The Bulletin *of the* University *of* Minnesota

The Medical School Announcement for the Year 1917-1918

Catalog Series No. 8

Vol. XX No. 23 June 28 1917

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

1917

JULY

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

AUGUST

..	..	..	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
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

..	..	..	..	..	..	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	..	..	..	..	..

1918

JANUARY

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

FEBRUARY

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

MARCH

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

APRIL

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

MAY

..	..	..	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	..	..	..	..	..	..

JULY

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

AUGUST

..	..	..	..	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	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

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	..	..	..	..
..	..	..	..	..	..	..

Because of war conditions, the date for the opening of the college year has been changed to October 10, and the calendar dates appearing in this bulletin will be modified accordingly.

UNIVERSITY CALENDAR

1917-1918

1917			
September	12	Wednesday	Registration closes for all students
September	12-19	Week	Fees payable for all students
September	18-25	Week	Examinations for removal of conditions (except for Colleges of Agriculture and Forestry), and entrance examinations
September	26	Wednesday	First semester begins
October	1	Monday	Agricultural College, farm experience examinations
October	1	Monday	First semester evening classes begin
October	1	Monday	School of Agriculture, first term begins
October	18	Thursday	Senate meeting, 4:00 p.m.
November	5	Monday	Dairy School opens
November	21	Wednesday	Medical School second quarter begins
November	28	Wednesday	Thanksgiving recess begins 9:00 p.m.
December	1	Saturday	Dairy School closes
December	3	Monday	Thanksgiving recess ends 8:00 a.m.
December	3-8	Week	Second semester condition examinations, Colleges of Agriculture and Forestry
December	3-8	Week	Short course for ice-cream makers
December	20	Thursday	Senate meeting, 4:00 p.m.
December	21	Friday	School of Agriculture, first term closes
December	21	Friday	Christmas vacation begins 9:00 p.m.
1918			
December / January	31 / 5	Week	Farmers' and Home Makers' Week Short Course
January	2	Wednesday	Christmas vacation ends 8:00 a.m.
January	2	Wednesday	School of Embalming begins, eight weeks' session
January	8	Tuesday	School of Agriculture, second term begins
January	23	Wednesday	Second semester registration closes
January	25	Friday	First semester evening classes close
January	28	Monday	Final examinations begin
January	30	Wednesday	Payment of fees for second semester closes
February	4	Monday	Second semester evening classes begin

February	4-9	Week	Merchants' Short Course
February	6	Wednesday	Merchants' Short Course (three weeks) begins
February	11	Monday	Second semester begins
February	12	Tuesday	Lincoln's Birthday; a holiday
February	21	Thursday	Senate meeting, 4:00 p.m.
February	22	Friday	Washington's Birthday; a holiday
March	2	Saturday	Merchants' Short Course (three weeks) closes
March	27	Wednesday	School of Agriculture closes
March	28	Thursday	Easter recess begins 9:00 p.m.
April	1-6	Week	Boys' and Girls' Week
April	3	Wednesday	Easter recess ends 8:00 a.m.
April	10	Wednesday	Medical School fourth quarter begins
April	8-13	Week	Condition examinations in certain colleges
April	30	Tuesday	Traction Engineering Short Course begins
May	16	Thursday	Senate meeting, 4:00 p.m.
May	25	Friday	Second semester evening classes close
May	30	Thursday	Memorial Day; a holiday
May	31	Friday	Traction Engineering Short Course closes
June	1	Saturday	Final examinations begin 2:00 p.m.
June	8	Saturday	Second semester closes
June	9	Sunday	Baccalaureate service
June	10	Monday	Senior Class Day exercises
June	12	Wednesday	Alumni Day
June	13	Thursday	Forty-sixth Annual Commencement
June	14	Friday	Summer vacation begins
June	17	Monday	Summer Session begins

The University year for 1918-19 will begin Tuesday, September 17. Classes will begin September 25.

THE MEDICAL SCHOOL

THE ADMINISTRATIVE BOARD

†George Edgar Vincent, Ph.D., LL.D., President
‡Marion LeRoy Burton, D.D., Ph.D., LL.D., President
Elias Potter Lyon, Ph.D., M.D., Dean, and Director of the Department of Physiology
Richard Olding Beard, M.D., Assistant Dean and Secretary of the Medical School
Louis B. Baldwin, M.D., Superintendent of the University Hospitals
Leonard G. Rowntree, M.D., Chief of the Department of Medicine
James E. Moore, M.D., Chief of the Department of Surgery
Clarence Martin Jackson, M.S., M.D., Director of the Department of Anatomy
Jennings C. Litzenberg, B.S., M.D., Chief of the Department of Obstetrics and Gynecology
Arthur D. Hirschfelder, B.S., M.D., Director of the Department of Pharmacology
Harold E. Robertson, B.A., M.D., Director of the Department of Pathology, Bacteriology, and Public Health
Frank C. Todd, M.D., Chief of the Department of Ophthalmology and Oto-Laryngology
Julius Parker Sedgwick, B.S., M.D., Chief of the Department of Pediatrics
Emil S. Geist, M.D., Member-Elect, Representing the Faculty
Frederick H. Scott, Ph.D., M.B., D.Sc., Member-Elect, Representing the Faculty

FACULTY

† George Edgar Vincent, Ph.D., LL.D., President — 1005 5th St. S. E.
‡Marion LeRoy Burton, D.D., Ph.D., LL.D., President — 1005 5th St. S. E.
Cyrus Northrop, LL.D., President, Emeritus — 519 10th Ave. S. E.
Amos W. Abbott, M.D., Emeritus Professor of Gynecology — 1717 Marquette Ave.
*Everton J. Abbott, B.A., M.D., Emeritus Professor of Clinical Medicine — 425 Dayton Ave., St. Paul
John W. Bell, M.D., Emeritus Professor of Clinical Medicine and Physical Diagnosis — 5127 Lake Harriet Blvd.

---

* Deceased.
† Term of office expires June 30, 1917.
‡ Term of office begins July 1, 1917.

C. EUGENE RIGGS, M.A., M.D., Emeritus Professor of Mental and Nervous Diseases 10 Crocus Hill, St. Paul

THOMAS S. ROBERTS, M.D., Emeritus Professor of Pediatrics 2303 Pleasant Ave.

JAMES T. CHRISTISON, M.D., Emeritus Professor of Pediatrics 535 Lowry Bldg., St. Paul

---

FRED L. ADAIR, B.S., M.D., Associate Professor of Obstetrics and Gynecology 820 Donaldson Bldg.

LOUIS B. BALDWIN, M.D., Superintendent of University Hospitals 509 E. River Road

MOSES BARRON, B.S., M.D., Assistant Professor of Pathology 763 Holly Ave., St. Paul

RICHARD OLDING BEARD, M.D., Assistant Dean and Secretary and Associate Professor of Physiology University of Minnesota

ELEXIOUS T. BELL, B.S., M.D., Associate Professor of Pathology 521 Sixth St. S. E.

FRANK S. BISSELL, M.D., Assistant Professor of Roentgenology 4412 Lake Harriet Blvd.

FRANCIS G. BLAKE, A.B., M.D., Assistant Professor of Medicine

EDGAR D. BROWN, Phm.D., M.D., Associate Professor of Pharmacology 3525 3d Ave. S.

FRANK E. BURCH, M.D., Assistant Professor of Ophthalmology and Oto-Laryngology 935 Lowry Bldg., St. Paul

ALEXANDER R. COLVIN, M.D., Assistant Professor of Surgery 630 Lowry Bldg., St. Paul

HENRY WIREMAN COOK, B.A., M.D., Lecturer on Life Insurance Auditorium Bldg.

J. FRANK CORBETT, M.D., Associate Professor of Experimental Surgery 4401 E. Lake Harriet Blvd.

CHARLES A. ERDMANN, M.D., Associate Professor of Applied Anatomy 612 9th Ave. S. E.

GEORGE B. FRANKFORTER, Ph.D., Dean of the School of Chemistry 525 East River Road

EMIL S. GEIST, M.D., Assistant Professor of Orthopedic Surgery 614 Syndicate Bldg.

JAMES S. GILFILLAN, M.D., Associate Professor of Medicine 942 Lowry Bldg., St. Paul

ARTHUR J. GILLETTE, M.D., Professor of Orthopedic Surgery, in Charge of Division Seven Corners, St. Paul

ARTHUR S. HAMILTON, B.S., M.D., Professor, in charge of Division of Nervous and Mental Diseases 406 Physicians' and Surgeons' Bldg.

ERNEST M. HAMMES, M.D., Assistant Professor of Nervous and Mental Diseases 1019 Lowry Bldg., St. Paul

THOMAS B. HARTZELL, D.M.D., M.D., Research Professor in Mouth Infections 716 Donaldson Bldg.

ARTHUR D. HIRSCHFELDER, B.S., M.D., Professor of Pharmacology and Director of the Department 2364 Lake of Isles Blvd.

CLARENCE MARTIN JACKSON, M.S., M.D., Professor of Anatomy and Director of the Department 436 Harvard St. S. E.

JOHN B. JOHNSTON, Ph.D., Dean of the College of Science, Literature, and the Arts, and Professor of Comparative Neurology 1115 5th St. S. E.

WINFORD P. LARSON, M.D., Associate Professor of Bacteriology 614 9th Ave. S. E.

ARTHUR A. LAW, M.D., Associate Professor of Surgery 420 Syndicate Bldg.

THOMAS G. LEE, B.S., M.D., Professor of Comparative Anatomy 509 E. River Road

JENNINGS C. LITZENBERG, B.S., M.D., Professor of Obstetrics and Gynecology and Chief of the Department 910 Donaldson Bldg.

ELIAS P. LYON, Ph.D., M.D., Dean, Professor of Physiology and Director of the Department 421 Union St. S. E.

JOHN F. MCCLENDON, Ph.D., Assistant Professor of Physiology 715 University Ave. S. E.

ARCHIBALD MACLAREN, B.S., M.D., Associate Professor of Surgery 914 Lowry Bldg., St. Paul

JOHN S. MACNIE, B.A., M.D., Assistant Professor of Ophthalmology and Oto-Laryngology 506 Donaldson Bldg.

ARTHUR T. MANN, B.S., M.D., Associate Professor of Surgery 910 Donaldson Bldg.

JAMES E. MOORE, M.D., Professor of Surgery and Chief of the Department 2200 Kenwood Blvd.

ANGUS W. MORRISON, B.A., M.D., Assistant Professor of Nervous and Mental Diseases 406 Physicians' and Surgeons' Bldg.

WILLIAM R. MURRAY, Ph.B., M.D., Associate Professor of Ophthalmology and Oto-Laryngology 309 Physicians' and Surgeons' Bldg.

OSCAR OWRE, M.D., C.M., Assistant Professor of Urology 707 Masonic Temple

HORACE NEWHART, B.A., M.D., Assistant Professor of Oto-Laryngology 910 Donaldson Bldg.

LOUISE M. POWELL, R.N., Superintendent of the School for Nurses 417 Delaware St. S. E.

WALTER R. RAMSEY, M.D., Associate Professor of Pediatrics 942 Lowry Bldg., St. Paul

*SOREN P. REES, B.S., M.D., Assistant Professor of Medicine 1964 Penn Ave. S.

HARRY P. RITCHIE, Ph.B., M.D., Assistant Professor of Surgery 914 Lowry Bldg., St. Paul

HAROLD E. ROBERTSON, B.A., M.D., Professor of Pathology and Director of Department of Pathology, Bacteriology, and Public Health 507 Essex St. S. E.

JOHN T. ROGERS, M.D., Associate Professor of Surgery 342 Lowry Bldg., St. Paul

---

* Resigned.

JOHN L. ROTHROCK, M.A., M.D., Associate Professor of Obstetrics and Gynecology 514 Lowry Bldg., St. Paul

LEONARD G. ROWNTREE, M.D., Professor of Medicine and Chief of the Department 1917 Fremont Ave. S.

RICHARD E. SCAMMON, Ph.D., Professor of Anatomy 521 6th St. S. E.

FREDERICK H. SCOTT, Ph.D., M.B., D.Sc., Associate Professor of Physiology 1307 6th St. S. E.

FREDERIC W. SCHLUTZ, B.A., M.D., Assistant Professor of Pediatrics 820 Donaldson Bldg.

JULIUS PARKER SEDGWICK, B.S., M.D., Professor of Pediatrics and Chief of the Department 614 Syndicate Bldg.

ARTHUR C. STRACHAUER, M.D., Assistant Professor of Surgery 412 Syndicate Bldg.

ARTHUR A. SWEENEY, B.A., M.D., Professor of Medical Jurisprudence 821 Lowry Bldg.

SAMUEL E. SWEITZER, M.D., Assistant Professor, in charge of Division of Dermatology and Syphilis 625 Syndicate Bldg.

FRANK C. TODD, M.D., Professor of Ophthalmology and Oto-Laryngology, and Chief of the Department 506 Donaldson Bldg.

HENRY L. ULRICH, B.S., M.D., Assistant Professor of Medicine 408 Syndicate Bldg.

S. MARX WHITE, B.S., M.D., Professor of Medicine 910 Donaldson Bldg.

M. RUSSELL WILCOX, M.D., Assistant Professor of Physiology 802 Donaldson Bldg.

FRANKLIN R. WRIGHT, M.D., Assistant Professor, in charge of Division of Urology 707 Donaldson Bldg.

FREDERICK J. WULLING, Phm.D., LL.M., Dean of the College of Pharmacy 3305 2d Ave. S.

JOHN S. ABBOTT, B.A., M.D., Instructor in Surgery 914 Lowry Bldg., St. Paul

JOHN M. ARMSTRONG, M.D., Instructor in Dermatology and Syphilis 1040 Lowry Bldg., St. Paul

J. FOWLER AVERY, M.D., Instructor in Medicine 907 Donaldson Bldg.

ANNE G. BENTON, B.A., Instructor in Bacteriology and Pathology 2024 Queen Ave. S.

PAUL F. BROWN, B.A., M.D., Instructor in Surgery 636 Syndicate Bldg.

