arnold, Minneapolis.  
 Grant, Georgia, Minneapolis.  
 Gregg, Dean B., St. Paul.  
 Hagen, Josephine, Radcliffe, Ia.

Hasson, Alice, St. Paul.  
 Hayes, Annie, Minneapolis.  
 Hayes, Bridget, Minneapolis.  
 Helgesen, Ellenora, Jordan.  
 Hunter, Grace J., Tracy.  
 Ianoka, Selmin, Minneapolis.  
 Jones, Henry B., Morris.  
 Kelly, Margaret E., St. Paul.  
 Konig, Eva, Minneapolis.  
 Lamp, Fred A., Stewartville.  
 Lewis, Emma G., Minneapolis.  
 Lewis, Sada, Minneapolis.  
 Lockman, Jessie F., Minneapolis.  
 Lovell, Eleanor, Minneapolis.  
 McCarthy, Frank J., Stoughton,  
 Wis.  
 McFetridge, Margaret E., St. Paul.  
 Mathewson, Grace, Minneapolis.  
 Matson, Jessie A., St. Paul.  
 Merrill, Eunice, Minneapolis.  
 Meyer, Mrs. E. M., Minneapolis.  
 Moritz, Arthur G., St. Paul.  
 Nicholson, Mrs. E., Minneapolis.  
 Overpeck, Nellie S., St. Paul.  
 Palne, Bertha S., Minneapolis.  
 Pennock, Alma G., Minneapolis.  
 Petri, Carl E., Minneapolis.  
 Picken, Mae E., Minneapolis.  
 Pike, Mrs. J. B., Minneapolis.  
 Pullen, D. S., Minneapolis.  
 Rapeer, L. W., Minneapolis.  
 Remele, Anna K., Minneapolis.  
 Roning, O. E., Pelican Rapids.  
 Saterlie, Julia K., Hagan.



## THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

### SENIOR CLASS.

#### CIVIL ENGINEERS, 14.

Adams, Elmer Ellsworth, Willmar	Hanauer, Monroe, St. Paul
Alrick, Bannona Gerhart, Zumbrota	Hayward, George I., Pine Island
Alsop, Ernest Benbon, Minneapolis	Hawley, Harry Garfield, Worthington
Bowen, Fred P., St. Paul	Malloy, Charles J., Red Wing
Childs, Hervey Butler, Ortonville	Murphy, John, Litchfield
Childs, John C., Minneapolis	Reed, Arthur Lathrop, Minneapolis
Doherty, Walter A., St. Paul	-Wiesner, Frederick Edward, Tracy

#### MECHANICAL ENGINEERS, 8.

Armstrong, Thomas S., Minneapolis	Matteson, F. E., Eyota
Crawford, Wallace Tyler, Faribault	Rawson, Ralph Harvey, Faribault
Garber, Gabriel E., Minneapolis	Ringsred, Arthur Christian, Duluth
Loye, Benjamin W., Red Wing	Rose, Norman, Duluth

#### ELECTRICAL ENGINEERS, 29.

Albrecht, George Moritz, St. Paul	Lang, Charles Arthur, Minneapolis
Bunce, Paul Fay, Minneapolis	Mowry, Harry, Minneapolis
Calmeyer, John Peter, Glenwood	Payne, Harold Gould, Minneapolis
Cohen, Nathan, Minneapolis	Roepke, Otto Bismarck, Minneapolis
Cooper, Leo Henry, Minneapolis	Schow, H. A., Minneapolis
Cornelius, Martin, Roberts, Wis.	Schwedes, Walter Fred, Wabasha
Dunn, Andrew Paul, Winnebago City	Shuck, Gordon R., Rushmore
Englin, Charles F., Stillwater	Stenger, Lawrence A., Minneapolis
Finchy, Jacob Oscar, Wabasha	Stone, Harris G., Minneapolis
Glascocok, Henry H., Minneapolis	Ungerman, Carl Mugg, Waseca
Gunther, Albert N., St. Paul	Weber, Erwin Leo Franz, Helena, Mont.
Haerberle, Elmer Harvey, New Ulm	Wiggins, Gerald Graham, Mpls.
Hoff, Christopher, Jr., St. Paul	Zimmer, William Arthur, Big Stone City, S. D.
Hokanson, Clarence, Hector	
Hubbard, Robert T., St. Paul	
Kauffman, Roy, Minneapolis	

### JUNIOR CLASS.

#### CIVIL ENGINEERS, 22.

Ash, J. Wesley, Wendell	Green, Fred Hall, Rushford
Blomquist, Hjalmar Frederick, Lake City	Haverson, Henry D., Winona
Dallimore, Arthur Norman, St. Paul	Hobart, Walter B., Minneapolis
Dougan, Henry K., Minneapolis	Houck, Stanley Buck, Minneapolis
Dougherty, Joe, Litchfield	Houston, David B., Minneapolis
Dunham, John A., Mason City, Ia.	Jones, Lewis Allen, Worthington
Ellis, Bruce Bonthron, Duluth	Kelly, Earl Wallace, Aitkin
Gage, Hugh Newton, Winona	Knowlton, Herbert Hamilton, Mpls.
	Mitchell, John B., Zumbrota



Okes, Day I., Minneapolis  
 Ostvig, Richter, Benson  
 Quinn, John, Minneapolis

Swenson, Charles August, Winthrop  
 Van Cleve, Horatio P., Minneapolis

MECHANICAL ENGINEERS, 15.

Baer, Louis E., Kenyon  
 Bell, Maurice Dwight, Minneapolis  
 Bjorge, Oscar Bernard, Underwood  
 Buhl, Paul Stephens, Graceville  
 Burwell, L. D., Minnetonka  
 Fee, E. Frank, Duluth  
 Geraghty, Herbert Aloysius, St. Paul  
 Gessert, George Richard, St. Paul

Gilman, Nicholas Albert, St. Cloud  
 Krag, Walter C., Hampton, Ia.  
 Meany, James, Lake City  
 Spring, Willis W., Minneapolis  
 Stacy, Eimer Neil, Eden Prairie  
 Tubby, Oliver George, St. Paul  
 Wagner, Otto Henry,  
 New Richland, Wis.

ELECTRICAL ENGINEERS, 25.

Alton, Herbert Dennett, Ceylon  
 Anderson, Godfrey, Lake City  
 Andrus, Raymond J., Mason City  
 Bachrach, Alfred, Faribault  
 Brown, Oliver, Minneapolis  
 Carter, Robert, Austin  
 Countryman, Peter Frederick,  
 Appleton  
 Doerfler, Julius A., Richfield  
 Eddy, Lynne W., St. Paul  
 Evans, Leon R., Hutchinson  
 Geil, Harry Festus, Bemidji  
 Kerns, Ralph W., Detroit

Nekola, John, La Crosse, Wis.  
 Norcross, Arthur Floyd, Minneapolis  
 Pearce, J. H., St. Paul  
 Rezab, John Joseph, Winona.  
 Schow, W. P., Minneapolis  
 Smith, Byron E., Minneapolis  
 Smithson, John Edward, Hawick  
 Sternberg, Carl, Minneapolis  
 Stephenson, Oliver, St. Anthony Pk.  
 Thornton, E. B., Benson  
 Uzzell, George Walter, Minneapolis  
 Walshe, James, Northfield  
 Woehler, W. L., Arlington

SOPHOMORE CLASS.

CIVIL ENGINEERS, 85.

Barnes, Paul, Minneapolis  
 Bergonst, Oscar J., Minneapolis  
 Borrowman, Leroy, Stillwater  
 Brenchley, Harry, Minneapolis  
 Brown, George J., Minneiska  
 Comstock, John W., Sloux Falls, S.D.  
 Drum, Samuel A., Waseca.  
 Effertz, Edward P., Norwood.  
 Esser, Frank E., Ellsworth  
 Fiske, F. William, Jr., St. Paul  
 Furber, Pierce P., Northfield  
 Godward, Alfred C., Elbow Lake  
 Houston, Cecil E., Minneapolis  
 Hubbard, Henry A., Spencer  
 Krauch, William L., St. Paul  
 Lang, Fred, Austin  
 Longfellow, Dwight, Minneapolis  
 Loomis, L. E., Minneapolis

McCall, Harry J., Minneapolis  
 McCree, Andrew A., St. Paul  
 Methuen, Clyde, Minneapolis  
 Moe, Alfred, Duluth  
 Mowery, Clarence W., Northfield  
 Norelius, Lewis M., Luverne  
 Olson, M. S., Minneapolis  
 Paris, Clarence, Winona  
 Peterson, William A., Elbow Lake  
 Robertson, Charles N., Sleepy Eye  
 Schlattman, Edw. C., Alberta  
 Scudder, Orville A., Willmar  
 Stevens, John C., St. Paul  
 Vireen, N. J., Minneapolis  
 Walker, George W., Minneapolis  
 Willis, Roy, St. Paul  
 Wodrich, Oscar F., St. Paul

**MECHANICAL ENGINEERS, 34.**

Albrecht, Armin G., St. Paul  
 Anderson, Frank A., Wells  
 Anderson, Ole A., Hawley  
 Best, Herbert L., Minneapolis  
 Bingham, Stanley E., New Ulm  
 Boyce, L. E., Minneapolis  
 Campbell, D. G., Little Falls  
 Councilman, H. P., Minneapolis  
 Currie, Neil, Jr., Minneapolis  
 Decker, Lyall, Minneapolis  
 Estep, Harvey C., Minneapolis  
 Fleming, Frank R., St. Paul  
 Frary, Hobart D., Minneapolis  
 Granzow, E. F., Duluth  
 Gunderson, Alfred J., Pelican Rapids  
 Harwood, Stanley, Minneapolis  
 Holmgren, Charles E., Breckenridge

Hustad, Byron P., Granite Falls  
 King, Robert N., Minneapolis  
 Lagerstrom, Cornell A., Minneapolis  
 Larkin, Arthur E., St. Paul  
 Lowey, F. J., Brainerd  
 Morris, Thomas C., Lime Springs, Ia.  
 Nelson, Edward S., St. Paul  
 Nemece, Frank L., Montgomery  
 Norelius, Emil F., Luverne  
 Norton, Clyde W., Lisbon, N. D.  
 Peterson, G. T., New Ulm  
 Priedeman, George W., St. Paul  
 Shepherd, F. M., Minneapolis  
 Souba, W. H., Hopkins  
 Thompson, Raymond S., Monticello  
 Trabert, William, Minneapolis  
 Udell, Carl D., Wells

**ELECTRICAL ENGINEERS, 45.**

Boyum, Benjamin O., Rushford  
 Casberg, James M., La Crosse, Wis.  
 Chandler, Malcolm D., Calhoun Place  
 Cottingham, George, Jr.,  
 Helena, Mont.

Dahl, Newell H., Minneota  
 Evans, John L., Duluth  
 Fitts, Joel A., Minneapolis  
 Frahm, Alfred R., Rochester  
 Fruen, Arthur B., Minneapolis  
 Hetherton, Percival, Minot, N. D.  
 Hoppin, Glenn, Minneapolis  
 Hornebrook, James William, Tower  
 Hull, George E., Harwood, N. D.  
 Ingraham, Harry A., Minneapolis  
 Japs, Barney G., Carver  
 Karn, Merritt J., Winona  
 King, Alfred B., Welcome  
 Kreitter, Alfred L., Duluth  
 Leonard, Milton, Rochester  
 McAfee, Allan L., St. Paul  
 Miller, Walter H., Ada  
 Mooney, Stanton G., Minneapolis  
 Nordine, Louis F., Lake City

Noyes, Harold, St. Vincent  
 Oech, George F., Winona  
 Pancratz, F. J., Perham  
 Pardee, Harvey S., Minneapolis  
 Peterson, Clarence A.

**Blooming Prairie**

Peterson, Henry N., Monticello  
 Peterson, James C., Alden  
 Piper, Herman, Stillwater  
 Preine, Irving A., Minneapolis  
 Prentice, Robert S., Minneapolis  
 Sargent, Harry R., St. Paul  
 Schildt, Wm. F. H., Hastings  
 Schoepf, Alfred S., Appleton  
 Scobie, Francis G., Duluth  
 Simonson, Ernfried T., Minneapolis  
 Svendson, George, Minneapolis  
 Swanstrom, Frank, Lake Park  
 Sweningsen, Oliver, Austin  
 Thompson, H. L., Minneapolis  
 Vita, Theodore, Faribault  
 Weibler, Wm. M., Belle Plaine  
 Wilcox, Donald H., Minneapolis

**FRESHMAN CLASS.****CIVIL ENGINEERS, 42.**

Alwin, Sidney S., New Ulm  
 Andrews, George J., New London  
 Asleson, Hans, Dawson  
 Atkinson, William B., Barnesville  
 Bailey, Leslie D., Minneapolis  
 Bazil, Joseph G., Montgomery

Berthe, Alfred, Winona  
 Bill, Jesse R., Northfield  
 Birmingham, Thomas, Minneapolis  
 Boeringer, John R., St. Paul  
 Bookwalter, Joseph S., Minneapolis  
 Brownell, Otto E., Ely

Clinch, R. S., Rush City  
 Counter, John, Milbank, S. D.  
 Elsberg, William, Minneapolis  
 Ferguson, Walker, Minneapolis  
 French, Merritt, Hibbing  
 Gilbertson, John L., Atwater  
 Gjerberg, Ole, Red Lake Falls  
 Graham, J. R., Ft. Worth, Texas  
 Huntington, Edward, St. Paul  
 Ittner, William, Red Lake Falls  
 Jaques, Robert, Duluth  
 Jensen, Arthur H., Minneapolis  
 Johnson, Lynn, Benson  
 King, Lawrence, Minneapolis

Leach, Edward W., Winona  
 Merriell, Walter H., Minneapolis  
 Merrill, Lewis H., Hutchinson  
 Miss, Allan, St. Paul  
 Moffett, James H. C., Minneapolis  
 Olsen, Arthur O., Muskegon, Mich  
 Pratt, Benj. A., Minneapolis  
 Robbins, R. S., Red Lodge, Mont.  
 Schluter, Ernest, Hutchinson  
 Sheffield, Fred, Crookston  
 Sherbourne, Jos. L., Minneapolis  
 Smith, George H., Spring Valley  
 Torrance, Ell, Jr., Minneapolis  
 White, Clarence A., Montevideo

## MECHANICAL ENGINEERS, 42.

Allen, Clark, W., Minneapolis  
 Alton, Guy, St. Paul  
 Anderson, Oscar P., Wells.  
 Baird, Edward, St. Paul  
 Beery, Charles, Minneapolis  
 Bieri, John B., Wells  
 Brewster, Donald R., Minneapolis  
 Cone, Robert, Minneapolis  
 Dewart, Clement V., Minneapolis  
 Ertl, Oscar, Minneapolis  
 Farrington, Thayer B., Minneapolis  
 Ford, Paul Boynton, Minneapolis  
 Forfar, Donald M., Minneapolis  
 Haven, Frank, Excelsior  
 Hess, Arba L., Watertown, S. D.  
 Hoagland, Roger, Minneapolis  
 Holden, Erick G., Sioux Falls, S. D.  
 Kinnard, O. B., Minneapolis  
 Kircher, Frank J., Hudson, Wis.  
 Kircher, George A., Hudson, Wis.  
 Knopp, William, St. Paul

Lambert, Edwin, Young America.  
 Mark, Walter J., St. Paul  
 Mencke, Paul, St. Paul  
 Moritz, Roy W., St. Paul  
 Morris, John E., Minneapolis  
 Nichols, Browning, Montevideo  
 Palmer, P. E., St. Paul.  
 Pittman, Max, Anoka.  
 Rasmussen, Carl R., Faribault  
 Reiff, Ernest, North St. Paul  
 Robertson, Soren M., Artichoke Lake  
 Rosenthal, Maurice, Crookston  
 Segall, Julius, St. Paul  
 Shippan, Willis, Minneapolis  
 Starrett, Howard, Minneapolis  
 Sukey, Paul, Minneapolis  
 Warren, Alvah, St. Paul  
 Warren, William, St. Paul  
 Weld, Quade, Minneapolis  
 Wilkinson, Charles P., Minneapolis  
 Williams, W. S., Buffalo, N. Y.