JOHN BUTLER, M.D., Instructor in Dermatology and Syphilis 403 Pillsbury Bldg.

CARL C. CHATTERTON, M.D., Instructor in Orthopedic Surgery Seven Corners, St. Paul

HOWARD S. CLARK, B.S., M.D., Instructor in Ophthalmology and Oto-Laryngology 616 Syndicate Bldg.

WALLACE COLE, M.D., Instructor in Orthopedic Surgery 1004 Lowry Bldg., St. Paul

WILLIAM H. CONDIT, B.S., M.D., Instructor in Obstetrics 2205 Kenwood Pkwy.

PAUL B. COOK, M.D., Instructor in Dermatology and Syphilis
710 Lowry Bldg., St. Paul
BRONSON CROTHERS, B.A., M.D., Instructor in Pediatrics
1004 Lowry Bldg., St. Paul
CHARLES R. DRAKE, M.D., Instructor in Medicine
606 Physicians' and Surgeons' Bldg.
EDWIN L. GARDNER, B.S., M.D., Instructor in Medicine
1011 E. River Road
ALEXANDER R. HALL, M.D., C.M., Instructor in Medicine
535 Lowry Bldg., St. Paul
*EARLE R. HARE, B.A., M.D., Instructor in Surgery 623 Syndicate Bldg.
ARTHUR T. HENRICI, M.D., Instructor in Pathology and Bacteriology and Research Assistant in Mouth Infections 939 14th Ave. S. E.
EDGAR J. HUENEKENS, B.A., M.D., Instructor in Pediatrics
803 Physicians' and Surgeons' Bldg.
HARRY G. IRVINE, M.D., Instructor in Dermatology and Syphilis
601 Syndicate Bldg.
JAMES A. JOHNSON, M.D., Instructor in Surgery 420 Syndicate Bldg.
FRANCIS B. KINGSBURY, Ph.D., Instructor in Physiologic Chemistry
209 State St. S. E.
RAE T. LAVAKE, B.A., M.D., Instructor in Obstetrics and Gynecology
910 Donaldson Bldg.
WILLIAM W. LEWIS, M.D., Instructor in Ophthalmology and Oto-Laryngology 836 Lowry Bldg., St. Paul
CLARENCE O. MALAND, B.A., M.D., Instructor in Obstetrics and Gynecology
300 Physicians' and Surgeons' Bldg.
JAY A. MYERS, Ph.D., Instructor in Anatomy 4025 12th Ave. S.
GEORGE M. OLSON, M.D., Instructor in Dermatology and Syphilis
636 Syndicate Bldg.
HAROLD PEDERSON, B.A., M.D., Instructor in Medicine
314 Syndicate Bldg.
CHAUNCEY J. V. PETTIBONE, Ph.D., Instructor in Physiologic Chemistry
611 Delaware St. S. E.
FREDERICK H. POPPE, B.A., M.D., Instructor in Surgery
820 Donaldson Bldg.
FRED J. PRATT, M.D., Instructor in Ophthalmology and Oto-Laryngology
328 E. Hennepin Ave.
ANDREW T. RASMUSSEN, B.A., Instructor in Neurology 979 14th Ave. S. E.
CHARLES A. REED, B.S., M.D., Instructor in Orthopedic Surgery
420 Syndicate Bldg.
ERNEST T. F. RICHARDS, M.D., C.M., Instructor in Medicine
741 Lowry Bldg., St. Paul
ROBERT I. RIZER, M.D., Instructor in Medicine 219 Meyers' Arcade
FREDERICK C. RODDA, M.D., Instructor in Pediatrics 614 Syndicate Bldg.
JOHN P. SCHNEIDER, M.D., Instructor in Medicine 414 Syndicate Bldg.
JALMAR H. SIMONS, B.S., M.D., Instructor in Obstetrics
1020 Donaldson Bldg.

*** Resigned.**

CHESTER A. STEWART, M.A., Instructor in Anatomy 1819 4th St. S. E.
MARION A. TEBBETS, B.A., Director of the Department of Social Service Glen Lake, Minn.
MARGARET WARWICK, B.S., M.D., Instructor in Pathology and Bacteriology 1516 7th St. S. E.
FREDERICK W. WITTICH, B.A., M.D., Instructor in Medicine 704 Pillsbury Bldg.
CHARLES B. WRIGHT, A.B., M.D., Instructor in Medicine 907 Donaldson Bldg.
HARRY B. ZIMMERMAN, M.D., Instructor in Surgery 342 Lowry Bldg., St. Paul

Members of the faculties of other schools giving instruction to medical students:

IRA HARRIS DERBY, Ph.D., Assistant Professor of Chemistry
WILLIAM H. HUNTER, Ph.D., Assistant Professor of Chemistry

TEACHING ASSISTANTS

ERRETT C. ALBRITTON, B.S., Assistant in Anatomy 122 21st Ave. S.
WILLIAM D. BEADIE, M.D., C.M., Assistant in Pediatrics 949 Lowry Bldg., St. Paul
ARCHIBALD H. BEARD, B.A., M.D., Resident Physician and Assistant in Medicine University Hospital
J. WARREN BELL, M.D., Assistant in Medicine 1001 E. River Road
TOBIAS L. BIRNBERG, M.D., Assistant in Pediatrics 1035 Lowry Bldg., St. Paul
LOUISA M. BOUTELLE, B.A., M.D., Assistant in Medicine 4120 Elliott Ave.
ERWIN W. BRUSS, D.D.S., Assistant in Dental Diseases
WALTER E. CAMP, B.A., M.D., Assistant in Ophthalmology and Oto-Laryngology 910 Donaldson Bldg.
HAROLD S. DIEHL, A.B., Assistant in Pathology and Bacteriology 429 Union St. S. E.
EDWARD J. ENGBERG, M.D., Assistant in Nervous and Mental Diseases 1044 Lowry Bldg., St. Paul
WALTER A. FANSLER, A.M., M.D., Assistant in Medicine 100 Andrus Bldg.
CHARLES W. FOGARTY, M.D., Assistant in Ophthalmology and Oto-Laryngology 314 Lowry Bldg., St. Paul
PAUL W. GIESSLER, B.S., M.D., Assistant in Surgery 701 Physicians' and Surgeons' Bldg.
EUGENE K. GREEN, M.D., Assistant in Surgery 808 Physicians' and Surgeons' Bldg.
WILLIAM A. GREY, D.D.S., Research Assistant in Mouth Infections 923 Lowry Bldg., St. Paul
CHARLES A. HALLBERG, M.D., Assistant in Surgery 204 Donaldson Bldg.
ARNOLD L. HAMEL, A.B., M.D., Assistant in Medicine Lake and Bloomington Aves.
JAMES F. HAMMOND, M.D., C.M., Assistant in Obstetrics 334 Lowry Bldg., St. Paul

OLGA S. HANSEN, B.S., M.D., Assistant in Medicine
2248 Carter Ave., St. Paul
HUGO J. HARTIG, B.S., M.D., Assistant in Surgery 701 20th Ave. N.
JOSEPH A. HEDDING, M.D., Assistant in Pediatrics
500 Physicians' and Surgeons' Bldg.
CLARENCE HERMANN, D.D.S., Assistant in Dental Diseases
JOHN P. HIEBERT, M.D., Assistant in Surgery 429 Syndicate Bldg.
KANO IKEDA, M.D., Assistant in Bacteriology St. Barnabas Hospital
BRUCE W. JARVIS, B.S., M.D., Assistant in Obstetrics and Gynecology
207 Moore Bldg., St. Paul
E. MENDELSSOHN JONES, M.D., Assistant in Obstetrics and Gynecology
544 Lowry Bldg.
JOHN A. KITTELSON, B.S., Assistant in Anatomy 1609 7th St. S. E.
RALPH T. KNIGHT, A.B., M.D., Assistant in Pediatrics
623 Syndicate Bldg.
WALTER J. KREMER, M.D., Assistant in Urology 625 Plymouth Ave. N.
JOHN W. LEE, M.D., M.C., Assistant in Ophthalmology and Oto-Laryngology 513 Syndicate Bldg.
ADOLPH E. LOBERG, M.D., Assistant in Mental and Nervous Diseases
1909 Washington Ave. S.
EARL A. LOOMIS, B.A., M.D., Assistant in Ophthalmology and Oto-Laryngology 203 Donaldson Bldg.
HENRY A. LYSNE, B.S., M.D., Assistant in Pediatrics 700 20th Ave. N.
JOHN C. MCKINLEY, B.S., Assistant in Anatomy 2423 Irving Ave. S.
FRANK S. MCKINNEY, A.B., M.D., Assistant in Medicine
3006 Nicollet Ave.
THOMAS J. MALONEY, M.D., Assistant in Ophthalmology and Oto-Laryngology 436 Lowry Bldg., St. Paul
ERNEST S. MARIETTE, B.S., M.D., Assistant in Medicine
Glen Lake Sanitorium
JOSEPH C. MICHAELS, B.S., M.D., Assistant in Nervous and Mental Diseases 1019 Lowry Bldg., St. Paul
FREDERICK P. MOERSCH, B.S., M.D., Assistant in Nervous and Mental Diseases 406 Physicians' and Surgeons' Bldg.
HARRY P. NORDLEY, M.D., Assistant in Medicine 1501 Washington Ave. S.
EDGAR H. NORRIS, B.S., Assistant in Anatomy 5031 Colfax Ave. S.
JAMES M. NORTHINGTON, M.D., Assistant in Medicine Campus Club
GUSTAV A. RENZ, M.D., Assistant in Obstetrics and Gynecology
Lowry Bldg., St. Paul
WILLMAR C. RUTHERFORD, M.D., Assistant in Obstetrics and Gynecology
618 Lowry Bldg., St. Paul
JOHN H. SCHROEDER, B.S., M.D., Assistant in Dermatology
1226 Marquette Ave.
EDWARD P. SLATER, B.S., Assistant in Physiology 226 Harvard St. S. E.
CHARLES E. SMITH, JR., M.D., Assistant in Pediatrics
741 Lowry Bldg., St. Paul
MARGARET I. SMITH, M.D., Assistant in Ophthalmology and Oto-Laryngology 1940 Emerson Ave. S.

HOMER R. SMITH, M.D., Assistant in Medicine 3401 5th Ave. S.
FREDERICK J. SOUBA, B.S., M.D., Assistant in Obstetrics and Gynecology 1007 Donaldson Bldg.
COURT ROGER STANLEY, M.D., Assistant in Medicine 1301 Penn Ave. S.
HENRY C. STUHR, M.D., Assistant in Surgery 628 Syndicate Bldg.
PERCY A. WARD, M.D., Assistant in Pathology and Bacteriology 429 Union St. S. E.
H. JOURNEAY WELLES, M.D., Assistant in Ophthalmology and Oto-Laryngology 307 Masonic Temple
ANTON G. WETHALL, B.S., M.D., Assistant in Urology 325 Cedar Ave.
OTTO L. WINTER, A.B., M.D., Assistant in Medicine Seven Corners, St. Paul
FLORIEN VAUGHN, B.A., Assistant in Anatomy 421 Oak St. S. E.
DANIEL E. ZISKIN, D.D.S., Assistant in Dental Diseases

TEACHING FELLOWS

LEE W. BARRY, M.D., in Department of Obstetrics and Gynecology
DONALD F. CAMERON, M.A., M.D., in Department of Surgery
CHARLES E. CONNERS, M.A., M.D., in Department of Ophthalmology and Oto-Laryngology
SAMUEL T. FORSYTHE, B.A., M.D., in Department of Ophthalmology and Oto-Laryngology
FLOYD GRAVE, B.S., M.D., in Department of Medicine
GOLDER L. MCWHORTER, B.S., M.D., in Department of Surgery
RALPH EDWIN MORRIS, M.S., M.D., in Department of Medicine
CHARLES E. NIXON, A.B., M.D., in Nervous and Mental Diseases
NABOTH O. PEARCE, M.D., in Department of Pediatrics
ROOD TAYLOR, M.D., in Department of Pediatrics
HENRY W. WOLTMANN, B.S., M.D., in Division of Mental and Nervous Diseases

GRADUATE SCHOLARS

HENRY J. FRIESEN, M.D., in Ophthalmology and Oto-Laryngology
ERLING W. HANSEN, B.S., M.D., in Otology
ARTHUR E. MARK, B.S., M.D., in Ophthalmology and Oto-Laryngology
MILLARD F. SMITH, B.S., in Otology

GENERAL INFORMATION

The thirtieth annual course of study in the Medical School begins Tuesday, September 18, 1917, and covers a period of nine months. The summer session opens June 18, 1917.

REQUIREMENTS FOR ADMISSION TO THE MEDICAL SCHOOL

(a) Two years of high school Latin, as part of the high school course required for entrance to the College of Science, Literature, and the Arts.*

(b) At least two years, or sixty credits, of prescribed and elective study in the College of Science, Literature, and the Arts of this University or of any other approved institution. The prescribed academic studies preliminary to medicine are: rhetoric, six credits; physics, eight credits; general chemistry and qualitative analysis, or these subjects combined with organic chemistry, twelve credits; zoology, six credits; and a reading knowledge of German.

This two or more years of collegiate study leads, upon the satisfactory completion of one or two years of medical study, to the baccalaureate degree in science or in arts. Students holding the bachelor's degree of any recognized college may submit credentials of practical equivalence in cultural studies, provided an adequate knowledge of biology, chemistry, and physics has been attained, and a reading knowledge of German is demonstrated.

With the year 1918, organic chemistry, as well as general chemistry and qualitative analysis, will become a pre-medical requirement and will not be included in the medical curriculum. It is recommended as a preliminary study at the present time, but provision will be made, until that date, for its inclusion in the schedule of the third year.

REGISTRATION

Registration is conducted under general University rules, in the office of the Registrar. Registration is reported to the office of the Dean of the Medical School. Students will interview the Students' Work Committee for classification and arrangement of courses. Students will not be permitted to register later than the tenth day from the opening of the semester, unless exceptional causes of delay are presented and are accepted by the Students' Work Committee.

On account of the present limited capacity of the Medical School, the registration of incoming (third year) classes has been limited to eighty.

* Candidates who offer a reading knowledge of both German and French may be excused, at the discretion of the Students' Work Committee, from one or more years of Latin.

All applicants for admission will fill out and submit to the Dean's office an application form. These applications should be entered so soon as the candidate's entrance requirements are completed. They will not be received later than August 1, 1917. If preparatory work has been done elsewhere than at the University of Minnesota, application must be accompanied by certified credentials of high school and college courses.

The Students' Work Committee will meet to consider applicants for admission at 9 a.m. on June 5, July 2, and August 1, 1917. A personal interview is required. Recommendations as to personal fitness, preparation, etc., must be submitted, with credentials.

Candidates will be selected with reference (a) to their full compliance with existing requirements; (b) to the quality of their preparatory work; (c) to their general knowledge; and (d) to their personal fitness. They will be submitted to competitive examination to establish their fitness and to determine their comparative merits. Such examinations will be held upon the dates given above. They will include tests of mental ability and general information. A physical examination is required.

Existing published requirements for admission to the Medical School will be respected. Holders of the degree of B.A. or B.S. who have covered the required subjects, and those who have successfully completed two or three years of collegiate work, including full credits and required subjects, will be entitled, other things being equal, to first consideration for existing vacancies at the date of their application.

No applicant carrying deficiencies in more than six collegiate credits, (including a reading knowledge of German, and the required two years of high-school Latin), will be considered. Such reading knowledge of German will be tested upon either of the above examination dates.

All other qualifications being equal, residents of Minnesota will be given prior opportunity in any vacancies existing at the date of their application.

If an entrance condition is allowed, it must be removed, invariably, before the opening of the succeeding school year.

FEES

The annual tuition fee in the Medical School is $150, payable in two installments, at the opening of the first and second semesters. No tuition fee is charged for the final hospital or advanced laboratory year, which is now requisite to the degree.

A deposit of $10 in the first year, and of $5 in succeeding years, is required as a caution fee. This fee covers the cost of unnecessary damage to school buildings, of breakage and loss of laboratory apparatus and material, penalties for late registration or late payment of fees, fees for condition examinations, and rentals of post-office box and lockers. Any balance remaining from this deposit will be returned to the student at the close of each year.

Students taking less than the regular course may arrange their fees upon a scale of $3 for each semester-hour's work.

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

A fee of $1 is required for condition examinations; and a fee of $5 for special examinations.

A fee of $1 is required for attendance of students upon the clinical service of the City and County Hospital of St. Paul. It is payable to the Hospital.

MICROSCOPES

Students will provide themselves, by purchase or rental, with a microscope of approved quality and equipment. They may arrange with the Assistant Dean for purchase of microscopes, through the University, upon cash payment or installment plan. Microscopes of suitable type range in cost from $50 upwards.

COMBINED COURSES IN ARTS AND MEDICINE

Students who are candidates for the degree of Bachelor of Arts, who have successfully completed three years, or 90 credits, of work and have won the required number of honor points in the College of Science, Literature, and the Arts, may elect their fourth year in the Medical School and secure the remaining 30 credits and the remaining honor points required for the baccalaureate degree, in that school.

Similarly, students who have completed, with the required number of honor points, the work of the first two years, or 60 credits, in the College of Science, Literature, and the Arts, may enter the Medical School and upon the successful conclusion of two years' work, with the required sixty honor points, will receive the degree of Bachelor of Science.

Students who have not received the B.A. or B.S. degree will be ineligible to registration in the fifth year of the combined course.

It will be understood that in either of these combined courses the required subjects, viz.: rhetoric, chemistry, zoology, physics, and a reading knowledge of German, must be included.

THE CURRICULUM

Within the four years of study in the Medical School, students cover a total of 4,200 hours of required and elective work. These hours are distributed as follows:

Subject	Hours		Subject	Hours
Anatomy	688		Medicine, including Medical Jurisprudence	681
Physiology	416		Surgery	547
Physical Chemistry	96		Obstetrics	206
or			Pedatrics	102
Organic Chemistry	160		Ophthalmology and Oto-Laryngology	88
Pathology	392		Electives	592
Bacteriology	168			
Pharmacology	160			
Hygiene	32			

ELECTIVE STUDIES

Elective courses are offered in the fourth, fifth, and sixth years. These are listed under Departmental Statements.

Certain approved courses in animal biology, chemistry, and other subjects taught in the University, outside the Medical School, may be taken as electives by medical students. A list of these courses is given in the quarterly programs.

The general arrangement of studies is planned for the average student of medicine. The order of studies is not absolutely fixed. As wide a range of individual freedom is permitted as may prove consistent with systematic education. The Committee on Students' Work has authority, within due bounds of sequence of subjects, to adjust a student's program to his particular preparation, needs, and abilities.

MIGRATORY STUDENTS

Students migrating from recognized medical schools will present to the Registrar their official credentials of admission requirements, which must be equivalent to those of this School. They will submit to the Students' Work Committee time and subject credits in medicine. They will present to the head of each department, in which they seek exemption or advanced standing, records of successful examinations. These may be accepted as of full value or supplemented by review examination, at the discretion of the department. Subject credit, but not time credit, may be given for work done other than in a medical school. Special work will be arranged for students taking such subject credits to fill the full period required by law in medical study.

No advanced standing entitles the student to take two years of any graded study coincidently.

CLINICAL SERVICE

Attendance upon clinics is required and will be recorded.

Seniors are assigned to clinical clerkships in the University Hospital. As clinical clerks they are under the supervision of senior interns or Teaching Fellows, who will assign them to duty.

For this service the hospital is open from 9:30 a.m. to 12 m. and from 1 p.m. to 4:30 p.m. Clinical clerks will record physical examinations, make and record laboratory investigations, and will attend hospital rounds and general clinics. Patients will be examined by clinical clerks only at the direction of the attending clinician.

EXAMINATIONS

The standing of students is determined by recitations, oral or written examinations, and review of laboratory or clinical note books. Examina-

tions are usually held at the end of each semester upon the courses closed within that period. Final standings are determined at the close of each semester in conference of the heads of departments with the Students' Work Committee. Reports of such standings are filed in and are announced by the Registrar's office.

A uniform marking system has been adopted for the whole University. Four passing grades, indicated by the symbols *A, B, C,* and *D,* represent differing degrees of merit. The symbol *E* represents a condition, which may be removed by examination and by such supplementary work as the department imposing it may require. *F* stands for a failure and calls for a repetition of the work in class. *I* stands for incomplete and grants the student further time for the completion of the required work.

CONDITIONS

It is incumbent upon the student to remove a condition at the first opportunity offered. If not so removed it becomes a failure.

Examinations for the removal of conditions and for advanced standing are held at the opening of the school year, from September 19 to 26, 1917. Schedule of examinations may be had upon request.

An opportunity for the removal of first-semester conditions will be given at the Easter recess.

Any student, who, at the end of any given semester, receives grades of *E* or *F* in more than 50 per cent of his registered work in that semester, will be indefinitely dropped for poor scholarship; such percentage to be estimated upon an actual study-hour basis. Any student so dropped will not be eligible to condition examination or to reinstatement excepting upon recommendation of the Students' Work Committee and affirmative vote of the Administrative Board.

REQUIREMENTS FOR GRADUATION

Compliance with the admission requirements; the prior attainment of the degree of Bachelor of Arts or Bachelor of Science, to which one year in medicine for the arts degree, and two years in medicine for the science degree, may contribute; the completion of the full four-year period of required and elective work in the Medical School; an approved hospital internship or advanced laboratory work or public health study for one year; and an unimpeached moral character, are the essentials for graduation.

The required internship insures to the practitioner of medicine a year of varied clinical experience under competent supervision and gives to the public a greater assurance of efficiency in the graduate. The alternative of advanced laboratory work serves to encourage men and women of training who desire to enter the profession of medical teaching. The alternative of public health study meets a growing demand for trained medical sanitarians.

CLINICAL OPPORTUNITIES

THE UNIVERSITY HOSPITALS

The University is fortunate in the ownership and control of the University Hospital service. The Elliot Memorial Building, the product of a bequest of the estate of the late Dr. and Mrs. A. F. Elliot, supplemented by legislative appropriations, provides a present clinic of 192 beds.

The University Hospital system seeks the highest attainable results in the treatment of patients and the training of students. Its clinical service is closely coöperative with the laboratory departments. Its service is free and patients are admitted only upon the certificate of physicians of the state vouching for the applicant's inability to pay ordinary hospital charges and physician's fees, and stating the clinical character of the case.

A service building provides kitchens, dining-rooms, storerooms and quarters for domestic help.

The Outpatient Department of the University Hospitals is housed in Millard Hall. Its service is open to free patients and is conducted by the clinical staff of the Faculty of the Medical School. It is subdivided into medical, surgical, gynecological, obstetrical, children's, eye, ear, nose and throat, skin, syphilis, genito-urinary, nervous and mental, and orthopedic clinics. It enrolled 14,666 new patients and received 52,753 patients' visits during the past year.

Sections of the senior and junior classes are assigned to these clinics daily and are trained in case-history taking, physical examinations and diagnosis, in prescription writing, and in general therapeutic methods.

A Clinical Pathological Conference is held weekly in which the history and clinical manifestations and the gross and microscopic features of cases coming to autopsy are discussed. Members of the faculty and students are invited to participate.

AFFILIATED HOSPITALS

The City Hospital of Minneapolis and the City and County Hospital of St. Paul are closely affiliated with the Medical School of the University. One half of their clinical service is under the direction of the Faculty. Attending and consulting staffs are appointed annually upon the recommendation of the Administrative Board of the School.

The combined resources of these two hospitals cover some 1,400 beds. Every phase of clinical service is represented and clinical material is utilized, so far as possible, by the School.

The State Hospital for the Crippled and Deformed, at Phalen Park, invites the Medical School to full participation in its clinical opportunities. Its superintending surgeon and his aides are members of the faculty. Teaching Fellows and interns of the University Hospital are assigned in rotation to its service. It provides weekly clinics for divisions of the senior class.

Additional clinics are held in other institutions, as the Pillsbury House, the Glen Lake Sanitorium, and the St. Paul Free Dispensary.

LIBRARY

The library of the Medical School consists of the General Library, housed in Millard Hall, and of small collections of books in the departmental libraries of Surgery, Obstetrics, Anatomy, and Pathology and Bacteriology. These departmental collections are readily available to students and investigators. The General Library is open from 9 a.m. to 10 p.m. Some 200 current journals are on file; 15,850 bound volumes and 32,859 unbound volumes and monographs, etc., are cataloged.

The libraries of other schools and colleges in the University and of the Hennepin County and Ramsey County Medical Societies are accessible to students of medicine.

PRIZES, FELLOWSHIPS, AND ASSISTANTSHIPS

The Rollin E. Cutts Prize in Surgery.—Dr. Martha Smith Cutts, '91 medical, established, some years ago, as a memorial to her husband, the late Dr. Rollin E. Cutts, a fund of $500, the income of which is awarded, in the form of a gold medal, to the member of the senior class of the Medical School who presents the best thesis evidencing original work upon an approved surgical subject.

The Shevlin Fellowship.—A fellowship, representing the income of $10,000, established in the Graduate School by the late Thomas H. Shevlin, is open to candidates for one full year's work in acceptable medical research.

Several student assistantships and, occasionally, fellowships in the fundamental departments, offer free tuition and varying stipends.

THE SUMMER SESSION

A summer session of six weeks' duration almost immediately follows the commencement exercises in June. The courses in this session are conducted in the laboratories and lecture halls of the Medical School, in the Hospitals and in the Outpatient Department.

Undergraduates in medicine are admitted in the Summer Session to courses of study offered for the following purposes: (1) to secure advanced standing in courses equivalent to those of the regular session; (2) to compensate for deficiencies in studies taken in other acceptable schools; (3) to remove conditions or failures in subjects which are equivalently covered in these courses.

For courses of instruction offered and schedule of tuition fees see Circular of Information of the Summer School.

THE GRADUATE SCHOOL IN MEDICINE

The Graduate School in Medicine has been established as a part of the main Graduate School of the University. It offers to suitably prepared graduates in medicine courses covering two and three years, leading to the Degree of Doctor of Philosophy. The adequate training of specialists in medicine is one of the main purposes of the school and for this purpose, teaching fellowships, under annual stipends, have been created; with an additional number of graduate scholarships, under an abatement of tuition fees, to which selected graduate students receive appointment. An additional number of graduate students in medicine may be received under an annual tuition fee of $50.

The field of graduate teaching in medicine has been extended to the inclusion of the opportunities for graduate study and medical research offered by the Mayo Foundation for Medical Education and Research, established at Rochester, Minn. Fellows and graduate scholars are assigned to courses of study both at the University and in the Foundation.

Students in the Medical School who have received the Baccalaureate degree from this or any other approved University may become candidates for the degree of Master of Arts, Master of Science, or Doctor of Philosophy in the Graduate School. They will pursue courses of study conforming to the regulations of the Graduate School.

Students registered in the Graduate School may elect majors or minors for the graduate degrees, for which advanced courses are provided, in anatomy, embryology, histology, neurology, pathology, bacteriology, and physiology, in the Medical School.

In all cases, students must comply with the rules and regulations of the Graduate School of the University of Minnesota, further information on which may be found in the Announcement of the Graduate School, or in the Circular of Information on graduate work in medicine. Application blanks for teaching fellowships and scholarships may be had upon request.

OPPORTUNITIES OF STUDY FOR PHYSICIANS

Physicians who desire to attend medical lectures and clinics for a limited period of time may obtain a visitor's ticket from the Dean. They may enter for regular lecture and clinical courses in the Medical School upon payment of a fee of $10 for each semester. They may arrange for special courses of study in anatomy, physiology, experimental surgery, pathology, bacteriology, pharmacology, etc., at a fee of $25 per each full semester's course, with additional charge for material used.