## ELECTRICAL ENGINEERS, 69.

Batterton, Lyle K., Minneapolis  
 Beckjord, Walter, St. Paul  
 Bill, Jesse R., Northfield  
 Brockway, Alvah E., Luverne  
 Brown, Frank L., Ottumwa, Ia.  
 Carpenter, Ernest F., Redwood Falls  
 Cobban, Rollo, Luverne  
 Cook, Harry C., Red Wing  
 Councilman, Walter L., Minneapolis  
 Dada, Arch C., Cayuga, N. D.  
 Davies, Ralph M., Minneapolis  
 Denneen, John F.,  
     New Richmond, Wis  
 Dickinson, Walter, St. Paul  
 Duffy, Raymond, Kalspell, Mont.

Erwig, Martin, Minneapolis  
 Finke, W. J., Charles City, Ia.  
 Foker, Arnold, Minneapolis  
 Foss, Clarence, Milaca  
 Freese, LeRoy E., Hastings  
 Gadsby, Lester H., Minneapolis  
 Garen, George M., Stillwater  
 Grant, Fred R., Windom  
 Hall, Francis, Minneapolis  
 Hill, Clarence, Minneapolis  
 Hitzker, Albert, Winona.  
 Hunt, Thomas F., Le Sueur Centre  
 James, Henry, St. Paul  
 Johnson, Herman, Minneapolis  
 Johnson, Leonard, Lisbon

Kaplan, Eugene, Owatonna	Pettijohn, Lyle, St. Paul
Keeley, Bert C., Barnesville	Powles, James, St. Paul
Kiehle, James, Minneapolis	Radford, Joseph, Moorhead
Krauser, Aloysius, Minneapolis	Rosberg, Raymond, St. Paul
Kruschke, Geo. A., Duluth.	Sarette, Harvey E., Cloquet
Larson, Edwin, Fosston	Seeger, Walter G., St. Paul
Larson, Phinney, Fosston.	Shephard, George, Minneapolis
Layman, Jesse, Minneapolis	Sitzer, E. H., St. Paul
Lenz, Frank, Minneapolis	Skytte, Ernest, St. Paul
Lindelef, Charles G., Rush City	Slayton, Ernest, Sault Ste Marie, Ont.
Long, Raymond, Excelsior	Stahlman, Henry C. G., St. Paul
McBrady, Alphonsus, Graceville	Stillman, Marcus, Austin
McKenzie, L. F., Glencoe	Stover, Lester, Minneapolis
McLaughlin, Mark, Mapleton .	Stransky, Jos. M., Owatonna
Marshall, James, Red Lake Falls	Thayer, Arthur, Spring Valley
Mowry, J. L., Minneapolis	Turner, Leslie E., St. Paul
Mulr, John, Minneapolis	Underwood, Clarence, Hutchinson
Murrish, Fred, Minneapolis	Walling, Benjamin, Winona
Nutter, Clifford, Minneapolis	Webb, Harvey, West Concord
Ober, Floyd, Minneapolis	Young, Andrew, Duluth

## UNCLASSED, 7.

Avedovech, Myer, Minneapolis	Poore, Orson B., Bird Island
Clarke, Charles P., Elysian	Sturtevant, P., Detroit City
Fleming, D. R., St. Paul	Taylor, W. Bronson, Litchfield
Mitchell, Donald, Minneapolis	

## COURSE NOT SPECIFIED, 17.

Birnberg, Zingel, St. Paul	Kixmoeller, Henry G., Minneapolis
Buck, Frederick, Duluth.	Lindesmith, Arthur E., Owatonna
Childs, James A., St. Paul	McClure, H. W., Litchfield
Duncanson, Archie, Stewartville	McMillan, Edward, Robbinsdale
Foss, Elmer, Minneapolis	Schain, George A., Browns Valley
Friedman, Benjamin, St. Paul	Tolstad, Martin, Starbuck
Gustafson, Theodore, Storden	Voss, Fritz H., Mandan, N. D.
Helm, Clyde B., Two Harbors	Wright, Harris H., Farmington
Hopkins, Mark L., Bloomington	

## SCIENCE AND TECHNOLOGY.

## FRESHMAN CLASS, 4.

Arnesen, Burk, Benson	Hield, Clifford, Minneapolis
Hess, Charles L., Glencoe	Kelley, E. F., Minneapolis

## SOPHOMORE CLASS, 4.

Curtiss, Lindsley B., Minneapolis	Thomson, H. S., Minneapolis
Moore, Earle M., Minneapolis	Van Sicklen, William, Hutchinson

## THE SCHOOL OF MINES

## SENIORS—13

Brandt, John, St. Paul.  
 Clement, Lester, Winona.  
 Harrington, Guy P., Hutchinson.  
 Howes, Frank T., Minneapolis.  
 Kurtzman, Paul S., Rochester.  
 Moenke, William F., Belle Plaine.  
 Morgan, Charles, Zumbrota.

Neustadt, B. R., La Salle, Ill.  
 O'Connor, Edward S., Highwood.  
 Rawson, Horace C., Fergus Falls.  
 Rose, William A., Duluth.  
 Wallace, Geo. W. Jr., Duluth.  
 Wheeler, Walter H., Minneapolis.

## JUNIORS—21.

Bassett, R. H., Minneapolis.  
 Cowin, James, Minneapolis.  
 Edwards, Frank R., Bowdle, S. D.  
 Gillan, S. L., Minneapolis.  
 Hanks, I. B., Minneapolis.  
 Jackson, Charles F., Minneapolis.  
 McCreery, Arthur, Northfield.  
 McRae, Randolph J., Duluth.  
 Malcolmson, G. E., Minneapolis.  
 Noehl, B. F., Kasson.

Oberg, Anton C., Watertown.  
 Olund, H. E., St. Paul.  
 Parker, Walter H., Stillwater.  
 Parks, Edgar K., St. Paul.  
 Probst, E. A., Minneapolis.  
 Roed, Olaf, Minneapolis.  
 Smith, Edgar W., Minneapolis.  
 Steele, Charles W., Minneapolis.  
 Swenson, Karl P., Minneapolis.  
 Wiest, M. A., New Rome.  
 Ziesemer, Harry M., Fergus Falls.

## SOPHOMORES—40.

Barclay, Durant, St. Paul.  
 Becker, John A., Hastings.  
 Bischoff, Harry, St. Paul.  
 Bliss, Herbert S., Duluth.  
 Boyle, Patrick J., Brainerd.  
 Clark, W. G., Minneapolis.  
 Congdon, William B., Duluth.  
 Crowley, Jay, Stillwater.  
 Dahl, C. F., St. Hilaire.  
 Davy, Jesse J., Stewart.  
 Dedolph, Fred, St. Paul.  
 Deichen, William A., St. Paul.  
 Farnam, F. C., Minneapolis.  
 Fletcher, R. H., Minneapolis.  
 Fugile, A. E., Ashby.  
 Garrity, Harry, Minneapolis.  
 Goodwin, W. R., Minneapolis.  
 Grimes, John Alden, Minneapolis.  
 Grygla, Eugene, Minneapolis.  
 Halladay, F. C., Brainerd.

Haynes, Jack E., St. Paul.  
 Hoas, Ole G., McIntosh.  
 Hull, Wm. N., Minneapolis.  
 Jacobson, Robert, St. Paul.  
 Kennedy, J. J., St. Paul.  
 Kennedy, Thomas, St. James.  
 Knickerbocker, Arthur, Staples.  
 Locke, Alfred, Minneapolis.  
 Millar, H. A., Minneapolis.  
 Miss, Walter, St. Paul.  
 Olmstead, John S., St. Paul.  
 Parkhill, Walter, Pelican Rapids.  
 Peterson, Joseph S., Minneota.  
 Rood, Lynn, St. Paul.  
 Snyder, S. O., St. Paul.  
 Strong, John L., St. Paul.  
 Tyler, Adin P., Minneapolis.  
 Vanstrum, George R., Minneapolis.  
 Young, Courtland J., Superior, Wis.  
 Zaiser, Hugo V., Red Lake Falls.

## FRESHMEN—47.

Akin, Howard M., Willow River.  
 Anderson, A. Truman, Minneapolis.  
 Baas, Roy S., Moline, Ill.  
 Caldwell, Harold A., Minneapolis.  
 Channon, William, Minneapolis.  
 Chelsey, J. G., Minneapolis.  
 Cole, Willard, Lisbon, N. D.  
 Conkey, Charles R., Minneapolis.  
 Farrington, Thayer B., St. Paul.  
 Flanner, Edwin T., Minneapolis.  
 Fritzberg, Ernest A., Biwabik.  
 Gaston, LeRoy, Minneapolis.  
 Gavin, Lawrence T., Staples.  
 George, David W., Pipestone.

Grant, Roy C., Duluth.  
 Graves, A. Richard, Minneapolis.  
 Heath, Clarence L., Janesville.  
 Hedenstrom, Louis H., St. Paul.  
 Hedlin, P. T., Minneapolis.  
 Hicks, Lincoln C., Rochester.  
 Hoyt, Samuel, Minneapolis.  
 Johnson, Charles W., Chisago City.  
 Johnson, Karl O., Minneapolis.  
 Johnson, Lloyd W., Minneapolis.  
 Jones, Leonard R., Minneapolis.  
 Kearney, George S., Minneapolis.  
 Knox, Fay, Grand Rapids.  
 Lathrop, Harry, Minneapolis.

Lawrence, M. J., Wahpeton, N. D.  
 Mihlisen, F. R., Minneapolis.  
 Moir, Arthur D., Minneapolis.  
 Moody, R. G., Minneapolis.  
 Mowatt, William F., Delano.  
 Newell, John R., Shakopee.  
 Perkins, Allyn F., Colorado Springs,  
 Colo.  
 Quade, Edward H., Janesville.  
 Ruble, Ray, East Chain Lake.

Santo Julius H., Janesville.  
 Shields, L. J., St. Paul.  
 Swanson, Axel, Monticello.  
 Swartz, Samuel G., St. Paul.  
 Taylor, Harold, Minneapolis.  
 Teachout, Leigh, Lake Crystal.  
 Thomas, Clarence, Minneapolis.  
 Wharton, N. Earl, Ashland, Wis.  
 Wiley, Carl M., Minneapolis.  
 Williams, Homer A., Minneapolis.

## THE SCHOOL OF CHEMISTRY

### FRESHMEN—21.

Baas, R. S.  
 Bacon, Charles  
 Bills, Eugene  
 Browne, Caro  
 Castor, Paul B.  
 Chesnut, Edward T.  
 Dahlberg, Henry W.  
 Gray, Robert P.  
 Jenne, Magnus  
 Lovdahl, Arthur  
 Merrill, A. Reba

Merritt, Abbie L.  
 Morey, George W.  
 Pratt, Robert A.  
 Robinson, I. D.  
 Roehrich, Victor  
 Selvig, W. A.  
 Sprague, Clyde H.  
 Sterling, Faith  
 Thompson, Ward  
 Weeks, Arthur

### SOPHOMORES—7.

Badger, Walter L.  
 Barnaby, William E.  
 Kuefner, Otto K.  
 McBride, R. S.

Richards, John C.  
 Thomson, H. Britton  
 Wallace Lulu

### JUNIORS—17.

Anderson, Edward  
 Cressy, Charles R.  
 Davies, Edwin T.  
 Doran, James M.  
 Frazier, W. H.  
 Fuller, Harry B.  
 Gray, Carl W.  
 Haggard, Mildreth  
 Hawley, Neal C.

Kennedy, William W.  
 Lowe, John M.  
 Manuel, Earle V.  
 Neumann John X.  
 Newton, H. M.  
 Porter, A. Harold  
 Von Kuster, Edith  
 West, Rodney M.

### SENIORS—12.

Bernhagen, Lewis O.

Whited, Orle O.

## THE COLLEGE OF AGRICULTURE

### SENIORS—12.

Cox, William Thomas, Washington,  
 D. C.  
 Detwiler, Samuel B., Colorado  
 Springs, Colo.  
 Gaumnitz, Amos John, Berkeley,  
 Calif.  
 Leager, Marc Carl, Aberdeen, S. D.  
 Muir, Harry Scott, Winnebago City

Peck, William Argylus, Washington,  
 D. C.  
 Peterson, William Arnold, Olivia  
 Rockwell, Frank I., Brooklyn Center  
 Southworth, Pierre Duane, Mondovi,  
 Wis.  
 Thompson, A. Adel, Cottage Grove  
 Tierney, Dillon P., Farmington  
 Torrance, James B., Minneapolis

## JUNIORS—4.

- Blair, Donald Scripture, St. Anthony Park  
 Canavarro, George de S., Honolulu
- Rose, John de Cew, St. Anthony Park  
 —Tomhave, William H., Fergus Falls

## SOPHOMORES—13.

- Ainslee, George, Rochester  
 —Cady, LeRoy, St. Anthony Park  
 Frear, Dana Walter, St. Anthony Park  
 —Gaumnitz, Carl, St. Cloud  
 Knorr, Frederick, Fort Collins, Colo.  
 Mayland, Edwin, Rushford
- Moore, Walter M., Merriam Park  
 Orr, Raymond, St. Anthony Park.  
 Pfaender, Maximilian, New Ulm  
 Potter, Alden A., Minneapolis  
 Robinson, Mabel, Minneapolis  
 Skoglund, Walter L., Red Wing  
 White, Hall B., Winnebago

## FRESHMEN—18.

- Ainsworth, W. L., Minneapolis  
 Bingham, Charles L., St. Paul  
 Bergstrom, C. H., St. Anthony Park  
 Blackburn, James R., Royal, Neb.  
 Carrol, Harry B., St. Paul  
 Cooper, Thos. P., Minneapolis  
 Foster, Jeanette Ora, St. Anthony Park  
 \*Harris, Dwight, K., Winona  
 McNelly, Chester L., Caledonia  
 \*Died Mar. 25, 1906.
- Miller, Ralph C., Minneapolis, Sta. F. R. 1.  
 Paterson, Thomas, St. Cloud  
 Peterson, Eric, Dawson  
 Peterson, Elvin, L., Olivia  
 Strunk, Blanche, Faribault  
 Titrud, Ole L., Cokato  
 Underwood, Clarence, Minneapolis  
 West, Ralph L., Minneapolis  
 White, William, Camden, N. J.