THE SCHOOL FOR NURSES

The School for Nurses is a department of University instruction under the control of the Medical School. It is conducted in connection with the University Hospitals. It is in charge of a Superintendent, assisted by

a committee of management and by a teaching staff selected from the Faculty of the Medical School. While the undergraduates of the School for Nurses constitute in part the nursing corps of the University Hospitals, the school exists primarily for the efficient education of the nurse. It is the first school for nurses in the United States organized under direct University control.

A four years' high-school course is the minimal requirement for admission. A six months' preliminary course in foundational studies is given before entry to the hospital service. The full course covers a period of three years. It leads to the degree of Graduate in Nursing conferred, upon the recommendation of the Faculty, by the Board of Regents.

Nurses in training are received from certain affiliated hospitals for the completion of their courses of study.

For further information, see Bulletin of the School for Nurses.

THE SCHOOL OF EMBALMING

With the coöperation of the State Funeral Directors' Association a School of Embalming has been organized by the University, and is conducted for a period of eight weeks, commencing January 3, 1918. It is under the direction of a committee of the Administrative Board of the Medical School.

Didactic and laboratory instruction is given in anatomy, bacteriology, chemistry, public health and sanitation, in autopsies, professional embalming, funeral management, and business principles. Certificates are issued to candidates successfully completing the course and are accepted for state license by the State Board of Health.

Circular of Information will be sent upon application.

THE SOCIAL SERVICE OF THE UNIVERSITY HOSPITALS

A Social Service Department has been established in relation to the hospital system and its outpatient clinics. In addition to the economic values it brings to the clinical service and the benefits which hospital and dispensary patients derive from a trained supervision extending to their homes, it offers opportunities of field work and social study to medical and sociological students.

TABULAR STATEMENT OF STUDIES IN THE MEDICAL SCHOOL

1917-1918

SUBJECTS	Hours		Total Hours
Third Year	1st Sem.	2nd Sem.	
Gross Anatomy (3-4)	13	8	336
Histology (Anat. 101)	10	...	160
Embryology (Anat. 102)	...	6	96
*Physical Chemistry (Chem. 121)	6	...	96
Physiologic Chemistry (Physiol. 102)	...	10	160
General Bacteriology (Path., etc., 104)	...	6	96
Sub-totals	29	30	
Third Year, Total Hours			944

* Organic Chemistry substituted if not taken pre-medically.

SUBJECTS	Hours				Total Hours
Fourth Year	1st Quar.	2nd Quar.	3rd Quar.	4th Quar.	
Neurology (Anat. 103)	6	6	..	..	96
Physiology (103-104)	8	8	8	8	256
Special Bacteriology (Path. etc., 105)	9	..	..	..	72
General Pathology (101)	..	12	..	..	96
Special Pathology (102)	..	..	15	14	232
Pharmacology (102-104)	..	..	6	6	80
Physical Diagnosis, etc. (Medicine 50)	..	..	2	2	32
*Electives	6	6	6	6	192
Sub-totals	29	32	36	35	
Fourth Year, Total Hours					1,056

* Elective courses are subject to adjustment by the Students' Work Committee. The hours are distributed in this schedule on a basis of average assignment.

SUBJECTS	Hours				Total Hours
Fifth Year	1st Quar.	2nd Quar.	3rd Quar.	4th Quar.	
Pharmacology and Therapeutics (105)	2	2	2	2	64
Clinical Pathology (103)	4	4	..	..	64
Medicine (51 to 55)	6	6	5	5	176
Nervous and Mental Diseases (75-76)	..	1	2	2	40
Dermatology (91)	1	1	..	..	16
Diseases of Children (Pediatrics 101-102)	1	2	2	2	56
Principles of Surgery (53)	2	2	2	1	56
General Surgery (52)	2	2	2	..	48
Regional Surgery (54)	..	..	3	3	48
Surgical Technique (51)	..	..	1	1	16
Surgical Diagnostic Clinic (57a,b)	1	1	1	1	32
Obstetrics (51-52)	2	2	2	2	64
Gynecology (Obst. 53)	2	..	..	..	16
Section Clinics	6½	6½	6	6	200
Electives	6	7	7	7	216
Sub-totals	35	36	35	32	
Fifth Year, Total Hours					1,112

SUBJECTS	Hours				Total Hours
Sixth Year	1st Quar.	2nd Quar.	3rd Quar.	4th Quar.	
Therapeutic Conference (Pharm. 107)	1	1	..	..	16
Hygiene (Path., etc., 106-107)	2	2	2	2	64
Medical Clinic (Medicine 63-64)	2	2	2	2	64
Mouth Infections (Medicine 60)	..	..	1	..	8
Medical Jurisprudence (Medicine 62)	..	..	2	..	16
General Surgery (55)	..	..	2	2	32
Urology (Surgery 73)	1	1	..	..	16
Ophthalmology and Otology (79)	2	2	..	..	32
Rhinology and Laryngology (81)	1	1	..	..	16
Obstetrics and Gynecology (57 to 61)	2	2	3	3	80
Section Clinics and Clerkships	17	17	17	17	544
Electives	6	6	6	7	200
Sub-totals	34	34	35	33	
Sixth Year, Total Hours					1,088

DEPARTMENTAL STATEMENTS*

THE DEPARTMENT OF ANATOMY

Professors CLARENCE M. JACKSON, JOHN B. JOHNSTON, THOMAS G. LEE, RICHARD E. SCAMMON; Associate Professor CHARLES A. ERDMANN; Instructors JAY A. MYERS, ANDREW T. RASMUSSEN, CHESTER A. STEWART; Assistants ERRETT C. ALBRITTON, JOHN A. KITTELSON, JOHN C. MCKINLEY, EDGAR H. NORRIS, FLORIEN VAUGHN.

Departmental Office, Institute of Anatomy

REQUIRED COURSES

1a,b. ELEMENTARY HUMAN ANATOMY. School for Nurses. 48 hours; two credits. KITTELSON.

3-4. GROSS HUMAN ANATOMY. Dissection, including osteology. A disarticulated skeleton loaned to every two students. Every student required to dissect lateral half of the body. Third year medical students; 13 hours a week, first semester; 8 hours a week, second semester. 336 hours; ten credits. JACKSON, ERDMANN, MYERS and Assistants.

5-6. GROSS HUMAN ANATOMY. Morphology of the various systems. Osteology. Splanchnology, with special reference to the digestive system. Dissection of the head, neck, and trunk. Second year dental students. 288 hours; eight credits. JACKSON, ERDMANN and Assistants.

7. HISTOLOGY AND EMBRYOLOGY. Minute structure and development of the tissues and organs. Second year dental students. 128 hours; four credits. JACKSON, LEE and Assistants.

101. HUMAN HISTOLOGY. Microscopic study of the various tissues and organs. Third year medical students. 160 hours; five credits. SCAMMON, STEWART and Assistants.

102. HUMAN EMBRYOLOGY. Development of the human body. Third year medical students. Prerequisite: Course 101. 96 hours; three credits. LEE, SCAMMON and Assistants.

103. HUMAN NEUROLOGY. A study of the central nervous system and sense organs. Fourth year medical students. Prerequisite: Courses 101, 102. 96 hours; three credits. JOHNSTON, RASMUSSEN and Assistants.

---

* Courses with number followed by "a,b." are given in each semester. Odd numbers denote first semester, and even numbers second semester courses.

ELECTIVE COURSES

106. Drawing for Publication. Advanced course in methods, principles and technique of drawings intended for publication. Limited to six students. 40 hours; one and one-half credits. Whitney.

108. Advanced Osteology. Special study of the skull or other regions. Laboratory. 32 hours, one credit. Myers.

110. Special Embryology. Detailed study of the development of man and mammals. Supplementary to course 102 which must precede or accompany it. 48 hours, one and one-half credits. Scammon.

111a,b. Anatomical Technique. Microtechnique, reconstruction and museum methods, etc. Fourth, fifth or sixth year medical students. Limited to sixteen students. 96 hours; three credits. Lee.

113. Advanced Histology. A study of special preparations, including practice in the identification of unknown specimens. Fourth, fifth, or sixth year medical, or graduate students. Limited to sixteen students. Prerequisite: Course 101. 48 hours, one and one-half credits. Rasmussen.

114. Topographic Anatomy. Based upon a study of serial cross-sections of the human body. Fourth, fifth, or sixth year medical, or graduate students. Prerequisite: Course 3-4. 96 hours, three credits. Jackson.

115. Fetal Anatomy. Study of the human fetus, with comparison of earlier embryonic and later post-natal structure. Fourth, fifth, or sixth year medical, or graduate students. Limited to twenty students. Prerequisites: Courses 3-4, 102. 96 hours, three credits. Scammon.

117. Implantation and Placentation. A study of the implantation of the ovum and the formation of the placenta, and the earliest stages of embryonic development in man and mammals. Fourth, fifth, or sixth year medical, or graduate students. Limited to twelve students. Prerequisite: Course 102 or equivalent. 96 hours; three credits. Lee.

118. Applied Anatomy. Relationships, with reference to their clinical applications. Fourth, fifth, or sixth year medical, or graduate students. Prerequisite: Course 3-4. 48 hours; one and one-half credits. Erdmann.

119. Special Dissections. Dissections of special regions, including preparation of museum specimens. Fourth, fifth or sixth year medical, or graduate students. Limited to twenty-four students. Prerequisite: Course 3-4. 96 hours; three credits. Erdmann.

120. Experimental Neurology. A study of the morphology of the central nervous system as determined by experimental methods. Fifth or sixth year medical, or graduate students. Limited to five students. Prerequisite: Course 103. 96 hours; three credits. Rasmussen.

123-124. ADVANCED ANATOMY. Advanced work, largely individual in character, in gross anatomy, histology, embryology, or neurology. Open to fourth, fifth or sixth year medical, or graduate students. Admission only upon approval of instructor. Hours and credits to be arranged. JACKSON, JOHNSTON, LEE, OR SCAMMON.

201-202. RESEARCH IN ANATOMY. Research work in gross or microscopic anatomy, neurology, histology, or embryology, for properly qualified students, graduates or others, upon approval of any one of the instructors. Hours and credits to be arranged. JACKSON, JOHNSTON, LEE, SCAMMON.

203-204. ANATOMICAL SEMINAR. Presentation and discussion of research work in progress in the department, together with reviews of current anatomical literature. Open to graduates or others upon approval of instructor. 32 hours; two credits. JACKSON.

THE DEPARTMENT OF PHYSIOLOGY

Professor ELIAS P. LYON; Associate Professors RICHARD OLDING BEARD, FREDERICK H. SCOTT; Assistant Professors JOHN F. MCCLENDON, M. RUSSELL WILCOX; Instructors FRANCIS B. KINGSBURY, CHAUNCEY J. V. PETTIBONE; Assistants CHARLES C. GAULT, EDWARD P. SLATER.

Departmental Office, Millard Hall

REQUIRED COURSES

*1-2. ELEMENTARY PHYSIOLOGY AND HYGIENE. A course planned to afford teachers a helpful knowledge of the human subject. The study of muscle-nerve function; the circulation; respiration; nervous system and senses. Lectures and laboratory work. 48 hours; two credits, each semester. BEARD OR LYON and Assistant.

*1x-2x. ELEMENTARY PHYSIOLOGIC CHEMISTRY. The chemical components of the body and body fluids; physiology of secretion; digestion, absorption, foods; metabolism and excretion. Lectures and laboratory work. 48 hours, two credits in each semester.

3a,b. ELEMENTARY HUMAN PHYSIOLOGY. School for Nurses, Home Economics students and others. Prerequisites: elementary biology and chemistry. 96 hours; three credits. BEARD OR LYON and Assistants.

4. ELEMENTARY PHYSIOLOGY. Sophomore dental students. Prerequisites:

* Courses 1-2 and 1x-2x are offered in alternate years. Together they are designed to cover the field of physiology in its physical and chemical aspects. These courses are given on Saturdays from 9:00 to 12:00 and are primarily for teachers. Course 1-2 will be given in 1917-18; Course 1x-2x in 1918-19.

elementary biology or anatomy and chemistry. 80 hours; three credits. LYON, BEARD, SCOTT and Assistants.

6. ELEMENTARY PHYSIOLOGIC CHEMISTRY. Sophomore dental students. Prerequisite: organic chemistry. 64 hours; two credits. PETTIBONE, KINGSBURY and Assistants.

102. PHYSIOLOGIC CHEMISTRY. The components of the animal body; foods, digestion, the excreta and metabolism. Third year medical students and others. Prerequisite: organic chemistry. 160 hours; five credits. PETTIBONE, KINGSBURY and Assistant.

103. PHYSIOLOGY OF MUSCLE, NERVE, BLOOD, CIRCULATION, AND DIGESTION. Fourth year medical students and others. Prerequisites: organic chemistry and animal biology. 128 hours; four credits. SCOTT, LYON, BEARD, MCCLENDON and Assistants.

104. PHYSIOLOGY OF THE NERVOUS SYSTEM AND SPECIAL SENSES; RESPIRATION, METABOLISM, NUTRITION, AND EXCRETION. Fourth year medical students and others. Prerequisite: organic chemistry and animal biology. 128 hours; four credits. LYON, BEARD, SCOTT, MCCLENDON, WILCOX and Assistants.

ELECTIVE COURSES

111. PHYSICAL CHEMISTRY OF CELLS. Osmotic pressure, surface tension and electric conductivity of blood and urine; colloids; permeability of cells and tissues, and changes in permeability produced by electrolytes. Prerequisites: animal biology and two courses in chemistry. 96 hours; three credits. MCCLENDON.

112. ELECTRO-PHYSIOLOGY. The bio-electric currents and the theory of stimulation and narcosis. Hydrogen ion concentration and its relation to enzyme activity and irritability. Prerequisites: animal biology and two courses in chemistry. 96 hours; three credits. MCCLENDON.

113-114. PROBLEMS IN PHYSIOLOGY. Arranged by instructors with qualified students. Each student will be assigned a topic for special laboratory study, leading in some cases to original investigation. Fourth, fifth or sixth year medical students and others. 96 hours; three credits, or more; either or both semesters. LYON, SCOTT, OR MCCLENDON.