## SPECIALS—3.

- Gayman, Leah M., Minneapolis  
 Mapother, P. G., Louisville, Ky.  
 Newell, P. F., Minneapolis

## THE SCHOOL OF AGRICULTURE

## "Intermediate Year" Students.—16.

- Angell, James B., White Bear Lake  
 Curtis, Jay L., Alexandria  
 Dixon, Helen C., Mora  
 Garrett, Harry D., Little Falls  
 Greaves, Harold A., Saskatoon Can  
 Gudal, Jorgen O., Briceyn, R3  
 Hendrickson, Catherine, Grant  
 Laate, Gurd, Skare, Norway  
 Svarstad, Anne, Bath, S. Dak
- Larson, John S., Ulen, R 1  
 Lathrop, Elbe A., Hugo, R29, Box 53  
 Ley, Peter J., Kellogg  
 Merrill, Alfred S., Minneapolis  
 Parten, Lillie T., Minneapolis  
 Peterson, Eric L., Dawson  
 Pond, Harold H., Minneapolis,  
 Sta. F. R. 1.

## "A" CLASS 108

- Aanes, Susanna, Clarkfield, R 1  
 Anderson, Albert Brown, Goodhue,  
 R. 2
- Anderson, Henry W., Starbuck  
 Anderson, Martha J., Mattson  
 Bailey, Phoebe G., Duluth  
 Barker, Emil V., Atwater R. 3  
 Beaulieu, Francis D., White Earth  
 Bellinger, Fred W., Cannon Falls  
 Berg, Lena M., Lonsdale, R. 2  
 Bergh, Edmund C., Hendrum  
 Billings, Carlos R., Audubon  
 Borlaug, Helen Marie, Kenyon  
 Bost, Maurice A., Excelsior  
 Bowen, Ray R., Kanaranz
- Bredvold, August J., Belview  
 Brekke, Andrea J., Kenyon, R. 5  
 Bren, Samuel A., Hopkins  
 Burger, Irene E., Staples  
 Carlson, Lillian, Minneapolis  
 Clapp, Harry H., Roberts, Wis.  
 Corser, Frederick, Minneapolis  
 Crimmins, Ellen M., Minneapolis  
 Dahlberg, Anne E., Fergus Falls  
 Dahlquist, Henry D., Warren  
 Dedon, Denton P., Taylors Falls  
 DeMars, Stuart A., Minneapolis  
 Dixon, Samuel C., North St. Paul  
 Doyle, John B., Wayzata  
 Dusschee, James T., Lauesboro

- Edwards, June A., Spring Valley  
 Erickson, Oscar, Owatonna  
 Flom, Halvor A., Kenyon, R. 5  
 Gammell, Myrtle A., Spring Valley  
 Greenwalt, Lillian C., Withrow  
 Gudal, Nellie B., Bricelyn, R. 3  
 Hall, Ray N., Winnebago  
 Halvorsen, Magnus J., Norway Lake  
 Hanson, Almon J., Big Lake  
 Hathaway, Floyd Cecil, Amboy, R. 1  
 Haugen, Olaf O., Zumbrota, R. 6  
 Hille, Hans O., Webster  
 Hjermstad, Morten, Balaton  
 Howard, Minnie S., St. Paul  
 Jacobson, Oscar P., Fawndale, R. 1  
 Jaquith, Roy E., Minnetonka, R. 1  
 Johnson, Charles N., Northfield, R. 4  
 King, Mary Inez, Spring Valley, R. 4  
 Krogh, George F., St. Anthony Park  
 Lathrop, Orley K., Hugo, R. 29  
 Lenhart, Ella M., Minneapolis  
 Lunde, Sigrid, Spring Grove, R. 2  
 McArthur, Graham S., Hancock, R. 3  
 McClure, Wayne C., Joliet, Ill.  
 Maring, Gemine, Dennison, R. 2  
 Marple, Ruth L., Wendell  
 Meisch, Henry A., Minnesota City,  
 R F D.  
 Melsness, Martin G., Sacred Heart,  
 R. 3  
 Mielke, George H., Dundas  
 Monson, Eva D., Elbow Lake, R. 2  
 Moore, Chester A., Stewart, R. 2  
 Murphy, Harley F., St. Paul  
 Noltmier, Zoa E., St. Paul  
 Norskog, Conrad B., Eddsville  
 Palmer, William S., Afton, R. 1  
 Pearson, Julick, Gladstone  
 Pederson, Emma P., Cannon Falls  
 Perkins, Bert B., Monticello  
 Peter, Emil, West St. Paul, R. 2  
 Peterson, Wallace E., Waverly, R. 2  
 Pickett, Allan L., Superior, Wis.  
 Pourtales, Louis F., Northfield  
 Ramstad, Elvin S., Audubon  
 Rathjen, William, Kanaranz  
 Riechel, Anna M., Faribault, R. 4  
 Rischatsca, Edward L., St. Paul  
 Roberts, Arthur H., Roberts  
 Rothl, Albert, Kenyon, R. 3  
 Rudolph, Charles E., Annandale  
 Sampson, Walter C., Strout  
 Sargent, Forrest H., Red Wing, R. 2  
 Savage, Edward W., Windom  
 Schrepel, Claudena L., Le Sueur  
 Seager, Clarence L., Cannon Falls  
 Seavey, Clark H., Los Angeles, Cal.  
 Sonstegard, Peter O., Georgeville,  
 R. 1  
 Southworth, Pierre D., Mondovi, Wis.  
 Stromberg, Edwin O., Buffalo, R. 2  
 Swenson, Eva E., St. Paul  
 Swezey, Addie A., Clinton  
 Swoffer, Walter A., Walnut Grove  
 Tanner, Eliza M., Brownsdale  
 Taylor, George S., Litchfield  
 Thayer, Alvin E., Forsman, Ind.  
 Thompson, Agnette J., Hazel Run  
 Thorpe, Florence A., Long Lake  
 Trondson, Albert O., Lakefield  
 Trovatten, Louis H., Hanley Falls,  
 R. 1  
 Turner, Elmo, St. Paul  
 Ulrich, Edward H., Biscay  
 Urness, Elizabeth M., Kenyon, R. 1  
 Veeder, George F., Minneapolis  
 Vinje, Svein, Dalton, R. 1  
 Von Wald, Herbert C., Nerstrand  
 Voxland, Halvor L., Kenyon, R. 4  
 White, Frank W., Marshall  
 Wickstrom, Elizabeth B., Anoka, R. 1  
 Wilson, Cora, Granite Falls, R. 1  
 Winters, Chester J., Mazeppa, R. 3

## "B" Class—155

- Ainslie, Robert T., Chatfield, R. 1  
 Anderson, Albert C., Albert Lea, R. 6  
 Anderson, Reuben W. E., Linstrom  
 Ashworth, Harold E., Minneapolis  
 Atz, Lloyd A., Hancock  
 Austin Reed S., Minneapolis  
 Babcock, Genevieve, St. Paul  
 Baker, Emmet D., Josephine, Mont.  
 Barsness, Fred, Kenyon, R. 6  
 Bassett, Morton H., Rushmore  
 Belgum, Ella, Farwell  
 Bennett, Frank G., Argyle  
 Berg, Joseph Henry, Willmar, R. 1  
 Blehrud, Knute, Spring Grove, R. 2  
 Boese, Freda M., Atwater  
 Bohanon, Archie C., Minneapolis  
 Bollum, Olaf E., Goodhue, R. 3  
 Bowman, May V., Minneapolis  
 Brandt, Henry P., Morris, R. 1  
 Brown, Edward W., Luverne  
 Carlisle, Clifford A., Stacy  
 Carpenter, Paul J., Sleepy Eye, R. 5  
 Chermak, Mabel C., Chatfield, R. 4  
 Chermak, Minnie, Chatfield, R. 4  
 Christie, Howard C., Kawende,  
 Manitoba  
 Clark, Scott G., Morris  
 Cleator, Fred W., Minneapolis  
 Comings, Geo. H., Eau Claire, Wis.  
 Cooley, Harvey W., Minneapolis  
 Dodds, Mabel, Wheaton  
 Durkee, Flora B., Hancock  
 Durkee, Philander A., Hancock  
 Drysdale, Clarence, St. Charles  
 Ekman, Sidney, St. Anthony Park  
 Evans, Catherine M., Merriam Park  
 Evenson, Otto T., Sacred Heart, R. 3  
 Field, Carl, Nora Springs, Ia.  
 Field, Martin, Nora Springs, Ia.  
 Foslein, Theodore, Garfield  
 Fruechte, Franklin H., Eitzen  
 Gage Marjorie H., Minneapolis  
 Garrett, Walter C., New Brighton  
 Gilles, Dewitt C., Minneapolis  
 Greenwalt, Dorothy, Withrow  
 Greenwalt, James A., Withrow  
 Hall, Fay E., Morris  
 Hall, Jessie M., Minneapolis



Hallan, Joseph A., Spring Grove  
 Halvorson, Josephine E., Norway  
 Lake  
 Harper, Sidney R., West St. Paul, R 1  
 Harris, John S., Merriam Park  
 Haw, John W., Superior, Wis.  
 Held, Julius W., St. Louis Park, R. 1  
 Heywood, Ralph M., Minneapolis  
 Hickman, Emmett E., Minneapolis  
 Higgins, Bradley C., Levant, Maine  
 Holden, Dec. Amboy  
 Holmquist, Oscar W., Dawson, R. 1  
**Howard, Burt, Madella**  
 Hunstad, Peter N., Bath S. Dak.  
 Hurley, Vincent A., Louisberg  
 Ingalls, Clyde C., Merriam Park  
 Irvine, Robert, St. Paul  
 Jacobson, Mabel L., Baldwin, Wis.  
 R. 4  
 James, Edwin, Glenwood, R. 1  
 Johnshoy, Selma H., Starbuck, R. 2  
 Johnson, Albert W., Lafayette, R. 1  
 Johnsrud, Peder L., Spring Grove  
 R. 3  
**Johnston, Theodore, Madison**  
 Keller, Elmer J., Dundas, R. 1  
 Keller, Martha K., Dundas, R. 1  
 Kern, Harry E., Minneapolis  
 Lamb, Eva J., Mazeppa, R. 3  
 Lane, Dwight J., Minnetonka, R. 2  
 Langseth, Clarence C., Worthington,  
 R. 2  
 Layman, Walter D., Minneapolis R. 3  
 Lewis, Pauline L., Long Lake  
 Linde, Ernest A., Abercrombie, N. D.  
 Linder, Leopold S., Mankato  
 Loomer, Frederick A., Sherburn, R. 2  
 Lowe, Florence L., St. Anthony Park  
 Lundgren, Magda E., Excelsior, R. 3  
 Lundholm, Agnes M., St. Paul  
 Lydiard, Susla C., Long Lake  
 Marple, Paul A., Wendell  
 Marquardt, Minnie E., St. Paul  
 Maylott, George A., Hancock, R. 2  
 Mayne, Mac H., Maple Lake  
 Miller, Estella A., Excelsior, R. 1  
 Monson, Irving A., Elbow Lake, R. 2  
 Monson, Laura L., New London  
 Monson Orville J., Elbow Lake, R. 2  
 Mork, Ludwig H., Bricelyn  
 Nicholson, Iry M., St. Paul  
 Noltmier, Mark, St. Paul  
 Norin, Ada M., Willmar, Box 777  
 Norling, Albert L., Svea, R. 1  
 Nowlan, Hazel E., Minneapolis  
 Ohnstad, Louis, Cannon Falls, R. 1  
 Olsen, Oscar F., Delhi  
 Orr, Harry C., Afton, R. 14

Pattee, Ralph E., Minneapolis  
 Pederson, Christine, Clarkfield  
 Pengilly, Mary E., Shakopee, R. 1  
 Peterson, Edwin R., Willmar  
 Peterson, Estella H., Stillwater, R. 3  
 Peterson, Walter E., Canton  
 Phillely, Edgar E., Lewisburg, R. 1  
 Phillips, Ellen A., Excelsior, R. 3  
 Phillips, Richard, Le Sueur, R. 1  
 Quam, Oscar A., New London  
 Quist, Emil, Nicollet, R. 2  
 Rask, Oliver H., Hendrum  
 Raymond, Newton, Minneapolis  
 Reidhead, John M., Osseo, R. 1  
 Robbins, Leon H., Clear Water  
 Robey, Thornton W., River Falls,  
 Wis.  
 Robinson, Mabel, Minneapolis  
 Sagness, Lena H., Sacred Heart, R. 3  
 Sampson, Blanche, Excelsior, R. 1  
 Samuelson, Levi, Lafayette, R. 1  
 Sandager, Martin N., Belview, R. 1  
 Schilling, Jacob, Plainview, R. 4  
 Scott, Warner C., Minneapolis, Sta.  
 F., R. 3  
 Seip, Henry, Beardsley, R. 1  
 Sewall, Thomas R., St. Paul  
 Shelley, Ella, Hanska  
 Sherman, Alton C., Clinton  
 Smith, Ethelyn I., Minneapolis  
 Solhaug, Louis G., Starbuck, R. 5  
**Staples, Alice M., West St. Paul, R. 2**  
 Stickney, Horace T., Clear Lake  
 Strate, Louis A., New Ulm, R. 1  
 Strate, Wm. E., New Ulm, R. 1  
 Strombo, Mattie P., Dalton  
 Stuhr, Anna H., Buffalo  
 Swedberg, Jasper I., White Bear  
 Lake  
**Tomte, George A., Sacred Heart**  
**\*Torgerson, Henry C., Lanesboro**  
 Triefoff, Erick C., Carver  
 Trondson, Ole, Lambertson, R. 2  
 Trovatten, Birdie, Park River, N. D.  
 Turner, Winfield H., St. Peter, R. 1  
 Underleak, Frances, Chatfield  
 Venzke, Harry E., Cardigan Jct.  
 Ward, Guy H., Carver, R. 1  
 Watkins, Walter O., Carlton  
 Wedge, Jesse C., Albert Lea  
 White, Winnifred E., Winnebago,  
 R. 1  
 Wilcox, Richard S., White Bear Lake  
 Wilcox, William W., White Bear Lake  
 Wilkins, Chester A., Minneapolis  
 Wille, Fred H., Hancock, R. 2  
 Winge, Oscar E., St. Paul  
 Zamwinkle, Charles G., Morton, R. 1

## "C" Class—257

Adkins, Alice E., Minneapolis  
 Ahlquist, Margaret E., St. Paul  
 Ahlstrom, Hilda O., Wheaton  
 Akin, Jesse, Willow River  
 Albers, Mary W., Northfield  
 Allan, William D., Redwood Falls  
 Anderson, Agnes E., Alexandria, R. 1  
 Anderson Elmer O., Alexandria, R. 1  
 Anderson, Fred A., Minneapolis

Anderson, Oscar C., Lanesboro  
 Anonby, Annie, Kasson  
**Arhart, Ira, New Ulm**  
 Ayers, Edward B., St. Paul  
 Ayers, Frederick S., St. Paul  
 Bacheller, Herbert S., Forest  
 Lake, R. 26  
 Bakken, Harry O., Faribault  
 Barsness, Thilda, Glenwood

\*Died. March 28.

- Beach, Paul G., Warren  
 Beckstrand, Andrew C., Brookfield  
 Behlen, Henry W., Appleton  
 Berg, Alma, Minneapolis  
 Berg, George E., Northfield  
 Berg, Rosa R., Dundas  
 Bird, Walter F., Minneapolis  
 Bofferding, Clara S., Minneapolis  
 Bradley, Clifford E., St. Paul Park  
 Bushard, Francis, New Ulm, R. 1  
 Busse, Rose O., Merriam Park, R. 8  
 Butterfield, Elsie M., Faribault  
 Calkins, John E., Imogen, R. 1  
 Cantwell, William F., White Bear  
 Carpenter, Fred B., Sleepy Eye, R. 5  
 Charles, Ernest H., Hancock  
 Chester, Amanda O., Osseo, Wis  
 Church, George H., St. Paul  
 Clark, Margaret L., Osseo, R. 5  
 Cleland, Edgar J., Waseca  
 Cole, Mary E., New York Mills  
 Cole, Nathaniel M., St. Louis Park  
 Colombe, Robert D., Little Falls  
 Cooper, Percy E. R., Minneapolis,  
 Sta. F., R. 5  
 Cowin, Alton B., Minneapolis  
 Cranmer, Max A., Duluth  
 Cross, Harrison J., Childs  
 Dalagher, Sophus A., Glenwood  
 Dayton, George N., Minneapolis  
 Demann, Frank A., Lonsdale, R. 2  
 Denison, Ena L., Faribault, R. 7  
 Dodds, Edgar, Wheaton  
 Doely, Helmer S., Spring Grove  
 Dorn, Ivan C., Brooklyn Center  
 Dotseth, Nettie O., Clarkfield  
 Dow, Charles F., Worthington  
 Eklund, Carl J., Brookston  
 Embertson, George, Grue  
 Engelstad, Louisa E., Thief River  
 Falls  
 Engstrand, Adolph G., Dawson  
 Enright, John P., Rose Creek  
 Erb, Thomas H., Clarence, N. Y.  
 Finkbliner, David E., Roversford, Pa.  
 Flaten, Mabel, Granite Falls  
 Follingstad, Henry A., Zumbrota,  
 Forbes, Charles S., West Side Sta.,  
 St. Paul  
 Frank, Benhard, New Ulm  
 Freebury, Harry M., Little Fork  
 Furber, Alice M., Cottage Grove,  
 R. 16  
 Gammel, Warren H., Chatfield  
 Gaumnitz, Emma M., St. Cloud, R. 1  
 Gee, Merrill H., Minneapolis  
 Gillingham, Emille J., St. Paul  
 Glasrud, Arthur S., Spring Grove,  
 R. 6  
 Goenner, Henry H., Clear Lake  
 Gore, John F., Redlands, Cal.  
 Gottfried, Ella, Merriam Park,  
 R. F. D.  
 Gronewald, Almon J., Connell,  
 Wash.  
 Hagen, Norman, Granite Falls, R. 1  
 Hamilton, Horace L., St. Louis Park  
 Hancock, Morris W., Mankato  
 Hanratty, Joseph A., Barry, R. 2  
 Hanscome, Clarence P., Brooklyn  
 Center  
 Harper, Lloyd J., St. Paul  
 Harrison, Earl D., Osseo, R. 1  
 Hart, Iva P., Farmington  
 Haslerud, Oliver, Rushford, R. 3  
 Hasslen, Anna, St. Paul  
 Hastad, John L., Appleton, R. 3  
 Haugen, Knute, Clarkfield, R. 1  
 Hazelton, Lyman W., Appleton  
 Hefty, Inoh P., Spring Grove  
 Hegdahl, Josephine, Belvlew  
 Hegland, Harvey L., Canton, R. 1  
 Helgemoe, Julla E., Canby  
 Herum, Haldor C., New Centerville,  
 Wis.  
 Hickman, Irene R., Hamline  
 Hoglund, Herbert, Pennock, R. 2  
 Hojem, Adolph, Springfield  
 Hojem, Lewis A., Springfield  
 Holden, Edwin, Corson, S. Dak.  
 Holt, Harry G., Delhi  
 Hoyde, Frederick T., Hanska  
 Hummel, Max, New Ulm  
 Hunt, N. K., St. Cloud  
 Hunt, Florence A., St. Cloud  
 Hunt, Freed K., St. Cloud  
 Hurning, Elmer R., Chatfield  
 Huseby, Bennie J., Adams  
 Johnson, Clara V., New Richmond,  
 Johnson, Emma S., St. Paul Park  
 Johnson, Ernestine M., St. Paul  
 Johnson, Henry A., Taylors Falls  
 Johnson, Henry E., New Richland,  
 R. 4  
 Johnson, Joseph Arthur, Center City  
 Johnson, Walter, Red Wing, R. 8  
 Johnsrud, Clara L., Spring Grove,  
 R. 3  
 Jones, Clarence A., Duluth  
 Jones, Myrtle M., Le Sueur, R. 6  
 Kalstad, Julius C., Glenville, R. 2  
 Keller, John W., Dundas, R. 1  
 Kelley, Lloyd S., Markville  
 Kern, Roy S., St. Paul  
 King, Edwin H., Spring Valley, R. 4  
 Knight, Amy F., Colgate, N. Dak.  
 Knight, Grace L., Colgate, N. Dak.  
 Knight, Herbert M., Colgate, N. D.  
 Kronlokken, Lars A., Renville  
 Kronlokken, Martha G., Renville  
 Kroshus, Andrew, Spring Grove, R. 4  
 Kvittem, John A., Kenyon, R. 1  
 Lambert Lenora M., Withrow  
 Lane, Geo. E., Minnetonka, R. 2  
 Larson, Henrietta A., Tlen, R. 1  
 Larson, Marie S., North Branch  
 Lathrop, Alden B., Hugo, R. 29,  
 Box 53  
 Laughlin, Lee, Ada  
 Leathers, Stanley W., Brooklyn  
 Center  
 Lewis, Roy, Lewisville  
 Lindall, Carl O. R., Parkers Prairie  
 Lindgren, Rose S. T., Stillwater  
 Park  
 Loegering, Aloysius J., Long Prairie  
 Lommen, Wm. A., Caledonia

\*Died March 5th, 1906

- Loucks, Menzo C., Hutchinson  
 Lundberg, Henry, N. P. Ashby  
 Lundgren, Wm. Anthony, Excelsior, R. 2  
 Lundquist, Mabel V., Winthrop  
 Lyman, Walter S. Jr., Clinton  
 McClary, Clyde F., Minneapolis  
 Marsden, Lawrence N., Luverne  
 Marsden, Viola E., Edgerton, Wis., R. 3  
 Maylott, Eugene A., Hancock, R. 2  
 Melwold, Dena, Fairfax, R. 1  
 Miller La Verne A., Fort Madison, Ia.  
 Mitchell, Warren F., Osseo, R. 4  
 Monson, Clara, Kenyon, R. 4  
 Monson, Grace V., Elbow Lake  
 Nakamura, Yoshitaro, Tokio, Japan  
 Nash, Floyd E., Robbinsdale  
 Nellerroe, Jay C., Sacred Heart  
 Nelson, Albert L., Taylors Falls, R. 1  
 Nelson, Emil R., Canby  
 Nelson, Ida C., Alexandria  
 Nesbit, Sidney, Mondovi, Wis.  
 Ness, Charles R., Litchfield, R. 7  
 Newman, Jesse, Stroud, Okla.  
 Nolte, Fred A., Ellsworth  
 Norman, Edwin C., Traverse  
 O'Bryan, Allen P., Little Falls  
 Oleson, Victor, Perley  
 Olson, Luther E., Cannon Falls, R. 8  
 Orton, Herbert O., Elk River  
 Ostrem, Martin J., Lanesboro, R. 1  
 Overlie, John E., Wrenshall  
 Parish, David A., Mondovi, Wis.  
 Paulson, Emil, Windom  
 Pedrick, Wm. H., Minneapolis  
 Pentz, Kenneth W., Faribault  
 Person, Fred A., Hugo  
 Peterson, Alice B., New Ulm R. 3  
 Peterson, August W., Brookfield, R. 2  
 Peterson, Fred O., Olivia  
 Peterson, George W., Canton, R. 1  
 Peterson, Mamie C., Parkers Prairie  
 Peterson, Nels L., Worthing, S. D.  
 Potter, Olive M., Springfield  
 Potter, Reuben M., Springfield  
 Ramstad, Peter N., Ada R. 1  
 Reasoner, Margretta, New Brighton  
 Rees, James, Sheldon, Ill.  
 Remund, Arthur C., Waseca, R. 3  
 Richter, Edward A., Montgomery  
 Richter, Louis W., Montgomery  
 Ricks, Nelson Depew, Minneapolis  
 Ringrose, Lura, Hancock  
 Robertson, John E., Appleton  
 Robinson, Alta E., St. Paul  
 Rollefson, Thea S., Clarkfield  
 Routhe, Anton C., Morgan  
 Routhe, Walter L., Morgan  
 Rustad, Minnie, Dalton  
 Sargent, Ray L., Red Wing, R. 2  
 Saul, Myrtle M., St. Paul  
 Sheie, Ada L., Halstad  
 Schlegel, Alfred, Le Sueur  
 Schmid, Victoria M., Springfield  
 Schmidt, Wm. A., Osseo, R. 1  
 Schreck, John P., Appleton  
 Sederstrom, Joseph W., Montevideo  
 Selbig, Florence M., St. Paul  
 Selnes, Julia, Spring Grove, R. 4  
 Skalbeck, Joseph, Sacred Heart  
 Sheaff, Philip L., Stillwater  
 Shumway, Frank E., Minneapolis  
 Sontag, George A., Somerset, Wis.  
 Spence, Alice V., Hamilton, Ill.  
 Spence, John C., Hamilton, Ill.  
 Squire, Homer H., Hanley Falls  
 Staples, Myrtle C., West Side Sta., St. Paul, R. 2  
 Stepka, Sophie M., Minneapolis  
 Stevens, Ruth E., Minneapolis  
 Stewart, Whitney B., Alpha  
 Strand, Elmor A., Ada, R. 2  
 Strand, Marcus, Elbow Lake  
 Strate, Wilbur J., New Ulm, R. 1  
 Swain, Lawrence B., St. Paul  
 Swanson, Anna C., St. James, R. 4  
 Swanson, Robert J., Dassel  
 Swenson, Charlie H., Dawson  
 Thoe, Bertha F., Hayfield  
 Thom, John R., Stewart  
 Thompson, Norris R., St. Paul Park  
 Thordsen, Clara, Hanska  
 Tolan, Arthur, W. Hegbert  
 Tolan, Charles A., Hegbert  
 Trileoff, Hattie L., Carver  
 Trovatten, Rollef A., Hanley Falls, R. 1  
 Trow, Clinton F., Glenville  
 Turner, Esther M., St. Peter  
 Twedt, Martin, Clarkfield  
 Valleau, Dorney W., St. Anthony Park  
 Van Doren, Amy L., Farmington  
 Verbeck, Wilbur, New York Mills  
 Vinje, Helga, Dalton, R. 1  
 Wanvig, Louisa M., Minneapolis  
 Watts, Leon E., Hammond  
 Webber, Steven B., White Bear  
 Wermager, Hans P., Spring Grove, R. 3  
 Westby, Sigurd, Bath, S. Dak.  
 Whitbred, Charles E., St. Paul Park  
 White, Sherman L., Marshall  
 Wilcox, Jessie S., Winnebago  
 Wilkins, R. Orson, Wheaton  
 Wilson, Lillie M., Granite Falls, R. 1  
 Wisted, Albert, Sacred Heart  
 Wolfe, Sydney J., Morrilstown  
 Wright, Albert D., St. Cloud  
 Woolie, Karl S., Delaven, R. 1  
 Zoller, Otto A., New Ulm

## Farmers Short Course—95

- Albrecht, Gustave C., New Ulm, Minn.  
 Anderson, W. J., Centerville, S. D.  
 Ash, Walter, Minneapolis, Minn.  
 Bement, E. P., St. Paul, Minn., 664 York St.  
 Bergsather, John, Briceyn, Minn.  
 Bjorka, Knute, Ferguson Falls, Minn.