115-116. CONFERENCE COURSE IN PRINCIPLES OF PHYSIOLOGY; STUDENT SEMINAR. Informal lectures and library study. Basis of study, *Bayliss' Text-book*. Fourth, fifth, and sixth year medical students and others. 12 hours, each quarter; one and one-half credits, each semester. LYON, SCOTT, OR MCCLENDON.

131. PHYSIOLOGY OF THE BLOOD. Alterations due to physiological conditions. Methods of examination. Fourth, fifth or sixth year medical

students. Limited to sixteen students. 48 hours; one and one-half credits. SCOTT.

132. PHYSIOLOGY OF THE CIRCULATION. Conference and laboratory work. Open to fourth, fifth or sixth year medical students. Limited to sixteen students. Conference may be taken separately. 24 or 48 hours; three-fourths or one and one-half credits. SCOTT.

137. FOODS AND PRACTICAL DIETETICS. A study of human foods and food values; of the principles of food selection; of caloric indices and balanced dietaries. Exercises in the practical preparation of foods. Open to fourth, fifth or sixth year medical students. Limited to twelve students. 40 hours; two credits. BEARD, assisted by MISS THOMAS, Dietitian, University Hospital.

138. PHYSIOLOGY OF DEVELOPMENT. The physiology of the ovum, the embryo, the fetus; the functions of menstruation, ovulation, pregnancy, parturition and lactation; the functional characteristics of birth, infancy, childhood, adolescence, maturity, and old age. Open to fourth, fifth or sixth year medical students. 32 hours; two credits. BEARD.

139. EXAMINATION OF THE EYE AND EAR. A study of advanced methods. Lectures, demonstrations, and laboratory exercises. Prerequisite: Course 104. Open to fifth or sixth year medical students. 24 hours; one credit. WILCOX.

140. PHYSIOLOGY OF ACCOMMODATION. A study of optical principles and methods. Lectures, demonstrations, and laboratory exercises. Open to fifth or sixth year medical students. 24 hours; one credit. WILCOX.

151-152. PHYSIOLOGIC CHEMISTRY. The components of the body, foods, digestion and metabolism. Prerequisite: organic chemistry. Open to qualified students in all divisions of the University. May be taken by medical students in place of Course 102. 96 hours; three credits; in each semester. KINGSBURY.

153-154. ADVANCED PHYSIOLOGIC CHEMISTRY. Course arranged by instructors with qualified students for special work. Open to fourth, fifth or sixth year medical students and others; may be taken in either semester or both. Prerequisite: Course 102. 96 hours; three credits, either semester or both. PETTIBONE OR KINGSBURY.

161. URINALYSIS. Advanced methods. Open to fourth, fifth or sixth year medical and other qualified students. First quarter. Prerequisite: Course 102. 48 hours; one and one-half credits. PETTIBONE.

163. METABOLISM. Special phases of metabolism. Lectures may be taken alone; number of students unlimited; laboratory course limited to ten students. Open to fourth, fifth or sixth year medical students and others. Prerequisite: Course 102. 48 hours; three-fourths or one and one-half credits. PETTIBONE.

164. QUANTITATIVE METHODS. The estimation of certain important substances in the urine, blood and other body fluids. Open to fourth, fifth or sixth year medical students and others. Prerequisite: Course 102. 96 hours; three credits. KINGSBURY.

201-202. SEMINAR IN PHYSIOLOGY AND PHARMACOLOGY. For instructors and advanced students. 16 hours, each semester; one credit. LYON, HIRSCHFELDER and Staff.

203-204. RESEARCH IN PHYSIOLOGY. Hours and credits arranged. LYON, SCOTT, OR MCCLENDON.

205-206. RESEARCH IN PHYSIOLOGIC CHEMISTRY. Hours and credits arranged. KINGSBURY OR PETTIBONE.

208. SEMINAR IN PHYSIOLOGIC OPTICS. Primarily for graduate students. Open to sixth year medical students. 24 hours; one and one-half credits. LYON.

PHYSIOLOGIC OPTICS. A laboratory course. For graduate and sixth year students. 48 hours. One and one-half credits. LYON.

DEPARTMENT OF PHARMACOLOGY

Professor ARTHUR D. HIRSCHFELDER; Associate Professor EDGAR D. BROWN; Instructor.....

Departmental Office, Millard Hall

REQUIRED COURSES

1a,b. ELEMENTARY PHARMACOLOGY. A study of the history, uses, classification and preparation of drugs; definition of descriptive terms; systems of weights and measures; methods of administration, principles of dosage, etc. School for Nurses and others. 64 hours; three credits. .....

4. COURSE IN PHARMACOLOGY. The history, origin, nature, pharmacal preparations, and uses of drugs, including the discussion of their physiologic, pharmacologic, and therapeutic actions. Second year dental students. 48 hours; three credits. .....

102. GENERAL PHARMACOLOGY. The principles underlying the structure, physico-chemical properties, physiologic, therapeutic, and toxic actions of substances, natural or synthetic, used as medicines. Fourth year medical students. 32 hours; two credits. HIRSCHFELDER, BROWN.

104. EXPERIMENTAL PHARMACOLOGY. Exercises illustrating the preparation and action of medicines, their relation to chemical structure and their mode of administration. Fourth year medical students. 48 hours; one and one-half credits. HIRSCHFELDER, BROWN.

105a,b. General Pharmacology and Therapeutics. A more detailed study of drugs important in clinical practice, covering the relations of chemical structure to physiologic and therapeutic action and modes of application in clinical medicine. Fifth year medical students. 48 hours; two credits. Hirschfelder, Brown.

107a,b. Therapeutic Conference. A systematic discussion of the causation of disease in relation to therapeutics, studied upon actual cases at the bedside; followed by demonstrations of similar conditions produced experimentally in the laboratory. Sixth year, each quarter; to clinic clerks in medicine. Eight hours. Hirschfelder, Rowntree.

ELECTIVE COURSES

6. Experimental Pharmacology. Experiments upon the effects of the important heart and nerve stimulants, sedatives, purgatives and antiseptics. Offered to dental and pharmacy students and nurses. 24 to 48 hours; one to two credits. Hirschfelder, Brown.

109a,b. Experimental Pharmacology. Special investigation and experimental study of one or more subjects in pharmacology, in which the student is given an opportunity of choice of the following topics:

a. Anesthetics, general and local; the principles and dangers of anesthesia.
b. Stimulants and depressants of the circulation and their relation to the treatment of heart disease.
c. Drugs acting upon the kidneys, normal or diseased.
d. Urinary antiseptics and the urinary excretion of drugs.
e. Action and detection of poisons and their antidotes.
f. Detailed study of the effects in man of the common harmless drugs.
g. The internal secretions and gland extracts; their effect upon the action of drugs.
h. Action of drugs upon animal and bacterial parasites, tumors, etc.

Offered in the second half of the fourth year and in the entire fifth or sixth year. 24 or 48 hours; one or two credits, each semester. Hirschfelder, Brown.

110. Poisons. Their detection, actions, and antidotes. Open to fourth, fifth or sixth year medical students. 48 hours; one and one-half credits. Brown.

111a,b. Prescription Writing. The principles of prescription writing; study of the flavoring, coloring, and incompatibilities of drugs. Open to fourth, fifth or sixth year medical students. 16 hours; one credit. Brown.

112. Practical Materia Medica and Prescription Writing. The study of crude drugs, pharmaceutical preparations and of the flavoring and

compounding of prescriptions. Open to fourth, fifth and sixth year medical students. 8 hours; one-half credit. BROWN.

113a,b. THE PHYSIOLOGICAL AND CHEMICAL BASIS OF PHARMACOLOGY. The relation of drug action to chemical structure; the mode of action and therapeutic application of various synthetic drugs; the study of chemotherapy. Primarily for students in the School of Chemistry. 80 hours; three credits. HIRSCHFELDER.

201-202. SEMINAR IN PHYSIOLOGY AND PHARMACOLOGY. Reviews of recent literature bearing upon physiologic and pharmacologic subjects. Conducted by department directors, with the collaboration of the staffs and of qualified graduate or undergraduate students. 32 hours.

203-204. RESEARCH IN PHARMACOLOGY. HIRSCHFELDER, BROWN.

THE DEPARTMENT OF PATHOLOGY, BACTERIOLOGY, AND PUBLIC HEALTH

Professor HAROLD E. ROBERTSON; Associate Professors ELEXIOUS T. BELL, WINFORD P. LARSON; Assistant Professor MOSES BARRON; Instructors ANNE G. BENTON, ARTHUR T. HENRICI, MARGARET WARWICK; Assistants HAROLD S. DIEHL, KANO IKEDA, PERCY A. WARD.

Departmental Office, Institute of Public Health and Pathology

REQUIRED COURSES

3. BACTERIOLOGY. The principles governing the isolation and study of bacteria. The bacteria and other parasites of the mouth and teeth. Studies of pathogenic organisms which produce, or appear in rheumatism; relation to infections of the teeth. Dental students. 96 hours; four credits. HENRICI.

4. PATHOLOGY. The study and recognition of gross and microscopic disease processes. The principles of general pathology with special consideration of diseases peculiar to the mouth and teeth and important in dental practice. Dental students. 96 hours; four credits. ROBERTSON, HENRICI.

6a,b. ELEMENTARY BACTERIOLOGY. The principles and technique of general bacteriology. Studies in the morphologic and biologic characters of the common bacteria. Preparation of culture media. Disinfectants and disinfection. Bacteriology of water and food products. Students of Home Economics, Agriculture, Nursing, etc. 80 hours; three credits. LARSON, HENRICI, DIEHL, WARD, IKEDA.

101. GENERAL PATHOLOGY. The general principles governing pathologic changes, including disturbances of the circulation and metabolism; inflammation, regeneration, and repair; tumor formation. The study

and recognition of gross and microscopic lesions. Fourth year medical students. Prerequisites: histology and special bacteriology. 96 hours; four credits. ROBERTSON, BELL, WARD.

102. SPECIAL PATHOLOGY. The study of the pathologic processes of infectious diseases, such as diphtheria, typhoid fever, etc.; the special pathology of lesions in various organs, systems of organs and tissues of the body. Fourth year medical students. Prerequisite: general pathology. 232 hours; eight credits. ROBERTSON, BELL, BARRON, WARD.

103. CLINICAL PATHOLOGY. The principles and methods involved in the examination of urine, blood, stomach contents, feces, sputum, exudates and transudates; the relation of pathologic findings to the diagnosis of disease. Fifth year medical students. 64 hours. BARRON, WARD.

104. GENERAL BACTERIOLOGY. The preparation of culture media; the morphology of bacteria; methods of staining and identification; anaerobic bacteria; principles of sterilization and disinfection; examination of air, water, milk; relation of bacteriology to the industries. Third year medical students and others. Prerequisites: general chemistry, and botany or zoology. 96 hours; four credits. LARSON, BENTON.

105. SPECIAL BACTERIOLOGY. The study of pathogenic bacteria, especially in relation to definite diseases; bacteriological methods in clinical diagnosis; principles of infection and immunity, with practical application of serum reactions. Fourth year medical students and others. Prerequisite: general bacteriology. 72 hours; three credits. LARSON, BENTON, WARD.

106. PREVENTIVE MEDICINE AND HYGIENE. Systematic study of the principles which govern the various procedures in the protection of public health. Sixth year medical students. 32 hours. ROBERTSON.

109a,b. CLINICAL PATHOLOGY. Practical work in the examination of blood, urine, stomach contents, sputum, etc. Conducted in the Outpatient Department with class sections. Sixth year medical students. 12 hours. WARWICK.

111a,b. AUTOPSIES. The technique of performing autopsies; making autopsy records; the examination of fresh organs removed from these autopsies. Opportunities afforded to study the observed lesions microscopically. Three or four students called to each post-mortem, excused from regular classes. Preference given to senior students. Each candidate for the degree must have taken part in at least four autopsies. Fifth and sixth year medical students. The Staff.

ELECTIVE COURSES

112. PATHOLOGIC TECHNIQUE. General and special methods of preparation of microscopic and gross pathologic specimens; including practice with freezing microtome, celloidin and paraffin embedding methods, general and special stains, preparation of museum specimens, etc. Limited to ten students. Fourth, fifth and sixth year medical students. Prerequisite: general pathology. 48 hours; one and one-half credits. ROBERTSON.

113a,b. ADVANCED PATHOLOGY. Laboratory studies in the examination of routine operative and autopsy specimens, with the investigation of special associated problems. Credit for work in this course is to be judged entirely by the character and amount of work accomplished. Dates and hours to be arranged. The Staff.

114. ADVANCED BACTERIOLOGY. An advanced course giving additional work in bacteriology and the opportunity of working out special problems. Fifth year medical students. Limited to ten students. 48 hours; one and one-half credits. LARSON.

115a,b. COURSE IN IMMUNITY. Laws of hemolysis. Quantitative relationship between antigen and antibody. Wassermann reaction. Opsonins. Vaccines. Precipitin reaction. Abderhalden reaction. Anaphylaxis. Fifth and sixth year medical students. Limited to ten students in each semester. 48 hours; one and one-half credits. LARSON.

117. DIAGNOSIS OF TUMORS. Rapid diagnosis and study of tumors and other pathologic conditions simulating tumor formation. Fifth and sixth year medical students. Prerequisite: special pathology. 48 hours; one and one-half credits. BELL.

118. GYNECOLOGICAL PATHOLOGY. The special study of pathologic conditions found in the female genital tract. This elective is an integral part of Course 102, special pathology. Fourth, fifth or sixth year medical students. 48 hours; one and one-half credits. BELL, ADAIR.

120. NEUROPATHOLOGY. The special study of pathologic conditions of the nerve tissues in lesions of the central and peripheral nervous system. This elective is an integral part of Course 102, special pathology. Fourth, fifth or sixth year medical students. 24 hours; three-fourths credit. BELL, HAMILTON.