- Bonnell, B. S., Eldridge, Ia  
Bork, Carl, Paynesville, Minn  
Brown, W. W., Amenia, N. D.  
Butchart, Robert, Minneapolis, Minn  
817 S. 6 St.  
Cadwell, Stephen, Goodhue, Minn  
Carey, Francis, Mapleton, Minn  
Carnel, Wm., Cannon Falls, Minn.  
Christenson, John, Bruno, Minn  
Corson, Henry H., Minneapolis, Minn.  
2701 Lake of the Isles Blvd.  
Dehn, Louis C., New Ulm, Minn.  
Doran, Sol. Brandon, Manitoba  
Eckberg, Albert, Lafayette, Minn.,  
R. 1  
Ellestad, Bernt, Flaxton, N. D.  
Engbretson, Thomas, Selby, S. D.  
Estenson, Ole H., Elbow Lake, Minn.,  
R. 1  
Ferrel, Howard A., Smith Lake,  
Minn.  
Gallagher, Michael, Waseca, Minn  
Gartner, George B., Golden Rod,  
Minn.  
Gilbertson, P. D., Glenwood, Minn.,  
R. 2, Box 17  
Hallickson, L. N., Aberdeen, S. D.  
Hanson, Hans M., Drayton, Minn.,  
R. 1  
Harkness, W. L., Northfield, Minn.  
Harris, W. C., Cambia, Minn  
Haugsvan, S., Wheelock, N. D.  
Hassett, John, St. Anthony Park,  
Minn.  
Hayden, Oscar, Oakland, Wis.  
Helfort, F. A., Stillwater, Minn.  
Hensel, Theodore, New Ulm, Minn.  
Hundebj, Theodore, Beardsley, Minn.  
Ingberg, Joseph, Hendrum, Minn.  
Iverson, Thomas J., Echo, Minn.  
Jacobson, J. T., Lafayette, Minn  
Johnson, John, Tyler, Minn  
Johnson, Linas, Wegdahl, Minn.  
King, Eugene, 663 Aurora Av. St.  
Paul, Minn.  
Kirwan, P. H., 201 N. Y. Life Bldg.,  
St. Paul  
Knapp, Mrs. Laura A., New Prague,  
Minn.  
Larking, Geo. B., Northfield, Minn.  
Larsen, Howard, Rice, Minn.  
Lecy, Norman, Echo, Minn  
Lee, A. A., Benson, Minn.  
Lee, Anton, Waseca, Minn.  
Lee, Jorgie, Benson, Minn.  
Liggett, Robert B., St. Anthony Park,  
Minn.
- Liljegren, Wm., Parkers Prairie,  
Minn.  
Lindgren, Alfred, Kennedy, Minn.  
Lindgren, Geo. A., Hallock, Minn.  
Long, Charles, 1318 W. Franklin,  
Minneapolis  
Lovell, C. C., Minneapolis, Minn.  
Mack, Adolph, New Ulm, Minn.  
Mackey, John, New Richland, Minn.,  
R. 5  
Martin, H. L., Minneapolis, Minn.  
Mattson, E. M., St. James, Minn.,  
R. 4  
Miller, Joe, Center City, Minn.  
Narverud, John, Atwater, Minn.  
Nash, Mrs. George, Milwaukee, Wis.  
Nelson, E. E., Fairfax, Minn.  
Nilson, Emil, Twin Valley, Minn.  
Olson, Albert J., 1287 De Soto St.,  
St. Paul  
Olson, Edwin, Thief River Falls,  
Minn.  
Olson, Joseph, Waseca, Minn.  
Olson, Theodore, Luverne, Minn.,  
R. 3  
Pearson, B. S., 278 E. Winnifred St.,  
St. Paul  
Peterson, Emil, Stacy, Minn., R. 2  
Peterson, Nels L., Worthing, S. D.  
Persons, T. S., Sun Prairie, Wis.  
Porter, Edna M., Buffalo, N. Y.  
Potter, Melvin, Staples, Minn.  
Sargent, Louie, Red Wing, Minn.,  
R. 2  
Schafer, Walter, Owatonna, Minn.  
Schilling, Harry, Newport, Minn.,  
R. 19  
Sheehan, Thos., Barry, Minn.  
Sheehan, Wm., Barry, Minn.  
Sherman, Paul, Sleepy Eye, Minn.  
Smith, A. F., Blue Earth City, Minn.  
Sodergren, Robert, Scandia, Minn.  
Storer, Wm., Wanda, Minn.  
Swanson, Andrew, Minnesota, Minn.  
Tessman, Herman, Springfield, Minn.  
Ultrop, Morris, St. Thomas, N. D.  
Ulvestad, Peter, Lanesboro, Minn.  
Vetterling, Herman A., Pioneer, S. D.  
Watson, Ernest, 817 6 Av. S.,  
Minneapolis  
Wetzel, August, St. Cloud, Minn.  
White, Ada E., 2734 Garfield av.  
Minneapolis  
White, C. H., Marshall, Minn  
Wiker, N. H., Mabel, Minn.  
Windingstad, Albert, Dawson, Minn.  
Woolsey, Harry, Lake Elmo, Minn.

## Dairy School—1905—87

Aarr, Oscar O., Kenyon  
Anderson, Alf. A., Cushing, Wis.  
Anderson, Axel L., Minneapolis, R. 4  
Anderson, Julius, Bricelyn  
Anderson, Oscar, Colozue  
Bacon, Lemuel E., Ottawa  
Baltes, John B., Newmarket  
Bartlett, Frank H., Wadena

Beckel, Joseph J., Austin, R. 4  
Bengtson, Martin, Crow River  
Berggren, Gustaf, Grove Lake  
Bluhm, Emil, Bertha  
Blume, Clem, Jr., Monticello  
Borman, John, Princeton  
Bringgold, Abram G., West Concord  
Cummings, Obediah, Waterville

Dahlman, Victor, T., North Branch  
 Dannehr, John W., Delano  
 Dascher, Matthias, Hutchinson  
 Dugan, Will J., **Dover**  
 Dunbar, Harold L., Wells  
 Engel, John W., Meridan  
 Erie, S. L., Adams  
 Erickson, Henry, Hutchinson  
 Escon, Herman V., Dassel  
 Ferris, Herbert B., Mankato  
 Findell, E. A., Cambridge  
 Froemming, Rudolph, Alexandria.

R. 3

Germain, Willie, Somerset, Wis.  
 Goerndt, Walter, Granada,  
 Greenwood, Ernest, St. Paul  
 Greethurst, Charles, Lewiston  
 Grundin, Benhard, Cokato  
 Halgren, Albert, West Sweden, Wis.  
 Hanson, Henry C., Owatonna  
 Hanson, Loren, Lewiston  
 Holm, Herman E., Harris  
 Holmes, Emil C., Cannon Falls  
 Holt Gustaf, Chisago City  
 Homme, Charles, Long Siding  
 Hopkins, Frederick W., Buffalo  
 Halvorson, Lewis, Gary  
 Hugger, N. F., Milltown, Wis.  
 Janish, Jacob, Royalton  
 Johnson, Ed., Wellman, Ia.  
 Johnson, John R., Hewitt  
 Johnson, James W., Arland, Wis.  
 Jones, Henry L., Sauk Center  
 Kobberdal, Hjalmar, Georgeville  
 Koep, Jacob J., Litchfield, R. 5  
 Kurth, W. J., Stewart  
 Larson, Emil, Annandale

Lee, Gustave A., Kingston  
 Lee, Selmer I., Clarkfield  
 Lowe, Ernest F., Clotho  
 McCormack, Robt. A., Monticello  
 McDonald, H. D., Annandale, R. 2  
 Meller, George, Holdingford  
 Miller, Ed. W., Concord  
 Miller, John B., Lincoln, Neb.  
 Nelson, Richard, Fertile  
 Norberg, Andrew, Cokato, R. 4  
 Olson, Helmar, Lamaille  
 Olson, John, Hanska  
 Olson, Oscar, Kingston  
 Peehl, Oscar F., Chisago City.  
 Peterson, Algot, Clear Lake, Wis.  
 Peterson, Carl., Dassel  
 Peterson, Ole J., Ashby  
 Potter, Frank C., Hector  
 Renner, Max, Springfield  
 Sersland, John O., Gary  
 Sjostrom, Ludwig, Lafayette  
 Sorenson, Harry, Monticello  
 Sorenson, James, Maple Plain  
 Sprenger, J. J., Zumbro Falls  
 Stefferud, Ole, Kenyon  
 Steinke, Gustave E., Owatonna  
 Teeke, Julius, Plainview  
 Theisen, John, Cold Springs  
 Wakefield, Leander, Jr., Watkins  
 Wehking, August F., Hector  
 Wellcom, Leland R., Sheburn  
 Wilcox, A. H., Kellogg  
 Woelpern, Alfred, Henderson  
 Woodfill, Elmer J., New Richland  
 Zoerb, Alfred, Long Lake

## THE COLLEGE OF LAW

### FOR DOCTOR OF CIVIL LAW-6

Bates, William Earl, LL. M., Minneapolis.	Mercer, Hugh Victor, LL. M., Minneapolis.
Denegre, James D., LL. M., St. Paul.	Moore, Albert R., LL. M., St. Paul.
Hermann, Arthur L., LL. M., Minneapolis.	Willis, Hugh E., LL. M., Minneapolis.

### FOR MASTER OF LAWS-8.

Baird, Roy, River Falls, Wis.	Smith, John W., Chippewa Falls, Wis.
Mehan, James Edward, Minneapolis.	Stevens, Homer William, Loman.
Osterberg, Arthur G., Cokato.	Stuart, Robert Kincade, Minneapolis.
Shimizu, Tomesabura, Mayabashi, Japan.	Thompson, William Edward, Minne- apols.

### SENIOR DAY-68.

Anderson, Albert S., Stewartville.	Aylmer, Adolph William, Minneap- olis.
Anderson, Victor E., Wheaton.	Beal, W. N., Gifford, Me.
Arnston, Arthur Emanuel, Red Wing.	Bell, John Bliss, Minneapolis.

- Brown, Garfield W., Pipestone.  
 Burrell, Fred R., Princeton.  
 Carey, William, Mapleton.  
 Carpenter, Fred J., Parker, So. Dak.  
 Charles, Herbert John, St. Paul.  
 Clark, Percy Moon, Ortonville.  
 Coakley, Charles Arthur, Flandreau, So. Dak.  
 Collins, Louis L., St. Cloud.  
 Corcoran, John H., Prescott, Wis.  
 Curtis, Horace F., Minneapolis.  
 Dickinson, Burr Andrew, St. Paul.  
 Dille, Chester, B., Minneapolis.  
 Eberhart, Axel Albert, Mankato.  
 Frantz, Clarence Andrew, Sleepy Eye.  
 Freimuth, David Charles, Duluth.  
 Funck, Richard Maurice, Minneapolis.  
 Gardner, Richard N., Minneapolis.  
 Garvin, Frank R., Mapleton.  
 Gorman, Frank S., St. Paul.  
 Hanson, Hans A., Fergus Falls.  
 Hewitt, Clyde Ackley, Nassau.  
 Homnes, George Paul, Castle Rock, Wis.  
 Hurley, Martin J., Pine City.  
 Johnson, Andrew, Valley City, No. Dak.  
 Johnson, Arvid, Mankato.  
 Johnson, Henry A., Minneapolis.  
 Kimball, Edward Lincoln, Duluth.
- Koefod, Sigford Marius, Ashby.  
 Lavik, Peter R., Minneapolis.  
 Leach, Hugh E., Spring Valley.  
 Lewis, John Chester, Hudson.  
 Lewis, Roy Vivian, Worthington.  
 Loevinger, Gustavus, Mitchell, South Dak.  
 Lundquist, Seth, Minneapolis.  
 McCanna, Charles David, Minneapolis.  
 McManigal, W. Allison, Minneapolis.  
 McNelly, William Oscar, Caledonia.  
 Magnussen, Peter Magnus, St. Cloud.  
 Menz, Clifford John, St. Cloud.  
 Merrifield, Herbert, Elk River.  
 Miller, Ray Othello, St. Paul.  
 Newcomb, Albert Shirley, Halleck.  
 Nordin, George, St. Paul.  
 Phillips, Charles Earl, Larrabee, Ia.  
 Pryor, William Hammond, Winona.  
 Pye, Charles Richard, Northfield.  
 Redding, John G., Windom.  
 Reed, Albert P., Minneapolis.  
 Schutz, Wilhelm Tell, Pine Island.  
 Smith, George David, Redwood Falls.  
 Stradley, John Woodcock, Cresco, Ia.  
 Swinland, John, Halsted.  
 Truax, June Jay, Mantorville.  
 Tyler, George Harvey, Willmar.  
 Waters, Sam Matthew, Minneapolis.  
 Werring, Wayne Richard, Sleepy Eye.  
 Wright, Charles Rolla, Fergus Falls.

**SENIOR NIGHT—48.**

- Allen, Gustavus William, Minneapolis.  
 Breeding, A. Melvin, Minneapolis.  
 Brorby, Joseph, Minneapolis.  
 Churchill, Irving Allen, Rochester.  
 Clarke, Arthur H., Minneapolis.  
 Crouley, William D., Redwood Falls.  
 Davin, Edward H., Beloit, Wis.  
 Domes, Fred Sam, Blue Earth.  
 Dow, Don Carlos, Worthington.  
 Drake, Clarence E., Minneapolis.  
 Dyer, Howard Vance, Pipestone.  
 Edison, Harry James, Kasson.  
 Egleston, Martin Jay, Wykoff.  
 Frost, Daniel Ramsey, St. Paul.  
 Gallagher, Richard, Minneapolis.  
 Gruber, J. Henry, St. Paul.
- Henderson, Jess Gideon, Minneapolis.  
 Hinman, Walter Clifford, Brainerd.  
 Humphrey, J. H. K., Minneapolis.  
 Joss, Louis H., Minneapolis.  
 Kay, John Henry, St. Paul.  
 Kleinschnitz, Henry George, Eau Claire, Wis.  
 Langlois, Victor Seabury, Minneapolis.  
 Larson, John C., St. Cloud.  
 Lemen, Denny Price, Minneapolis.  
 Linde, Henry J., Ridgeway, Ia.  
 Lyons, Dennis Francis, Merriam Park.  
 Mani, Thomas F., Sisseton, So. Dak.  
 Norton, Wills Irving, Minneapolis.

Preus, Jacob A. O., Decorah, Ia.  
 Remele, Albert C., Sleepy Eye.  
 Robinson, Bernard, New York City.  
 Rosenmeir, Christian, Thorpe.  
 Schuck, Warren E., Rushmore.  
 Schull, Harold, Minneapolis.  
 Stine, David Lowe, Slayton.  
 Swendman, John, Jr., Dodge Center.  
 Thomas, David Richard, Minneapolis.  
 Thorson, Carl O., Minneapolis.  
 Van Fredenberg, Henry, Alexandria.  
 Wildey, Herbert L., Minneapolis.  
 Wold, Carl J., Minneapolis.  
 Young, Margaret Agnes, Minneapolis.

## MIDDLE DAY—93.

Addy, Willard C., Minneapolis.  
 Amundson, Walter G., St. Peter.  
 Asher, Allen Preston, Granite Falls.  
 Barry, John Sumner, Phillips, Wis.  
 Baudler, Otto, Austin.  
 Bingham, Henry G., New Ulm.  
 Branham, Harold D., Minneapolis.  
 Brooks, William Clark, Minneapolis.  
 Brush, Percy Porter, St. Paul.  
 Carlson, Eloy Julius, Meriden, Ia.  
 Casey, Edwin Luther, Minneapolis.  
 Chisholm, Dan B., New Paynesville.  
 Christiansen, Charles Martin, Barron,  
 Wis.  
 Cloutier, Harry Hubert, Minneapolis.  
 Colburn, Algernon, Minneapolis.  
 Coleman, John Patrick, Anoka.  
 Condon, E. St. John, Minneapolis.  
 Cooper, Clayton E., Adrian.  
 Costello, William P., Graceville.  
 Crossman, Charles Nye, Milwaukee,  
 Wis.  
 Davis, David, Duluth.  
 De Vaney, John P., Lake Mills, Ia.  
 Doane, William Cleveland, St. Cloud.  
 Eckhardt, John Henry, Mankato.  
 Fawcett, Andrew, Minneapolis.  
 Flynn, Francis Earl, Lake City.  
 Foley, Thomas R., Aitkin.  
 Folsom, Arthur Russell, Lake Crystal.  
 Gault, Lorenzo J., St. Peter.  
 Gould, Raymond Milton, Minneapolis.  
 Grettenberg, C. Hale, Osage, Ia.  
 Harris, Rex Webster, So. Dak.  
 Heffron, Carl Lee, Bemidji.  
 Hosp, Joseph Abraham, Hopkins.  
 Jackson, Frank Alonzo, Abbottsford,  
 Wis.  
 Jelle, Gilbert, Brice lyn.  
 Johnson, Arthur J., Gibbon.  
 Johnson, John Ludwig, Little Falls,  
 Johnson, Joseph T., Kasota.  
 Wis.  
 Kremer, George E., Minneapolis.  
 Langland, George, Marshall.  
 Lindgren, Joseph Raymond, Adrian.  
 Linehan, James Don, River Falls,  
 Wis.  
 Luce, Earl David, Minneapolis.  
 Lynch, William David, Verona, So.  
 Dak.  
 McGrath, Dennis Francis, Jr.,  
 Barnesville.  
 McHugh, Edward Everett, Zumbrota.  
 McManigal, Kenneth George, St.  
 Paul.  
 McQuat, R. A., St. Paul.  
 Manus, Albert Herman, Minneapolis.  
 Meader, George F., Minneapolis.  
 Molyneau, Francis A., Winnebago  
 City.  
 Murphy, Charles T., Moorhead.  
 Nelson, Oscar H., Zumbrota.  
 Nilson, Clifford N., Morris.  
 Ober, Bernard A., Minneapolis.  
 Oliver, Fred A., Lisbon, No. Dak.  
 Park, Herbert T., Minneapolis.  
 Peterson, John O., Minneapolis.  
 Peterson, John W., Montevideo.  
 Poppe, Forest Robert, St. Paul.  
 Pratt, Chester William, Minneapolis.  
 Radcliffe, Amos, Eagle River, Wis.  
 Radcliffe, Samuel J., Larimore, No.  
 Dak.  
 Ransom, John E., Albert Lea.  
 Richardson, Howard Gray, Madison,  
 Ind.  
 Robertson, Hugh A., Sleepy Eye.  
 Robinson, Ellis Astor, Ostrander, O.  
 Ronken, Oscar Christian, Ostrander.  
 Savela, August, Franklin.

Schaetzel, Jacob A., Minneapolis.  
 Schain, Josephine., Brown's Valley.  
 Schouten, Charles P., Lisbon, No. Dak.  
 Schutz, Rollin Hunt, Marshall.  
 Schultz, William Alvin, Sleepy Eye.  
 Schwartz, L. L., Minneapolis.  
 Snyder, Fred Alton, Austin.  
 Sprague, Walter Hubbard, St. Paul.  
 Stangeland, Arthur William, Minneapolis.  
 Stockton, Charles Murray, Faribault.  
 Swanson, Gotfried Swantie, Brainerd.

Turnquist, Ralph A. E., Minneapolis.  
 Van Dusen, George C., Minneapolis.  
 Van Vorst, Melvin J., New Paynesville.  
 Walchli, Hans, Kalispel, Mont.  
 Warner, Cecil Ilisha, Minneapolis.  
 Wells, W. Roy, Aberdeen, So. Dak.  
 Wheeler, Harry Earl, Minneapolis.  
 Willmot, Earl C., Farmington.  
 Wilson, Roy, Minneapolis.  
 Woodward, Herbert Starr, Minneapolis.  
 Woodworth, Rees Paul, Winona.  
 Wright, Frank E., Appleton.

#### MIDDLE NIGHT—27.

Allen, Edmund Pratt, Minneapolis.  
 Bicknell, Lewis William, Minneapolis.  
 Brekke, Edward Albertin, Spillville, Ia.  
 Burns, Carl Elmore, Mason City, Ia.  
 Doanes, Ira Chapman, Minneapolis.  
 Elliott, Harry Duane, Hopkins.  
 Fitzpatrick, James Joseph, Winona.  
 Feroe, Helmer Mathew, Granite Falls.  
 Gilmore, Charles E., Lake Crystal.  
 Greer, Allen James, St. Paul.  
 Irnsfeld, James B., Minneapolis.  
 Jackson, Louis Freeman, Minneapolis.

Knapp, Chas. T., Minneapolis.  
 L'Herault, Napoleon A., Minneapolis.  
 Lund, William Oscar, Minneapolis.  
 Moen, Henry, Nelson.  
 Murfin, Walter Henry, Minneapolis.  
 Norton, Frank E., Minneapolis.  
 Peterson, Victor Muller, Minneapolis.  
 Reiff, I. M., Minneapolis.  
 Roup, Clarence J., Ames, Ia.  
 Smith, Charles Elmer, Wadena.  
 Stone, Ralph A., Morris.  
 Uhl, Alfred Woodbridge, Faribault.  
 Wiggan, Richard S., Rogers.  
 Williams, Wadsworth A., Minneapolis.  
 Williams, Warren O., Minneapolis.

#### JUNIOR DAY— 117.

Allison, Lawrence R., Minneapolis.  
 Anderson, Arthur H., Minneapolis.  
 Andrews, George J., New London.  
 Atkins, Arthur B., Columbia, So. Dak.  
 Babst, Harry F., Moorhead.  
 Baker, James Bradford, Brownton.  
 Barclay, Joseph Knox, Howard Lake.  
 Barnes, Eugene, Minneapolis.  
 Batzer, Reinhold Erick, Royalton.  
 Bell, Floyd Leigh, Owatonna.  
 Bixby, Edson, Red Wing.  
 Bollou, Ellis Luverne, Larrabee, Ia.  
 Bowman, Samuel Henry, Jr., Minneapolis.  
 Brenna, Oscar Cornelius, Granite Falls.

Brown, Harry F., Aberdeen, So. Dak.  
 Browne, Paul Fred, Aberdeen, So. Dak.  
 Cady, Edward Philip, Pipestone.  
 Campbell, Roy, Minneapolis.  
 Carnes, Raymond John, Renville.  
 Carpenter, Cyrus Clay, Summit, So. Dak.  
 Carpenter, Lee, Eagle River, Wis.  
 Carson, Harry Summers, Minneapolis.  
 Champine, Clifford C., Fargo, No. Dak.  
 Clapp, Edwin Griffin, Fargo, No. Dak.  
 Clarkson, Hugh James, St. Charles.



- Cole, James Reynolds, Minneapolis.  
 Collester, Thorley Marc, Minneapolis.  
 Coleman, Henry J., Chippewa Falls, Wis.  
 Coppage, Earl Rochester, Minneapolis.  
 Councilman, Charles H., Glenwood.  
 Cowles, Roy John, West Concord.  
 Crowhall, Lester William, Minneapolis.  
 Dansingberg, Paul, Minneapolis.  
 Davenport, Murray Taylor, Minneapolis.  
 Dempsey, William Henry, Wakasha, Wis.  
 Dodge, Donald Sherman, Minneapolis.  
 Donohue, William John, Richwood, Wis.  
 Dougherty, George Edward, St. Paul.  
 Dougherty, John Francis, Park River, No. Dak.  
 Doyle, David Wilfred, Great Falls, Mont.  
 Dunn, Ney Marshall, Jackson.  
 Eenkema, Abelius, Clara City.  
 Erickson, Harold, Hancock.  
 Evans, Eliza P., Minneapolis.  
 Forbes, Mason Merrill, Minneapolis.  
 Foster, Willie Kerr, Renviie.  
 French, Lee D., Atwater.  
 Gage, Leroy Arthur, Montrose, So. Dak.  
 Garnes, Martin Julius, Mabel.  
 Giles, Leon Leslie, Albert Lea.  
 Graves, Luther G., Minneapolis.  
 Greene, Hammond Bey, Sheldon, So. Dak.  
 Haas, William Hanson, St. Paul.  
 Haggart, Alexander McKenzie, Fargo, No. Dak.  
 Hamrum, Alfred Ulysses, Franklin.  
 Hayes, Manon Cleveland, Appleton.  
 Hencier, Thomas, Olivia.  
 Henderson, George Norman, Red Wing.  
 Higgins, Harry Getchell, Minneapolis.  
 Houck, Stanley B., Minneapolis.  
 Hunter, De Koven, Minneapolis.  
 Jensen, Carl A., Minneapolis.  
 Jenson, Henry Nils, Detroit City.  
 Jevne, Frantz, Meridian.  
 Johnson, George Emanuel, St. Paul.  
 Johnson, Robert E., Marshalltown, Ia.  
 Johnson, Sidney Kenneth, Jennings, Ia.  
 Joyce, Wilbur B., Minneapolis.  
 Lahr, Edward V., Conger.  
 Linn, C. August, Fergus Falls.  
 Lockerby, Charles Emory, Mapleton.  
 Logan, Carlton, Pelican Rapids.  
 Lohn, Lewis Kent, Fosston.  
 McAllister, Roy Irvin, Minneapolis.  
 McCarthy, Frank M., Luverne.  
 McGregor, Donald Alexander, Minneapolis.  
 McLaughlin, Mark M., Mapleton.  
 Machatanz, Karl Adolph, St. Anthony Park.  
 Madigan, Michael, Marquette, Mich.  
 Maloy, Charles Edward Hill, St. Cloud.  
 Manion, James Thomas, Prescott, Wis.  
 Masee, Edward K., St. Paul.  
 Minser, Frederic Stanton, St. Paul.  
 Mo, Elmer James, Sleepy Eye.  
 Mo, Rolph, Sleepy Eye.  
 Morse, Frank Leonard, Minneapolis.  
 O'Gordon, Joseph Arthur, Minneapolis.  
 Oistad, Soren O., Fosston.  
 Pattison, Edward S., Durand, Wis.  
 Piper, Ralph Jefferson, St. Paul.  
 Rice, Frank Bernard, Wilton, Wis.  
 Riddell, Archie Cleveland, Minneapolis.  
 Rolph, Emery Amlle, Minneapolis.  
 Rosen, Jeannette V., St. Paul.  
 Russell, John C., Fairfax.  
 Rustad, Garfield H., Moorhead.  
 Schwartz, Louis Benjamin, St. Paul.  
 Searls, Spencer Judd, St. Paul.  
 Shull, Ralph Walter Charles, Minneapolis.  
 Sigerfoos, Edward, Minneapolis.  
 Sigmond, Lloyd Edgar, Zumbrotz.  
 Simmons, William Reed, Minneapolis.  
 Sinclair, John Archibald, Fairmont.  
 Smith, David, River Falls, Wis.  
 Smith, Harold Henry, Minneapolis.  
 Sorenson, Niles Madison, Hayfield.  
 Stearns, Harry, St. Paul.

Steenerson, Vivian, Crookston.	Thompson, Charles Richard, Mankato.
Stevenson, John D., Lake City.	Washington, Derwood, Glendive, Mont.
Storer, George Lord, Minneapolis.	Wilson, Arthur Cleveland, Glenwood.
Strand, Oscar Bernard, Zumbrota.	Wyman, Earl C., Minneapolis.
Stub, Ingold A. H., Hamline.	
Sullivan, George Francis, Shakopee.	

## JUNIOR NIGHT—83.

Allanson, Henry Gray, Wheaton.	Hall, Robert Blain, St. Paul.
Allen, Walter J., Minneapolis.	Heily, Patrick Robert, Graceville.
Aygarn, Magnus H., Minneapolis.	Hudson, Irving M., Benson.
Barger, John Gray, Gaylord.	Johnson, Chester Marius, Austin.
Barnes, Arthur Rich, Campbell.	Jones, David Mabies, Wabasha.
Barnes, Joseph Fauntleroy, Washington, D. C.	Jones, Frank Henry, Winona.
Bergstrom, Charles Walter, Minneapolis.	Kehm, John Charles, Minneapolis.
Broughton, Hamilton, Minneapolis.	La Belle, Dezara, Minneapolis.
Brown, Marcus Edward, St. Paul.	Lee, Herman N., Montevideo.
Burk, Harvey B., Leedit Falls, O.	Luxton, Harry Addison, Minneapolis.
Carhart, Roscoe Allen, St. Paul.	Mackall, Henry Clinton, Moorhead.
Carlson, Charles Gus, Mankato.	Moe, Carl Henry, Minneapolis.
Case, George Leland, St. Peter.	Moran, Sarsfield, Graceville.
Casserly, Paul Nathaniel, Marshall.	Morse, Gordon V., Sauk Centre.
Chase, Van R., St. Paul.	Morse, Guy M., Minneapolis.
Cherrier, Dan C., Minneapolis.	Mulally, James H., St. Paul.
Christianson, Christian Theodore, Dawson.	Myron, Olin C., Vermillion, So. Dak.
Coleman, James Patrick, Minneapolis.	Nebbergall, James Zechariah, Sioux Falls, So. Dak.
Connor, Earl Hugh, Minneapolis.	Nicholas, Edwin Herbert, Minneapolis.
Cook, Louis G., Minneapolis.	Oyen, Brynjolf, Watson.
Cribb, Ernest C., Minneapolis.	Peterson, Arthur Leonard, Benson.
Dolan, Francis Marlon, St. Paul.	Ripley, W. C., Minneapolis.
Everhard, Frank Taggart, Minneapolis.	Rowley, Thomas Clinton, Winona.
Flinders, Orlow Bailey, Sutherland, Ia.	Running, Albert, St. James.
Force, Edwin Arthur, Minneapolis.	Running, Clarence Herman, Add. Schweska, Claude Burr, West Union, Ia.
Frykman, Martin Nathaniel, Minneapolis.	Senn, Henry B., Kasson.
Gansle, Stanley C., Minneapolis.	Sexton, W. Howard, Minneapolis.
Gates, Cassius E., Alma City.	Sinclair, John Franklin, Minneapolis.
Gleason, John Lucia, Minneapolis.	Smiley, William C., St. Paul.
Godart, Walter, Minneapolis.	Smith, Frederic H., Ft. Snelling.
Goff, Ed. J., Minneapolis.	Smith, Emmet Wilbur, Minneapolis.
Greening, Charles William, Minneapolis.	Spooner, Paul Lord, Morris.
Groat, Benjamin Feland, Minneapolis.	Stratton, P. D., Granite Falls.
Gurnee, William Harold, Minneapolis.	Studdart, George F., Graceville.
	Tatam, John Ernest, Minneapolis.
	Tierney, C. N., Farmington.
	Tobin, W. F., Minneapolis.
	Vanderhoof, Robert Wilfred, Minneapolis.
	Weisel, George Ferdinand, Minneapolis.

Weston, Alfred Sewall, Minneapolis.	Wright, William Wallace, Little Falls.
Wilkins, John Walter, Minneapolis.	Wyman, Fred W., St. Paul.
Wirth, Fred A., Minneapolis.	Yeager, Floyd F., Minneapolis.
Wisstrand, Edwin Richard, Excelsior.	Yeates, Eugene W., Minneapolis.
Works, Robert, Augusta.	