121. CLINICAL LABORATORY COURSE. Practical diagnostic study in the outpatient department laboratory. Limited to sections of four students. Fifth or sixth year medical. 18 hours; one-half credit. WARWICK.

122. MEDICAL ENTOMOLOGY. A study of insects, and their allies, which are disease-bearers or parasites of man; life-history, habits and

methods of control. Fourth, fifth or sixth year students. Prerequisite: animal biology. 32 hours; two credits. HOWARD.

124. HEMATOLOGY. Advanced studies in diseases of the blood; with particular attention to special technical procedures and the significance of laboratory findings. Fifth or sixth year medical students. 48 hours; one and one-half credits. BARRON.

201-202. RESEARCH. Graduate students, of the necessary preliminary training, may elect research, either as majors or minors in pathology. Hours and credits to be arranged. ROBERTSON, BELL.

203-204. RESEARCH. Graduate students of the necessary preliminary training may elect research, either as majors or minors, in bacteriology. Hours and credits to be arranged. LARSON.

ELECTIVE COURSES

Offered by members of the State Board of Health Staff and by the Director of Hygiene of the Minneapolis Schools

125. EPIDEMIOLOGY. Office and field work in Division of Preventable Diseases of the State Board of Health. Collection and uses of morbidity reports; prevalence, sources, modes of spread of communicable diseases; practical methods of control and prevention. Limited to two students. Dates and hours to be arranged. ALBERT J. CHESLEY, M.D., Director of Division.

126. LABORATORY DIAGNOSIS. Routine laboratory diagnoses in State Board of Health Laboratory. Diphtheria culture examinations; virulent and non-virulent diphtheria carriers; Widal reactions; identification of typhoid carriers; examination of sputa and body fluids for tubercle bacilli; preparation of typhoid vaccine. Limited to two students. Dates and hours to be arranged. ETHEL M. WADE, M.A., Chief, Main Laboratory.

127. PASTEUR INSTITUTE. The diagnosis and prophylaxis of rabies; inoculation of animals; autopsies on animals; preparation of fixed virus spinal cords; administration of antirabic vaccine to patients; study of Negri bodies. Special phases of work for investigation and report. Limited to two students. Dates and hours to be arranged. ORIANNA MCDANIEL, M.D., Chief, Pasteur Institute.

128. SANITATION. Practical work on environmental sanitation in the Division of Sanitation. Water supplies, milk supplies, sewerage systems, trade wastes, garbage disposal; the sanitation of public buildings; field surveys, laboratory examinations, interpretation of results, reports, etc. Limited to two students. Dates and hours to be arranged. HAROLD A. WHITTAKER, B.A., Director, Division of Sanitation.

129. PUBLIC SCHOOL MEDICAL WORK. Lectures on the duties and qualifications of school medical officers. Fifth and sixth years. 8 hours. CHARLES H. KEENE, M.D., Director of Hygiene, Minneapolis Schools.

131a,b. PRACTICAL MEDICAL WORK, in the schools of Minneapolis, by school physicians. Fifth and sixth years, 24 hours. DR. KEENE and others.

THE DEPARTMENT OF SURGERY

Professors JAMES E. MOORE, ARTHUR J. GILLETTE; Associate Professors J. FRANK CORBETT, ARTHUR A. LAW, ARCHIBALD MACLAREN, ARTHUR T. MANN, JOHN T. ROGERS; Assistant Professors ALEXANDER R. COLVIN, EMIL S. GEIST, OSCAR OWRE, HARRY P. RITCHIE, ARTHUR C. STRACHAUER, FRANKLIN R. WRIGHT; Instructors JOHN S. ABBOTT, PAUL F. BROWN, CARL C. CHATTERTON, WALLACE COLE, JAMES A. JOHNSON, FREDERICK H. POPPE, CHARLES A. REED, HARRY B. ZIMMERMAN; Assistants PAUL W. GIESSLER, EUGENE K. GREEN, CHARLES A. HALLBERG, HUGO HARTIG, JOHN P. HIEBERT, WALTER J. KREMER, HENRY C. STUHR, ANTON J. WETHALL; Teaching Fellows DONALD F. CAMERON, GOLDER L. MCWHORTER.

Departmental Office, Millard Hall

REQUIRED COURSES

51. GENERAL SURGERY. The diseases and injuries of tendons, fasciae, bursae, blood-vessels, nerves, brain, and meninges. Lectures and demonstrations. Fifth year. 32 hours. LAW.

52. SURGICAL QUIZ. For fifth year students. 16 hours. MOORE.

53-54. PRINCIPLES OF SURGERY. A study of surgical inflammations, etc.; illustrated by gross and microscopic preparations from the living subject and from experimental courses. Lectures and demonstrations. Fifth year. 56 hours. CORBETT.

56. REGIONAL SURGERY. The practical surgery of the several regions of the body; diseases of bones, injuries and acute diseases of joints, etc. Lectures and demonstrations. Fifth year. 48 hours. MOORE.

58. GENERAL SURGERY. Fractures and dislocations. Lectures and demonstrations. Sixth year. 32 hours. LAW.

59-60. DIAGNOSTIC CLINIC. A series of clinics upon the diagnosis of surgical conditions as presented in the hospital wards. Fifth year. 32 hours. MOORE.

61-62. DIAGNOSTIC AND OPERATIVE CLINIC. A course in operative procedure conducted at the University Hospitals, the Minneapolis City Hospital, and the City and County Hospital at St. Paul, on Thurs-

days and Saturdays, throughout the year. Fifth year class, in sections. 56 hours. MOORE, LAW, MACLAREN, RITCHIE, STRACHAUER, CORBETT, MANN, POPPE, ROGERS, COLVIN.

63a,b. CLINICAL CLERKSHIPS. Direct observation of patients in hospital, under supervision of senior internes or teaching fellows; taking and recording of case histories and making of provisional diagnoses. Sixth year. 64 hours, each quarter. Clinical Staff.

64a,b. OPERATIVE CLINIC. A course of operations in the University Hospitals, the Minneapolis City Hospital, and the City and County Hospital at St. Paul, on Tuesdays, Thursdays, and Saturdays. For sections of class; sixth year. 48 hours. MOORE, LAW, MACLAREN, RITCHIE, STRACHAUER, CORBETT, MANN, POPPE, ROGERS, COLVIN.

65a,b. MINOR OPERATIVE CLINICS. Course conducted with class sections on three days in each week at the Out-patient Department. Sixth year. 12 hours. JOHNSON and Assistants.

66. MEDICAL ETHICS AND ECONOMICS. Sixth year. 8 hours. MOORE.

ELECTIVE COURSES

101a,b. COURSE IN MINOR SURGERY. The study of diagnosis and treatment of selected cases. Sixth year. 36 hours. JOHNSON and Assistants.

103. OPERATIVE COURSE ON THE CADAVER. The technique of abdominal incision and closure; of bowel suturing, appendiceal removal, kidney exploration, nephrotomy, tracheotomy, amputations, ligations, and other problems in emergency surgery. Fifth year. 32 hours. CORBETT.

104a,b. SURGICAL PROBLEMS. A study of approved problems, selected by students in the course, in operative, physiological, histological, and chemical methods. Fifth year. 24 hours, or more. CORBETT.

106. COURSE IN TUMORS. The pathology and diagnosis of tumors, classified by anatomical relation. Sixth year. 24 hours. CORBETT.

108. COURSE IN EXPERIMENTAL SURGERY. A study of surgical technique by cardinal operations upon animals. Sixth year. 40 hours. CORBETT.

109a,b. DIAGNOSTIC CLINIC, WITH OCCASIONAL OPERATIONS. Conducted at the City and County Hospital, St. Paul. Limited to ten students. Fifth or sixth year. 12 hours. COLVIN.

110. LOCAL ANESTHESIA. Methods and applications of local anesthesia in both major and minor surgery. Fifth and sixth year. 8 hours. STRACHAUER.

111a,b. EXTRACTION OF TEETH. Course offered in the College of Dentistry. Limited to eight students. Fifth or sixth year. 8 hours. GRIFFITH.

112. SURGICAL QUIZ. A review of surgical studies by recitation and conference. Sixth year. 16 hours. MANN.

119a,b. BEDSIDE SURGICAL CLINIC. Limited to four students. Repeated each quarter in the sixth year. 8 hours. MOORE.

DIVISION OF ORTHOPEDIA

REQUIRED COURSES

70a,b. ORTHOPEDIC SURGERY. A course of clinical lectures and operations conducted in each quarter, with divisions of class, at the Hospital for Crippled and Deformed at Phalen Park. Sixth year. 24 hours. GILLETTE, CHATTERTON.

71a,b. ORTHOPEDIC CLINIC. A study of cases of orthopedic disease and treatment at the Out-patient Department; with class sections, three weekly sessions. Sixth year. 8 hours. GEIST, REED, COLE.

ELECTIVE COURSES

113a,b. CLINIC IN ORTHOPEDIC SURGERY. The study of selected cases. Conducted in Out-patient Department. Limited to three students. Sixth year. 36 hours. GEIST, REED.

114. ORTHOPEDIC SURGERY. Illustrated clinical lectures. Sixth year. 24 hours. GEIST.

115a,b. CLINIC IN ORTHOPEDIC SURGERY. Conducted at Phalen Park Hospital for the Crippled and Deformed. 24 hours in each semester. COLE.

DIVISION OF UROLOGY

REQUIRED COURSES

73. GENITO-URINARY DISEASES. The etiology, diagnosis, and treatment of this group of diseases. A course of lectures. Sixth year. 16 hours. WRIGHT.

75a,b. GENITO-URINARY CLINIC. The study of cases at the bedside and in the operating rooms of the several hospitals. Sixth year. 8 hours. WRIGHT, OWRE.

77a,b. GENITO-URINARY CLINIC. The observation, examination, and treatment of patients in the Out-patient Service at three weekly sessions. Sixth year. 8 hours. WRIGHT, OWRE, and Assistants.

ELECTIVE COURSES

117a,b. GENITO-URINARY DISEASES. The study of cases in the Out-patient

clinics, giving the student the opportunity of examination and supervised treatment of patients. Sixth year. 36 hours. WRIGHT, OWRE, and Assistants.

118a,b. ENDOSCOPY AND CYSTOSCOPY. Methods of investigation and treatment. Conducted in Out-patient Department. Sixth year. 8 hours. WRIGHT.

THE DEPARTMENT OF MEDICINE

Professors LEONARD G. ROWNTREE, ARTHUR S. HAMILTON, S. MARX WHITE, ARTHUR A. SWEENEY; Research Professor THOMAS B. HARTZELL; Associate Professor JAMES S. GILFILLAN; Assistant Professors FRANCIS G. BLAKE, ERNEST M. HAMMES, ANGUS W. MORRISON, SAMUEL E. SWEITZER, HENRY L. ULRICH; Lecturer HENRY WIREMAN COOK; Instructors JOHN M. ARMSTRONG, J. FOWLER AVERY, ARCHIBALD H. BEARD, JOHN BUTLER, PAUL B. COOK, CHARLES RALPH DRAKE, EDWIN L. GARDNER, ALEXANDER R. HALL, HARRY J. IRVINE, GEORGE M. OLSON, HAROLD PEDERSON, ERNEST T. F. RICHARDS, ROBERT I. RIZER, JOHN P. SCHNEIDER, FREDERICK W. WITTICH, CHARLES B. WRIGHT; Research Assistant WILLIAM A. GREY; Assistants J. WARREN BELL, LOUISA M. BOUTELLE, EDWARD J. ENGBERG, WALTER A. FANSLER, ARNOLD L. HAMEL, OLGA S. HANSEN, ADOLPH E. LOBERG, FRANK S. MCKINNEY, ERNEST S. MARIETTE, JOSEPH C. MICHAELS, FREDERICK P. MOERSCH, HARRY P. NORDLEY, JOHN H. SCHROEDER, HOMER R. SMITH, COURT R. STANLEY; Teaching Fellows FLOYD GRAVE, RALPH EDWIN MORRIS, HENRY W. WOLTMANN.

Departmental Office, Millard Hall

REQUIRED COURSES

50. PHYSICAL DIAGNOSIS. A study of general symptomatology and of methods of physical examination, diagnosis, and record, with demonstrations upon the normal and abnormal subject; introductory to the group teaching of physical diagnosis in the fifth year. Fourth year. 24 hours. ROWNTREE, SCHNEIDER, and Assistants.

51-52. THE PRINCIPLES AND PRACTICE OF MEDICINE. Diseases of the heart and bloodvessels; of the bronchi, lungs, and pleura; of the intestinal tract; renal diseases; acute infections. Fifth year. 64 hours. ROWNTREE, WHITE, BLAKE, RICHARDS, RIZER, GARDNER, WITTICH.

53a,b. PHYSICAL DIAGNOSIS AND CASE-TAKING. Studies conducted, with divisions of the class, in the following clinics: (1) cardiac and vascular diseases; (2) respiratory diseases and tuberculosis; (3) metabolic diseases; (4) gastro-intestinal diseases; (5) nervous diseases; (6) dermatology and syphilis. See also Courses 77 and 85. Fifth

year. 144 hours. SCHNEIDER, RIZER, AVERY, WITTICH, WRIGHT, BEARD, MORRISON, SWEITZER, IRVINE, BUTLER, OLSON, and Assistants.

55. PHYSICAL DIAGNOSIS. A course of lectures in elaboration of the practical work in the outpatient service. Fifth year. 16 hours. SCHNEIDER, RIZER, WITTICH.

56. PRACTICAL THERAPY AND THERAPEUTIC TECHNIQUE. A study of special methods of therapeusis. Fifth year. 16 hours. RICHARDS, BEARD.

57a,b. CLINIC IN MEDICINE. Conducted in the University Hospital. Fifth year; one half the class in each semester. 16 hours. ULRICH.

59a,b. SECTION CLINICS IN MEDICINE. Conducted throughout the year in the Minneapolis City Hospital and the City and County Hospital, St. Paul. Fifth year. 48 hours. GILFILLAN, HALL, PEDERSON, GARDNER.

60. MOUTH INFECTIONS. The typical infections of the oral cavity and their casual relations to disease. Fourth quarter. Sixth year. 8 hours. HARTZELL.

62. MEDICAL JURISPRUDENCE. The principles of law, the rules of evidence and the duties of physicians in medico-legal cases. Third quarter. Sixth year. 16 hours. SWEENEY.

63a,b. CLINIC IN MEDICINE. A study of cases and case histories in the University Hospital service. Sixth year. 64 hours. ROWNTREE, WHITE.

65a,b. CLINICAL CLERKSHIPS. The personal and direct observation of patients in hospital under the supervision of the staff; the taking and recording of case histories and the making of provisional diagnoses. One fourth of class in each quarter. Hospital open for this service from 9:30 to 12 and 1 to 4:30. Sixth year. 144 hours.

67a,b. SECTION CLINICS IN MEDICINE. Conducted throughout the year at the Minneapolis City Hospital and the City and County Hospital of St. Paul. Sixth year. 8 hours. GILFILLAN, HALL, PEDERSON, GARDNER.

107a,b. CLINICAL-THERAPEUTIC CONFERENCE. A weekly conference in which the clinical features and the treatment of cases are discussed; followed by a reproduction of corresponding lesions and therapeutic effects in the animal. Sixth year. 32 hours. ROWNTREE, HIRSCHFELDER.

ELECTIVE COURSES

101a,b. CLINICAL ELECTIVES, offering the student an assistantship in the Outpatient Department in any of the services in medicine, nervous and mental diseases, and dermatology and syphilis. For services,

see Courses 53, 119, 121. Sixth year. Open to two students, who have completed clinical clerkships, in each service and in each quarter. 36 hours. The Staff.

103a,b. BEDSIDE CLINICS IN MEDICINE. Conducted at the City and County Hospital, St. Paul. Limited to ten students. Fifth year. 12 hours. HALL.

104. THE EXAMINATION FOR LIFE INSURANCE. The requirements of standard and special examinations of applicants for life insurance. Fifth or sixth year. 8 hours. COOK.

105. ACUTE INFECTIOUS DISEASES. Non-contagious. A comparative study of fevers. City Hospital. Limited to six students. Sixth year. 8 hours.

106. DISEASES OF THE RESPIRATORY TRACT. A study of physical signs. City Hospital. Limited to six students. Fifth year. 8 hours.

108. ADVANCED WORK IN GRAPHIC RECORDING AND FUNCTIONAL DIAGNOSIS OF CARDIO-VASCULAR DISEASES. A study of the use of the polygraph and electro-cardiagraph. Limited to six students. Sixth year. 16 hours. WHITE.

109a,b. ADVANCED PHYSICAL DIAGNOSIS OF THE CHEST. Practical work on tuberculosis patients at available hospitals. Two classes of six students each. Fifth and sixth year. WITTICH and Associates.

110. STUDIES IN METABOLISM, CLINICAL AND EXPERIMENTAL. Limited to six students. Sixth year. 48 hours. ROWNTREE and Staff.

111. PROBLEMS IN ADVANCED MEDICAL DIAGNOSIS. Limited to four students. Sixth year. 16 hours. ULRICH.

DIVISION OF NERVOUS AND MENTAL DISEASES

REQUIRED COURSES

69. NEUROLOGY AND NEUROLOGIC DIAGNOSIS. The general symptomatology and methods of examination of the nervous system; the etiology, pathology, diagnosis and treatment of the special diseases of the nervous system. Lectures, recitations, and lantern demonstrations. Fifth year. 24 hours. HAMILTON, HAMMES.

70. PSYCHIATRY. The principal data and methods of modern psychiatry, with the diagnosis and treatment of the various mental disorders. Lectures, recitations, and demonstrations. Prerequisite: Course 75. Fifth year. 16 hours. HAMILTON.

71a,b. CLINICAL NEUROLOGY AND PSYCHIATRY. Section clinics in nervous and mental diseases, conducted at the University Hospital, the Minneapolis City Hospital, and the City and County Hospital, St. Paul.

Fifth year. 20 hours. HAMILTON, HAMMES, MORRISON, WOLTMANN.

73a,b. ADVANCED SECTION CLINICS conducted at the above hospitals throughout the year. Sixth year. 20 hours. HAMILTON, HAMMES.

75a,b. PERSONAL OBSERVATION AND STUDY of cases of nervous and mental disease in the University Out-patient Service. In sections. Sixth year. 12 hours. MORRISON, WOLTMANN.

77a,b. PHYSICAL DIAGNOSIS AND CASE-TAKING. Studies conducted with divisions of the class in medical clinics, including neurology, in the Outpatient Department. See Course 53a,b. Fifth year. 24 hours. MORRISON.

ELECTIVE COURSES

113. PATHOLOGY OF THE NERVOUS SYSTEM. The exhibition of gross and microscopic preparations of diseased nerve tissues; the relations existing between pathologic lesions and signs and symptoms; the chief neurone systems and the principles underlying their degeneration. Limited to four students. Prerequisites: Courses 75 and 76. Sixth year. 8 hours. HAMILTON, WOLTMANN.

115. ORGANIC NERVOUS DISEASES. Advanced diagnosis of nervous diseases, with a view of giving each student practical experience in all the chief diagnostic procedures employed in the study of nervous diseases. Limited to four students. Prerequisites: Courses 75 and 76. Sixth year. 16 hours. HAMILTON.

116. SYPHILITIC NERVOUS AFFECTIONS. The diagnosis and treatment of the expressions of syphilis in the central nervous system, combining clinical and laboratory teaching and referring particularly to dementia paralytica and tabes dorsalis. Limited to six students. Sixth year. 16 hours. HAMMES.

118. REGIONAL DISEASES. A didactic and clinical conference on the regional diagnosis of lesions of the nervous system. Limited to four students. Third quarter, sixth year. 8 hours. MORRISON.

119a,b. CLINICAL ASSISTANTSHIP, in nervous and mental diseases in the Outpatient Department. Sixth year. Open to two students in each quarter. 36 hours. MORRISON.

DIVISION OF DERMATOLOGY

REQUIRED COURSES

79. COURSE IN DERMATOLOGY. Clinical lectures upon the common skin diseases and syphilis, including diagnosis and treatment. Fifth year. 32 hours. SWEITZER.

81. a,b. CLINICAL DERMATOLOGY. Section clinics conducted at the City and County Hospital, St. Paul. Sixth year. 4 hours.

83a,b. CLINIC IN DERMATOLOGY. The practical study of cases of skin and syphilitic disease, in the Outpatient Service. Sixth year. 12 hours. SWEITZER, BUTLER, IRVINE, OLSON.

85a,b. PHYSICAL DIAGNOSIS AND CASE-TAKING. Studies conducted with divisions of the class in medical clinics, including dermatology and syphilis, in the Outpatient Department. See Course 53a,b. Fifth year. 24 hours. SWEITZER, IRVINE, BUTLER, OLSON.

ELECTIVE COURSES

121a,b. ASSISTANTSHIP IN DERMATOLOGY, in the Outpatient Department. Sixth year. Open to two students in each quarter. 36 hours. SWEITZER, BUTLER, IRVINE, OLSON.

123a,b. WARD CLINICS IN DERMATOLOGY. Conducted in the City and County Hospital, St. Paul. Limited to ten students. Fifth or sixth year. 12 hours.

THE DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Professor JENNINGS C. LITZENBERG; Associate Professors JOHN L. ROTHROCK, FRED L. ADAIR; Instructors WILLIAM H. CONDIT, RAE T. LAVAKE, CLARENCE O. MALAND, JALMAR SIMONS; Assistants JAMES F. HAMMOND, BRUCE JARVIS, MENDELSSOHN JONES, WILLMAR C. RUTHERFORD, FREDERICK J. SOUBA; Teaching Fellow LEE W. BARRY.

Departmental Office, Institute of Anatomy

REQUIRED COURSES

51-52. OBSTETRICS. The physiology and pathology of pregnancy, parturition and the puerperium. Lectures and recitations. Fifth year. 64 hours. ADAIR, CONDIT.

53. GYNECOLOGY. Course in gynecologic diagnosis. Fifth year. 16 hours. LITZENBERG.

55a,b. CLINICS IN OBSTETRICS AND GYNECOLOGY. Sections of the class at the Minneapolis City Hospital, City and County Hospital, St. Paul. Fifth year. 10 hours. ROTHROCK AND RUTHERFORD; ADAIR AND SIMONS, and Assistants.

57a,b. OBSTETRICS. A study of the pathology of pregnancy and parturition and of the puerperium. Sixth year. 32 hours. LITZENBERG.

59a,b. GYNECOLOGY. A study of the diseases of women. Sixth year. 32 hours. LITZENBERG.

61. CASE ANALYSIS IN OBSTETRICS AND GYNECOLOGY. A course in the analytical study of cases. Sixth year. 16 hours. LITZENBERG.

63a,b. CLINIC IN OBSTETRICS AND GYNECOLOGY. Demonstrations, diagnosis, and treatment of cases in the Outpatient Department. Sections of class, sixth year. 12 hours. ADAIR and Assistants.

65a,b. CLINICS IN OBSTETRICS AND GYNECOLOGY. Demonstrations, diagnosis and treatment of cases. Conducted in Minneapolis City Hospital and City and County Hospital, St. Paul. Sections of class, sixth year. 24 hours. ROTHROCK, ADAIR, SIMONS, and Assistants.

67a,b. CLINICAL CLERKSHIPS. The direct observation of patients in hospital, under supervision; the taking and recording of case histories; the making of provisional diagnoses; including parturition clinics in hospital and outpatient service; operations and manikin demonstrations. Sixth year, in sections. 32 hours. LITZENBERG and Associates.

69a,b. PARTURITION CLINICS. Conducted in the University Hospital and the Outpatient service, at the Minneapolis City Hospital and the City and County Hospital, St. Paul. Students are on call for parturition cases; attendance required. No credits. Fifth and sixth years. ADAIR, RUTHERFORD, and Assistants.

ELECTIVE COURSES

101a,b. SEMINAR IN OBSTETRICS. Offering opportunities of advanced study. Limited to eight students. Sixth year. 16 hours. LITZENBERG.

103a,b. SPECIAL CLINICAL COURSE. A study in the diagnosis and treatment of diseases of women and of obstetrical conditions, at the Outpatient Department. Limited to four students. Sixth year. 36 hours. CONDIT.

105a,b. Same as above course. Fifth year. 8 hours. ADAIR.

107a,b. Same as above courses. Sixth year. 8 hours. ADAIR.

109. GYNECOLOGICAL CLINIC. A study in the diagnosis and treatment of diseases of women. Conducted in the St. Paul Dispensary. Two students. Sixth year. 16 hours. ROTHROCK.

111a,b. GYNECOLOGICAL CLINIC. Bedside studies in diagnosis and treatment of diseases of women. City and County Hospital, St. Paul. Fifth and sixth year. Limited to four students. 12 hours. JONES.

113a,b. CLINIC IN GYNECOLOGY AND OBSTETRICS. Bedside clinic at the Minneapolis City Hospital. Fifth or sixth year. Four students. 12 hours. MALAND.

115. CLINIC IN GYNECOLOGY AND OBSTETRICS. Course same as 111. SIMONS.

117. APPLIED ANATOMY OF THE PELVIS. Fifth year. Eight hours. LAVAKE.

THE DEPARTMENT OF PEDIATRICS

Professor JULIUS PARKER SEDGWICK; Associate Professor WALTER R. RAMSEY; Assistant Professor FREDERIC W. SCHLUTZ; Instructors BRONSON CROTHERS, EDGAR J. HUENEKENS, FREDERICK C. RODDA; Assistants WILLIAM D. BEADIE, TOBIAS L. BIRNBERG, JOSEPH A. HEDDING, RALPH T. KNIGHT, HENRY A. LYSNE, CHARLES E. SMITH, JR.; Teaching Fellows ROOD TAYLOR, NABOTH O. PEARCE.

Departmental Office, Millard Hall

REQUIRED COURSES

101-102. DISEASES OF CHILDREN. The etiology, pathology, diagnosis and treatment of diseases peculiar to, or distinctive of children, with particular emphasis upon their differences from adult type. Fifth year. 56 hours. SEDGWICK, RAMSEY.

102a,b. CLINIC IN PEDIATRICS. Conducted at the University Hospitals, the Minneapolis City Hospitals, Lymanhurst, and the City and County Hospital, St. Paul. Sections of class, fifth year. 16 hours. SEDGWICK, SCHLUTZ, RAMSEY, HUENEKENS, RODDA, and Assistants.

103a,b. CLINIC IN CONTAGIOUS DISEASES. Conducted in the Minneapolis City Hospital and the City and County Hospital, St. Paul. Sections of class, fifth year. 16 hours. RAMSEY, HUENEKENS, RODDA, and Assistants.

104a,b. CLINIC IN PEDIATRICS. An advanced clinical course, conducted at the University Hospital and affiliated hospitals. Sections of class, sixth year. 8 hours. SEDGWICK, RAMSEY, SCHLUTZ, RODDA, HUENEKENS, TAYLOR.

105a,b. OUTPATIENT PEDIATRIC CLINIC. The practical study of the diseases of children in the Outpatient service. Sections of class, sixth year. 12 hours. SCHLUTZ, HUENEKENS, TAYLOR, and Assistants.

ELECTIVE COURSES

111. DISEASES OF THE NEW-BORN. The pathology and treatment of these disorders, with the presentation of illustrative cases. Limited to six students. Fifth or sixth year. 16 hours. SEDGWICK, TAYLOR.

112. NERVOUS DISEASES OF CHILDREN. The functional nervous disorders of childhood, with the observation and practice of electrical reactions in normal and abnormal children. Limited to six students. Fifth or sixth year. 16 hours. SEDGWICK.

113. CONTAGIOUS DISEASES. The advanced study of contagious diseases, including the practice of intubation and tracheotomy, with training upon the cadaver. Fifth or sixth year. 16 hours. RAMSEY.