## SPECIAL STUDENTS—60.

Beckwith, George C., Minneapolis.	McDonald, John Harold, Minneapolis.
Borer, Otto J., Minneapolis.	McKay, Fred E., Minneapolis.
Bott, Herman, Minneapolis.	McCallum, William B., Barry.
Brill, Harry Hosiah, Minneapolis.	Marshall, Paul, Minneapolis.
Brown, Hosner, Brownsdale.	Marshall, Robert Wells, Minneapolis.
Christiansen, Otto Dwight, Minneapolis.	Michels, Joe, Mitchell, So. Dak.
Coon, Calvin Chauncey, Minneapolis.	Miller, William Eugene, St. Charles.
Cort, Maynard Blair, Minneapolis.	Morgan, Everett Fred., St. Paul.
Dacey, Walter F., Eveleth.	Nicholas, Frank S., Minneapolis.
DeCoursey, John C., St. Paul.	Norton, John, St. Charles.
Dieson, Julius Edwin, Cloquet.	Olson, Arthur E., Afton.
Duer, George Fred, Minneapolis.	Peterson, Horace, Pillager.
Eakins, Maxwell R., Gary, So. Dak.	Powers, Gordon, Montevideo.
Elwell, Edwin S., Minneapolis.	Raupagh, Paul, Watham.
Franklin, Wm. H. H., Minneapolis.	Reau, William E., Minneapolis.
Frary, Grace B., Minneapolis.	Reidell, George R., Minneapolis.
Gavere, Harry, Minneapolis.	Robinson, Howard Edwin, Minneapolis.
Greenley, Wm. L., Minneapolis.	Rogers, Arthur N., Aitkin.
Hall, Leroy William, Minneapolis.	Saari, John, Sparta.
Harkee, O. H. F., Mankato.	Shull, Harry Alfred, Minneapolis.
Hinch, Frederick Mortenson, Minneapolis.	Smith, Howard, St. Paul.
Holton, Wm. R., Minneapolis.	Stenberg, Andies Leonard, Minneapolis.
Johnson, Walter, Minneapolis.	Swinland, Ingman, Halsted.
Jones, Walter Bancroft, Minneapolis.	Thompson, Guy Munsey, Owatonna.
Judson, George H., Crookston.	Villaume, Louis Alphonse, St. Paul.
Kelly, Frank Luke, Madelia.	Williams, Frank Joseph, Minneapolis.
Kopplin, Fred W., St. Paul.	Williamson, Roy T., Oronoco.
Larson, Oscar Harry, Atwater.	Willmert, Alfred Elmer, Minneapolis.
Leonard, Patrick Fehr, Wabasha.	Young, Clyde L., Devils Lake.
Lewis, Harold Martin, Minneapolis.	
Longfellow, George L., Minneapolis.	

## THE COLLEGE OF MEDICINE AND SURGERY

## FOURTH YEAR—50.

Abbott, William Pitt, Faribault.	Berg, Luthard N., Minneapolis.
Ashley, Edward Mayo, Pembina.	Bray, Elwyn R., Biwabik.
	Brede, William George, Minneapolis.
Ashley, Paul Leonard, Frazee.	Bulkey, Nathan Cowperthwaite, Danbury, Conn.
Aspelund, Joseph Seiler, St. Paul.	
Bartron, Harry J., Lake City.	



Bostrom, August Edward,  
Minneapolis.  
Boyd, Leon Morelle, Alexandria.  
Buckley, John, Farmington.  
Burns, Herbert Arthur,  
Hutchinson.  
Dahleen, Henry, Granite Falls.  
Engstrom, Fred Alonzo,  
Cannon Falls.  
Esser, John, Austin.  
Eusterman, George Bysshe,  
Lewiston.  
Freedman, Isaac Valera,  
Minneapolis.  
Grangaard, Henry Oswald,  
Kindred, N. D.  
Hagenbeck, Max Alfred, St. Paul.  
Hemingway, Ernest Eugene,  
Minneapolis.  
Hensel, Charles Norton, St. Paul.  
Hitchings, William Sidney,  
Sutherland, Iowa.  
Johnson, Carl Martin, Minneapolis.  
Johnston, Edward James,  
St. Cloud.

Knutson, Albert, Bath, S. D.  
Lawrence, Edward John, Marshall.  
Lindberg, Arvid C., Harris.  
Maertz, Will Francis, New Prague.  
Magnuson, Gustaf Alfred, Harris.  
Manley, James Rollin, Duluth.  
Nelson, Melvin Sylvanius, Dawson.  
Olson, Frederick Adolf, Wells.  
Opp, Paul Alfred, Hegbert.  
Robertson, Archibald Wright,  
Litchfield.  
Ryan, Dennis Edward, Shakopee.  
Smith, Charles Eastwick, Jr.,  
St. Paul.  
Stadfield, Clayton Grube, St. Paul.  
Stebbins, Eugene Benson,  
Barron, Wis.  
Strachauer, Arthur Clarence,  
Minneapolis.  
Walker, George Hamilton,  
Pawnee City, Neb.  
Watson, Tolbert, Cashel, N. D.  
Weum, Thurston William,  
Minneapolis.  
Worman, Oscar Edward, Marshall.

## FIRST YEAR—58.

Anderson, Oscar Hennings,  
Star Prairie, Wis.  
Baker, Ernest Lavern, Fairmount,  
N. D.  
Barney, Leon Ambrose,  
River Falls, Wis.  
Blythe, Redford V. C., Minneapolis.  
Booren, Clifton Augustus, Stillwater.  
Brimmer, Archie Eli, St. Paul.  
Brooks, Charles Noyes, Minneapolis.  
Caldwell, James Phaon, St. Paul.  
Campbell, Albert Alexander,  
St. Paul.  
Coleman, Fred, Minneapolis.  
Critchfield, Lyman Ray, Hunter,  
N. D.  
Delmore, John Leo, Marshfield, Wis.  
Drake, Charles Ralph, Rushford.  
Earl, George Arthur, Minneapolis.  
Fiksdal, Mads Johanson, Webster,  
S. D.  
Foshager, Henry Theodore, Pennock.  
Furber, James Hinds, Minneapolis.  
Gardner, Ray, Mantorville.  
Glyer, Richard Theodore,  
Superior, Wis.  
Griabenow, Frederick, Alexandria.  
Hayes, Michael Francis, Lanesboro.  
Heley, Raymond Thomas,  
Minneapolis.  
Johnson, Carl Martin, Minneapolis.  
Kellogg, Paul Martin, Red Wing.  
Kjelland, Andrew Arthur, Rushford.  
Kurz, John Wesley, Annandale.  
Larson, Martin, Atwater, Minn.  
Leach, Harry P., Minneapolis.  
Libby, Elva Estelle, Spokane, Wash.  
McIntyre, Philip Henry,  
Eden Valley.  
Maloney, James Francis,  
Abbeyfeal, Ireland.

Maxeiner, Stanley Robert,  
Minneapolis.  
Mendelson, Oscar, Minneapolis.  
Meyerding, Henry William,  
St. Paul.  
Milner, Augustus Fischer,  
Chicago, Ill.  
Mortenson, Nels George, St. Paul.  
Murphy, Ignatius Joseph, Lakefield.  
Olson, William Paul, Merriam Park.  
Ostergren, Edward William,  
St. Paul.  
Oyen, Martin, Watson.  
Paulsen, Edward Ludwig, Hanska.  
Perry, Clarence George, St. Paul.  
Peterson, Henry Frithlof,  
Chisago City.  
Piper, Monte Charles, Mankato.  
Robitshek, Irving Herman,  
Minneapolis.  
Rowe, William Henry, St. James.  
Schmidt, Henry Albert, Westbrook.  
Smith, Alfred Nelson,  
Wheatland, N. D.  
Souba, Fred J., Hopkins.  
Stewart, Elsie Gertrude,  
Minneapolis.  
Sundt, Mathias, Minneapolis.  
Sutton, Charles Stewart,  
Prior Lake.  
Swanstrom, Henry Nelson,  
Lake Park.  
Thompson, Herbert Henry,  
St. Paul.  
Trowbridge, Ellsworth Hayden,  
St. Paul.  
Walker, James Douglas, Moorhead.  
Zander, Charles Henry, Rochester.  
Zoerb, Edward Franklin,  
Algoma, Wis.

## THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY

Cooper, M. J., Hopkins, Minn.  
Dorr, H. B., St. Paul.  
Diessner, H. D., Waconia.  
McKeown, E. W., Chatfield.  
May, H. W., Minneapolis.  
Meierding, W. H., Minneapolis.  
Newkirk, Bertha G., Minneapolis.

Pond, Samuel B., Minneapolis.  
Rand, W. J., Elk River.  
Sinclair, A. D., Minneapolis.  
Skaien, E. C., Postville, Ia.  
Smallwood, J. T., Worthington.  
Smith, Homer R., Minneapolis.  
Wilder, K. W., Minneapolis.

## THE COLLEGE OF DENTISTRY

### 3rd Year—35.

Ammundson, Frederick Arthur,  
St. Peter.  
Anderson, Carl Ernfrid, Kenedy.  
Baker, Harry Jacob, Rose Creek.  
Bjorge, Oscar, Lake Park.  
Blondell, Louis Dale, Spencer, Ia.  
Boerner, Ernest Wm. F., Buffalo.  
Coser, Wayne Bliss, St. Paul.  
Fortier, Stephen, Little Falls.  
Frederickson, Marcus, Lakefield.  
Heduy, Ula Emil, Minneapolis.  
Huntington, Walter Sandberg,  
Marion, Ia.  
Jung, William Richard, Fergus Falls.  
Jungclaus, Edward Henry, Glencoe.  
Kaasen, Kaare, Kristiania, Norway.  
Korfhage, Louis William, St. Paul.  
Layne, James Thomas, Rushford.  
Lestico, Alexander Cameron,  
Glencoe.  
Lier, Emil Hjalmar, Ashby.  
Malmgren, Robert Victor,  
Minneapolis.  
Melvin, Merton R., Dumont.

Morstain, William Basil,  
Minneapolis.  
Nilson, Verner Hjalmar, Minneapolis.  
Olson, Carlton Percy, Minneapolis.  
Rollin, Claus Albin, Minneapolis.  
Rowe, Arthur Taylor, Casselton, N. D.  
Selvig, Carlus, Rushford.  
Smith, Walter Herbert, Fairfax.  
† Styer, Matthias L., Caledonia.  
† Died, Jan. 2nd.  
Tomasek, Joseph Leo,  
Jackson Junction, Ia.  
Turner, George Chester, Canton.  
Wahlstrom, Isidor John,  
Minneapolis.  
Weaver, Mortimer R., Spencer, Ia.  
Wells, Amos Schumpert,  
Newberry, S. C.  
Winther, Conrad Peter,  
New Painesville.  
Woodbury, Leslie Maley,  
Zumbrota.

### 2nd Year—33.

Aarness, Walter Stain, Montevideo.  
Barnitz, Robert Andrew, Austin.  
Bauer, Theo. Phillip, Minneapolis.  
Birnberg, Ansel, St. Paul.  
Borgwardt, George, Peterson, Ia.  
Britzlus, Harry Adams, M. A., M. S.,  
Minneapolis.  
Butler, Archibald B., Moline, Ill.  
Carlaw, Allen Chester, Northfield.  
Carpenter, Dwight Jefferson,  
Minneapolis.  
Conway, Steven Vincent,  
Minneapolis.  
Damon, Geo. Myron, Worthington.  
Doely, Owen Eugene, Spring Grove.  
Fitzgerald, Francis Gerald,  
Lake City.  
Griffith, Chas Arthur, Hector.  
Harmon, Harry Weston, Faribault.  
Heleire, Orlen, St. Paul.  
Higgins, Clifford Crumbaugh,  
Kirkwood.

Hollern, Edward John, Sauk Rapids.  
Jones, Roland Ralph, Minneapolis.  
May, Clyde Luther, Young America.  
Niemi, William, Superior, Wis.  
Norwood, William, Balaton.  
Page, Wright Beuton, Minneapolis.  
Pinney, Egbert Ralph, Mankato.  
Purdon, Cleveland A.,  
Wahpeton, N. D.  
Ramstead, Henry Geo.,  
Eau Claire, Wis.  
Rauch, Charles, Minneapolis.  
Rosendahl, Peter Oscar,  
Spring Grove.  
Seebach, Oscar Christian, Red Wing.  
Smith, Nat Cyrus, Fair Haven.  
Thomas, Thos. Heathcote,  
Spencer, Ia.  
Weaver, Homer Abraham,  
Lancaster, Pa.  
Zierold, Arthur Adelbert,  
Granite Falls.

## 1st Year—66.

- Andrews, Samuel, Minneapolis.  
 Bandeln, William John, Arlington.  
 Basford, Clarence Meredith, Austin.  
 Bergh, Charles John, St. Paul.  
 \*Bigue, Arthur Edmund, St. Paul.  
 Broderson, Clarence,  
 Fountain City, Wis.  
 Bunce, Elmer Wayland, Minneapolis.  
 Capron, Harry, Minneapolis.  
 \*Chapman, Edgar, Minneapolis.  
 Coleman, Lauren M., Ellendale, N. D.  
 Collins, Myron Eugene,  
 Spring Valley.  
 Conway, Jesse Francis, Lake City.  
 Countryman, Ralph William,  
 Minneapolis.  
 \*Danielson, Henry, Minneapolis.  
 Donald, Raymond Bristol,  
 Minneapolis.  
 Doris, John Raphael, St. Paul.  
 Ebersperger, Joseph Francis,  
 Minneapolis.  
 Emery, Valmer Charles,  
 Two Harbors.  
 Franta, Valentine Adolph,  
 Montgomery.  
 Grafslund, Edwin, Lake Park.  
 Hagberg, Gust Adolph, Brainerd.  
 Harrison, Francis Randall,  
 St. Cloud.  
 Hartman, Harry Leonard, Afton.  
 Herring, Guy, St. Paul.  
 James, Meredith Jay, Lake Crystal.  
 James, William Henry,  
 Lake Crystal.  
 Johnson, Geo. Lionel, Minneapolis.  
 Johnson, Joseph, Edina Mills.  
 Johnson, Reuel Warren,  
 Cannon Falls.  
 Kaiser, Frederick John, Wells.  
 Kjelland, Joseph Almon, Rushford.  
 \*Knapp, Howard Eugene,  
 Oconto, Wis.  
 Knoche, Karl George, St. Paul.
- Lange, Henry Frederick, Little Falls.  
 Lawton, Harry Comegys, St. Paul.  
 Leary, Daniel James, Portage, Wis.  
 Lier, E Dorf Menton, Ashby.  
 McMullen, John Stephen,  
 Hutchinson.  
 Madden, Fred M., Watertown.  
 \*Metcalf, Ray James, Fergus Falls.  
 Miesen, Peter James, St. Peter.  
 Mittwer, Arthur Edward,  
 Minneapolis.  
 Moore, Thomas John, Chatfield.  
 Munns, Herbert Allen, Minneapolis.  
 Olson, Charles John, Hastings.  
 O'Neil, James, Lake City.  
 Radermacher, Harley Adolph,  
 Barron, Wis.  
 Rayman, Frederick Luverne, Austin.  
 Remele, Herman Charles,  
 Minneapolis.  
 Ringnell, Ernest Berthart,  
 Minneapolis.  
 Sandstrom, Carl L., Cloquet.  
 Schapler, John Earl, Pipestone.  
 Schmitz, Leroy Christian,  
 Jamestown, N. D.  
 Simon, Edwin James, Faribault.  
 Snyder, Lynn, Lake City.  
 Spurbeck, Lee, Two Harbors.  
 Tanner, Paul, Cannon Falls.  
 Trench, William, Dennison.  
 Van Dyke, Arthur Alexander,  
 Alexandria.  
 Varco, Lynn Gemmel, Austin.  
 Vaughn, William Henry,  
 Minneapolis.  
 Weible, Earl Bell, Weible, N. D.  
 Whitson, Abram Page,  
 Packwaukee, Wis.  
 \*Wickstrom, Charles, Lisbon, N. D.  
 Will, Melville Bruce, Mapleton.  
 Williams, Louis, Ashland, Wis.

## Specials—16.

- Barnett, Harvey Dwight, St. Paul.  
 Blix, Adolph Leonard, Bagley.  
 Bugbee, Clyde Sereno, Minneapolis.  
 Burgan, Frederick Preston,  
 Minneapolis.  
 Dittmarsen, John Elias, Irving.  
 Fagerstrom, Albert Harry,  
 Minneapolis.  
 Froelich, Geo. Henry, Winnebago  
 City.  
 Kendall, Ernest Clayton,  
 Merillan, Wis.
- Nelson, Geo, Andrew, Kasson.  
 Olson, Theodore John, St. James.  
 Schmidt, Adolph Robert, Springfield.  
 Sheehan, Thos. Vincent, Luverne.  
 Sivright, Guy Herbert, Hutchinson.  
 Spurr, Stephen Howard, M. D.,  
 Morris.  
 Thomas, Howard Weed,  
 Ellendale, N. D.  
 Waiste, Chas. Edgar, Minneapolis.

\*In attendance part of first semester.

## THE COLLEGE OF PHARMACY

## POST GRADUATE

—Todd, Alice M., Minneapolis

## SENIOR PHARMACISTS, 36.

Aker, Emil C., Montevideo  
 Baer, H. C., Kenyon  
 Barnett, H. J., Wheatland  
 Bockhoven, W. H., Clark, S. D.  
 Bowman, Fred M., Brown Valley  
 Carlson, E. G., Willmar  
 Caton, Charlotte E., Minneapolis  
 Cleveland, Zina, Northfield  
 Cutting, Joseph P., Sleepy Eye  
 Day, Benjamin H., St. Paul  
 Desmond, Emmet R., Rushford  
 Dretchko, Alvin LeRoy, Winthrop  
 Fitch, Frederick Chas., Hurley, S. D.  
 Frise, Dottie Curtis, Minneapolis  
 Granberg, Leonard, Minneapolis  
 Graves, Chas. Wilbur, Warsaw  
 Handy, John Abner, Good Thunder  
 Hanscom, George A., Willmar

Kelly, John V., St. Paul  
 Kennedy, Edward Phillip, Marshall  
 Kernot, George Thrall, Elk River  
 Ketcham, Koyla Myrle, Herman  
 Kurth, Asa Fred, Hendricks  
 Larson, Ned LeRoy, Atwater  
 Madden, Leo Daniel, Rochester  
 Maurier, David L., Brainerd  
 North, Robert, Hudson, Wis.  
 Peterson, Henry Ellis, Litchfield  
 Peterson, Sumner Amos, Atwater  
 —Rosenthal, Fannie, Java, S. D.  
 Sweet, LeRoy, River Falls, Wis.  
 Schreiter, Norman C., Red Lake Falls  
 —Smith, Carolyn H., Minneapolis  
 Trench, William Maurice, Dennison  
 Vatter, Frank Xavier, Sherburne  
 Van Campen, Harry Alton,  
 Cannon Falls

## JUNIOR PHARMACISTS, 43.

Allen, A. A., Minneapolis  
 Allen, C. Herbert, Minneapolis  
 Anstine, George C., St. Paul  
 —Austin, Albertha J., Milbank, S. D.  
 Baukol, Harris, Starbuck  
 Blossom, Oscar, Menominee, Wis.  
 Bohland, Carl P., St. Paul  
 Bolton, John Foster, Plainview  
 Brede, Otto H., Minneapolis  
 Carlson, Arthur E., Willmar  
 Deterling, Bernhard A., Gaylord  
 DeWitz, Frank A., Rochester  
 Egbert, Henry G., Winona  
 Engebretson, Engelbert, Hendricks  
 Flemming, J. M., Tracy  
 Gronvold, Bernt O., Kenyon  
 Gunderson, A. Joseph, Pelican Rapids  
 Hanson, Wm., Sleepy Eye  
 Holmes, Robie E., Billings, Montana  
 Holt, Dennis H., Rochester  
 Kellam, Ansel B., Heron Lake  
 Kelly, Chas. Francis, Webster, S. D.

Klovstad, Thomas, Milan  
 Knapp, John A., River Falls  
 Lafans, Arthur R., Minneapolis  
 Lovdahl, Arthur E., Park Rapids  
 McGovern, Thos. B., Minneapolis  
 Morrill, Rae M., Champlin  
 Murnane, George W., St. Paul  
 Nott, Ray James, Brownton  
 Olverson, Oscar A., Clark, S. D.  
 Quick, F. R., St. Paul  
 Schulte, Joe F., Henderson  
 —Snyder, Bessie E., Hector  
 Steinhilber, Irvin H., Minneapolis  
 Stover, Chas. E., Minneapolis  
 Thompson, Charles A., Buffalo  
 Spengler, Wm., St. Paul  
 Turton, Lloyd E., Alexandria  
 Weber, George C., Rochester  
 Welch, Leo S., Glencoe  
 Winter, W. M., St. Paul  
 —Yorke, Georgia M., Minneapolis



## SUMMARY OF STUDENTS

### GRADUATE DEPARTMENT.

	Men	Women	Total
Graduate students .....	73	37	110

### THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

	Men	Women	Total
Senior class .....	72	150	222
Junior class .....	76	194	270
Sophomore class .....	97	189	286
Freshman class .....	167	268	435
Unclassed students .....	23	73	96
	435	874	1309
			1309

### SIX YEAR MEDICAL COURSE.

	Men	Women	Total
Sophomore class .....	14	2	16
Freshman class .....	36	1	37
	50	3	53
			53

### SCHOOL OF CHEMISTRY.

	Men	Women	Total
Senior class .....	2		2
Junior class .....	15	2	17
Sophomore class .....	6	1	7
Freshman class .....	17	4	21
	40	7	47
			47

### THE COLLEGE OF ENGINEERING AND MECHANICAL ARTS.

Senior Class—			
	Men	Women	Total
Civil Engineering section .....	14		14
Mechanical Engineering section .....	8		8
Electrical Engineering section .....	29		29
Science and Technology .....			
	51		51
			51
Junior Class—			
	Men	Women	Total
Civil Engineering section .....	22		22
Mechanical Engineering section .....	15		15
Electrical Engineering section .....	25		25
Science and Technology .....			
	62		62
			62

## Sophomore Class—

	Men	Women	Total
Civil Engineering section . . . . .	35		35
Mechanical Engineering section . . . . .	34		34
Electrical Engineering section . . . . .	45		45
Science and Technology . . . . .	2		2
	<hr/>	<hr/>	<hr/>
	116	116	116

## Freshman Class—

	Men	Women	Total
Civil Engineering section . . . . .	42		42
Mechanical Engineering section . . . . .	42		42
Electrical Engineering section . . . . .	69		69
Science and Technology . . . . .	4		4
Unclassed . . . . .	7		7
Class not specified . . . . .	17		17
	<hr/>	<hr/>	<hr/>
	164	164	164
			<hr/>
			393

## THE SCHOOL OF MINES.

	Men	Women	Total
Senior class . . . . .	13		13
Junior class . . . . .	21		21
Sophomore class . . . . .	40		40
Freshman class . . . . .	47		47
	<hr/>	<hr/>	<hr/>
	121	121	121

## THE DEPARTMENT OF AGRICULTURE.

## College of Agriculture—

	Men	Women	Total
Senior class . . . . .	11	1	12
Junior class . . . . .	4		4
Sophomore class . . . . .	12	1	13
Freshman class . . . . .	16	2	18
Specials . . . . .	2	1	3
	<hr/>	<hr/>	<hr/>
	45	5	50

## The School of Agriculture—

	Men	Women	Total
Intermediate Year Students . . . . .	12	4	16
Class "A" . . . . .	77	31	108
Class "B" . . . . .	117	38	155
Class "C" . . . . .	186	71	257
Farmers' Short Course . . . . .	95		95
The Dairy School . . . . .	87		87
	<hr/>	<hr/>	<hr/>
	574	144	718
			<hr/>
			718

## THE COLLEGE OF LAW.

	Men	Women	Total
Graduate Students for Doctor of Civil Law . . . . .	6		6
Graduate Students for Master of Laws . . . . .	8		8
Senior class . . . . .	105	1	106
Middle class . . . . .	119	1	120
Junior class . . . . .	198	2	200
Special Students . . . . .	59	1	60
	<hr/>	<hr/>	<hr/>
	495	5	500
			<hr/>
			500

## THE DEPARTMENT OF MEDICINE.

## College of Medicine and Surgery—

	Men	Women	Total	
Senior class .....	49	1	50	
Junior class .....	43	1	44	
Sophomore class .....	39	1	40	
Freshman class .....	56	2	58	
	<u>187</u>	<u>5</u>	<u>192</u>	<u>192</u>

## College of Homeopathic Medicine and Surgery—

	Men	Women	Total	
Senior class .....		1	1	
Junior class .....	6		6	
Sophomore class .....	4		4	
Freshman class .....	3		3	
	<u>13</u>	<u>1</u>	<u>14</u>	<u>14</u>

## The College of Dentistry—

	Men	Women	Total	
Senior class .....	35		35	
Junior class .....	33		33	
Freshman class .....	66		66	
Special Students .....	16		16	
	<u>150</u>	<u></u>	<u>150</u>	<u>150</u>

## The College of Pharmacy—

	Men	Women	Total	
Graduate Students .....		1	1	
Senior class .....	31	5	36	
Junior class .....	41	2	43	
	<u>72</u>	<u>8</u>	<u>80</u>	<u>80</u>

## SUMMARY OF TOTALS

	Men	Women	Total	
Graduate students .....	73	37	110	
The College of Science, Literature and the Arts .....	435	874	1309	
The School of Chemistry .....	40	7	47	
Six Year Medics .....	50	3	53	
The College of Engineering and the Mechanic Arts .....	412		412	
The School of Mines .....	121		121	
The Department of Agriculture .....	605	163	768	
The College of Law .....	495	5	500	
The Department of Medicine .....	453	13	466	
The Summer School, University Section, less duplicates .....	62	148	210	
	<u>2746</u>	<u>1250</u>	<u>3996</u>	<u>3996</u>
Less duplicates .....			<u>41</u>	<u>41</u>
			3955	3955

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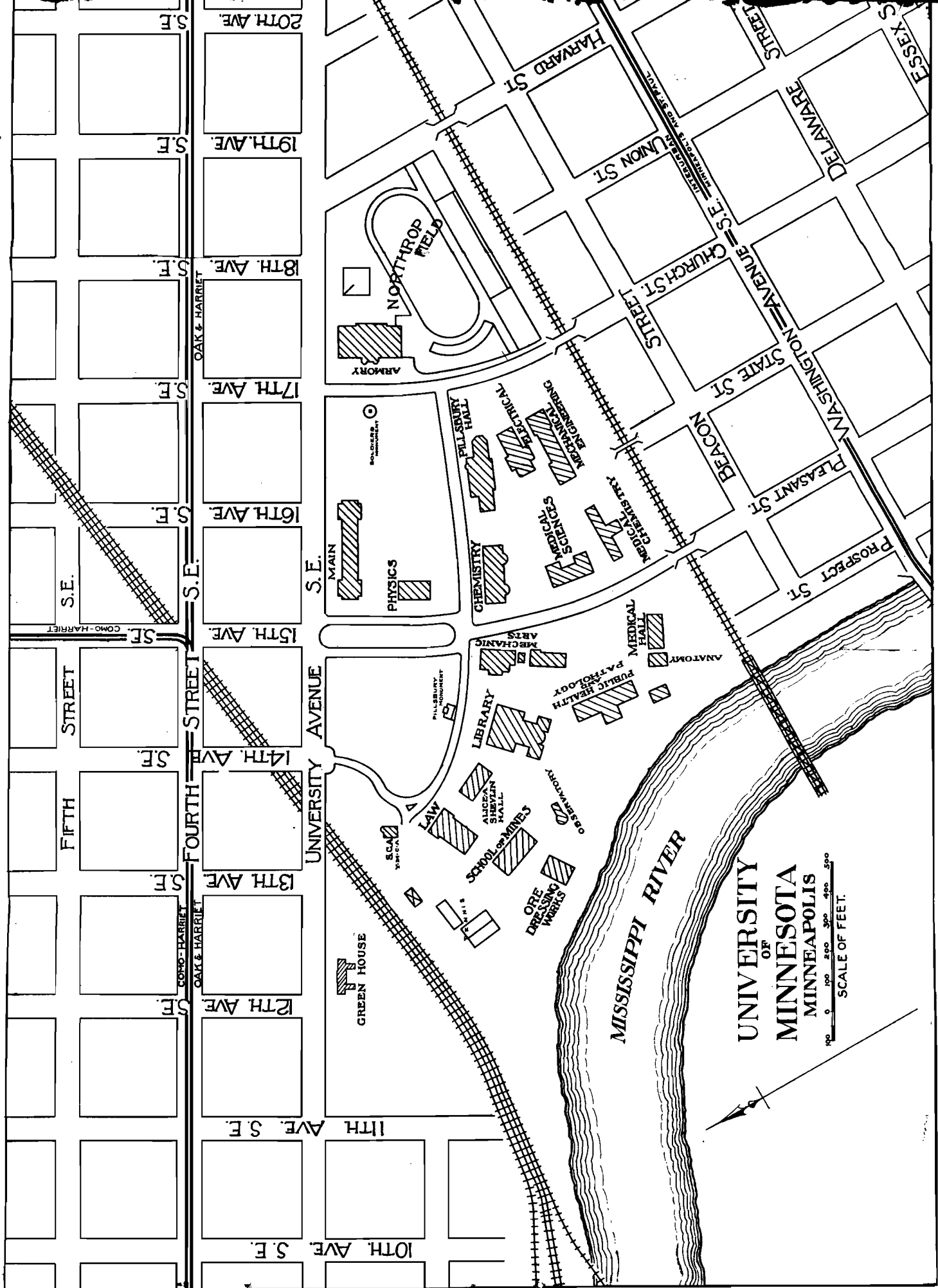
Accredited Schools.....	124	Alternating Currents.....	199
Administrative officers.....	20, 21	Alumni Weekly.....	61
Admission		Anatomy.....	401-402
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13TH AVE.

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