114. COURSE IN INFANT FEEDING. Conducted at the St. Paul Baby Welfare Clinic of the H. Amherst Wilder Charity. Sixth year. 24 hours. **RAMSEY.**

115a,b. THEORY AND PRACTICE OF INFANT FEEDING, INCLUDING DISEASES OF THE GASTRO-INTESTINAL TRACT. Limited to six students. In first three quarters, sixth year; in fourth quarter, fifth year. 8 hours. SCHLUTZ.

117a,b. CONGENITAL DEFECTS AND CONSTITUTIONAL DISORDERS OF INFANCY AND CHILDHOOD. Limited to six students. In each quarter. Fifth or sixth year. 8 hours. SCHLUTZ.

119a,b. INFANT FEEDING. A course of study conducted at the Pillsbury Settlement House. Limited to four students. Sixth year. 8 hours. **HUENEKENS.**

121a,b. PEDIATRIC CLINIC, OUTPATIENT DEPARTMENT. Limited to six students. Fifth or sixth year. 36 hours. HUENEKENS, SCHLUTZ, RODDA, TAYLOR.

123. SYPHILIS IN CHILDREN. Conducted at the Outpatient Department and at the University Hospital. Limited to four students. Fifth or sixth year. 8 hours. SEDGWICK, TAYLOR.

125a,b. CLINIC IN CONTAGIOUS DISEASES. Conducted at the Minneapolis City Hospital. Limited to four students. Sixth year. 16 hours. SCHLUTZ.

127a,b. CLINIC IN CONTAGIOUS DISEASES. Conducted at the City and County Hospital, St. Paul. Limited to ten students. Course repeated in each quarter. Fifth or sixth year. 12 hours. RAMSEY, BIRNBERG.

DEPARTMENT OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

Professor FRANK C. TODD; Associate Professor WILLIAM R. MURRAY; Assistant Professors FRANK E. BURCH, JOHN S. MACNIE, HORACE NEWHART; Instructors HOWARD S. CLARK, WILLIAM W. LEWIS, FRED J. PRATT; Assistants WALTER E. CAMP, CHARLES W. FOGARTY, JOHN W. LEE, EARL A. LOOMIS, THOMAS J. MALONEY, MARGARET I. SMITH, H. JOURNEAY WELLES; Teaching Fellows CHARLES E. CONNOR, SAMUEL T. FORSYTHE; Graduate Scholars HENRY J. FRIESEN, ERLING W. HANSEN, ARTHUR E. MARK, MILLARD F. SMITH.

Departmental Office, Millard Hall

REQUIRED COURSES

79. OPHTHALMOLOGY AND OTOLOGY. Disorders and diseases of the eye

and ear and their corrective, medical, and surgical treatment. Sixth year. 32 hours. TODD.

81. RHINOLOGY AND LARYNGOLOGY. The diagnosis and treatment of diseases of the nose and throat. Sixth year. 16 hours. MURRAY.

83a,b. SECTION CLINICS IN EYE, EAR, NOSE, AND THROAT. Diagnostic and operative procedures in the clinics of the University Hospital, the Minneapolis City Hospital, and the City and County Hospital, St. Paul. Sixth year. 28 hours. TODD, BURCH, MURRAY, LEWIS.

85a,b. SECTION CLINIC IN DISEASES OF THE EYE. Study and treatment of cases in the Outpatient service. Sixth year. 12 hours. MACNIE, CLARK, and Assistants.

87a,b. SECTION CLINIC IN DISEASES OF THE EAR. Study and treatment of cases in the Outpatient service. Sixth year. 12 hours. NEWHART and Assistants.

89a,b. SECTION CLINIC IN DISEASES OF THE NOSE AND THROAT. Study and treatment of cases in the Outpatient service, at three weekly sessions. Sixth year. 12 hours. MURRAY, PRATT, and Assistants.

ELECTIVE COURSES

115a,b. CLINIC IN DISEASES OF THE EYE. The examination of patients, diagnosis of disease conditions and supervised treatment. Alternate days, in the Outpatient Department. Sixth year. 36 hours. MACNIE and Assistants.

117a,b. CLINIC IN DISEASES OF THE EAR. Studies in examination of cases, diagnosis, and supervised treatment. Alternate days, at the Outpatient Department. Sixth year. 12 hours. NEWHART and Assistants.

119a,b. CLINIC IN DISEASES OF THE NOSE AND THROAT. The examination of patients, diagnosis of disease conditions and supervised treatment. Alternate days, at the Outpatient Department. Sixth year. 24 hours. MURRAY, PRATT, and Assistants.

121a,b. OPERATIVE CLINICS IN EYE, EAR, NOSE, AND THROAT. Conducted at the University Hospital. Course repeated in each quarter. Limited to ten students. Sixth year. 16 hours. TODD, BURCH, CLARK.

123. REFRACTION. A course of lectures. Required of all desiring the practical course 125a,b. Sixth year. 8 hours. BURCH.

125a,b. PRACTICAL COURSE IN REFRACTION. Limited to ten students. Prerequisite: Course 123. Sixth year. 36 hours. BURCH, LOOMIS.

126. OPHTHALMOSCOPY. The principles and practice of this method of examination of the eye. Sixth year. 16 hours. MACNIE, CLARK.

127a,b. CLINIC IN DISEASES OF THE EYE. City and County Hospital, St. Paul. Limited to ten students. Fifth or sixth year. 36 hours. LEWIS.

201-202. SEMINAR IN OPHTHALMOLOGY AND OTO-LARYNGOLOGY. Sixth year. 48 hours. Staff.

THE DEPARTMENT OF SOCIAL SERVICE

Director, MARION A. TEBBETS

ELECTIVE COURSES

101. MEDICAL SOCIAL SERVICE. A study of inter-related physical, social, and industrial conditions affecting the individual health and demanding the service of the physician. The origin and purpose of medical social service. The social factors in household, industrial, and communal health. The community's health resources. Special medico-social problems. Lectures and laboratory field work. Limited to ten students. Offered in fifth or sixth year. 48 hours. TEBBETS.

THE SCHOOL OF CHEMISTRY

Professor GEORGE B. FRANKFORTER; Assistant Professors IRA H. DERBY, WILLIAM H. HUNTER; Instructor WOLF KRITCHEVSKY.

(Contributing courses to The Medical School)

13-14. MEDICAL ORGANIC CHEMISTRY. An outline of the chemistry of carbon, including the preparation of some of the more important organic compounds. Special emphasis is laid on the parts of organic chemistry most important in medicine. For third year medical students who have not completed organic chemistry in the pre-medical years. 208 hours; six credits. HUNTER, KRITCHEVSKY, and Assistants.

91. PHYSICAL CHEMISTRY. Special attention will be given to those divisions of the subject which have most application in the science of medicine, such as osmosis, colloidal solutions, chemical equilibria, etc. Third year medical students. Two hours lectures; four hours of laboratory work, weekly. 96 hours; four credits. DERBY.

NOTE: For information regarding other available courses in Chemistry, see Bulletin, School of Chemistry.

The Bulletin *of the* University *of* Minnesota

The College of Dentistry Announcement for the Year 1917-1918

Catalog Series No. 9

Vol. XX No. 30 July 27 1917

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

1917

JULY

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

AUGUST

..	..	..	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
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

..	..	..	..	..	..	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	..	..	..	..	..

1918

JANUARY

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

FEBRUARY

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

MARCH

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

APRIL

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

MAY

..	..	..	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	..	..	..	..	..	..

JULY

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

AUGUST

..	..	..	..	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	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

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	..	..	..	..
..	..	..	..	..	..	..

UNIVERSITY CALENDAR

1917-1918

1917			
September	26	Wednesday	Registration closes for all students
September 26 – October 3		Week	Fees payable for all students
October	1	Monday	First semester evening extension classes begin
October	2-9	Week	Examinations for removal of conditions (except for Colleges of Agriculture and Forestry), and entrance examinations
October	10	Wednesday	First semester begins
October	15	Monday	Agricultural College, farm experience examinations
October	18	Thursday	Senate meeting, 4:00 p.m.
October	29	Monday	Dairy School opens
November	5	Monday	School of Agriculture, first term begins
November	28	Wednesday	Thanksgiving recess begins 9:00 p.m.
December	1	Saturday	Dairy School closes
December	3	Monday	Thanksgiving recess ends 8:00 a.m.
December	3-8	Week	Second semester condition examinations, Colleges of Agriculture and Forestry
December	3-8	Week	Short course for ice-cream makers
December	5	Wednesday	Medical School second quarter begins
December	20	Thursday	Senate meeting, 4:00 p.m.
December	21	Friday	School of Agriculture, first term closes
December	21	Friday	Christmas vacation begins 9:00 p.m.
1918			
December 31 – January 5		Week	Farmers' and Home Makers' Week Short Course
January	2	Wednesday	Christmas vacation ends 8:00 a.m.
January	2	Wednesday	School of Embalming begins, eight weeks' vacation
January	8	Tuesday	School of Agriculture, second term begins
January	25	Friday	First semester evening extension classes close
February	4	Monday	Second semester registration closes
February	4	Monday	Second semester evening extension classes begin
February	4-9	Week	Merchants' Short Course

February	11	Monday	Final examinations begin
February	11	Monday	Payment of fees for second semester closes
February	12	Tuesday	Lincoln's Birthday; a holiday
February	18	Monday	Second semester begins
February	21	Thursday	Senate meeting, 4:00 p.m.
February	22	Friday	Washington's Birthday; a holiday
March	27	Wednesday	School of Agriculture closes
March	28	Thursday	Easter recess begins 9:00 p.m.
April	1	Monday	Easter recess ends 8:00 a.m.
April	1-6	Week	Boys' and Girls' Week
April	1-6	Week	Condition examinations in certain colleges
April	15	Monday	Medical School fourth quarter begins
April	30	Tuesday	Traction Engineering Short Course begins
May	16	Thursday	Senate meeting, 4:00 p.m.
May	24	Friday	Second semester evening extension classes close
May	30	Thursday	Memorial Day; a holiday
May	31	Friday	Traction Engineering Short Course closes
June	8	Saturday	Final examinations begin 2:00 p.m.
June	15	Saturday	Second semester closes
June	16	Sunday	Baccalaureate service
June	17	Monday	Senior Class Day exercises
June	19	Wednesday	Alumni Day
June	20	Thursday	Forty-sixth Annual Commencement
June	21	Friday	Summer vacation begins
June	24	Monday	Summer Session begins

The University year for 1918-19 probably will begin Tuesday, September 17. Classes will begin September 25.

COLLEGE OF DENTISTRY

FACULTY

MARION LEROY BURTON, Ph.D., D.D., LL.D., President 1005 5th St. S. E.
CYRUS NORTHROP, LL.D., President Emeritus 519 10th Ave. S. E.
ALFRED OWRE, B.A., M.D., C.D., D.M.D., Dean, Professor of Theory and Practice of Dentistry and Dental Metallurgy University of Minnesota
MOSES BARRON, B.S., M.D., Assistant Professor of Pathology 763 Holly Ave., St. Paul
RICHARD OLDING BEARD, M.D., Associate Professor of Physiology University of Minnesota
ELEXIOUS T. BELL, M.D., Assistant Professor of Pathology 215 Walnut St. S. E.
PETER J. BREKHUS, B.A., D.D.S., Associate Professor of Crown and Bridge Work 3719 Pleasant Ave.
EDGAR D. BROWN, Phm.D., M.D., Associate Professor of Pharmacology 3525 3rd Ave. S.
LOUIS J. COOKE, M.D., Director Physical Education for Men 909 6th St. S. E.
OSCAR COOPERMAN, D.D.S., Assistant Professor in Prosthetic Dentistry and Dental Anatomy 638 6th Ave. N.
RALPH W. COUNTRYMAN, D.D.S., Assistant Professor in Operative Dentistry 401 Reid Corner
NORMAN J. COX, B.S., D.M.D., Assistant Professor of Operative Dentistry 986 15th Ave. S. E.
GEORGE M. DAMON, D.D.S., Associate Professor of Prosthetic Dentistry and Dental Anatomy 3340 Portland Ave.
BROR E. DAHLGREN, D.M.D., Associate Professor of Theory and Practice 1708 Portland Ave.
CHARLES A. ERDMANN, M.D., Associate Professor of Applied Anatomy 612 9th Ave. S. E.
CARL O. FLAGSTAD, D.D.S., Assistant Professor in Prosthetic Dentistry and Orthodontia 229 Cedar Ave.
GEORGE B. FRANKFORTER, Ph.D., Professor of Chemistry and Dean of the School of Chemistry 525 E. River Road
HENRY S. GODFREY, D.M.D., Professor of Operative Dentistry 1766 Girard Ave. S.
ROBERT O. GREEN, D.D.S., Associate Professor of Operative Dentistry 828 Lowry Bldg., St. Paul
CHARLES A. GRIFFITH, D.D.S., Associate Professor of Oral Surgery 1917 Hamline Ave.
WILLIAM K. FOSTER, LL.M., Assistant Director Physical Education for Men 652 Erie St. S. E.

ROBERT A. HALL, Ph.D., Assistant Professor of Pharmacology 323 6th Ave. S. E.

THOMAS B. HARTZELL, D.M.D., M.D., Professor of Oral Surgery, Therapeutics, and Clinical Pathology 716 Donaldson Bldg.

ARTHUR D. HIRSCHFELDER, B.S., M.D., Professor of Pharmacology and Director of the Department 906 5th St. S. E.

CLARENCE M. JACKSON, M.S., M.D., Professor of Anatomy and Director of the Department 428 Walnut St. S. E.

WILLIAM H. KIRCHNER, B.S., Professor of Drawing and Descriptive Geometry 722 10th Ave. S. E.

RAY R. KNIGHT, B.A., M.D., Assistant Professor of Roentgenology 304 Pillsbury Bldg.

WINFORD P. LARSON, M.D., Assistant Professor of Bacteriology 614 9th Ave. S. E.

WILLIAM F. LASBY, B.A., D.D.S., Associate Professor of Prosthetic Dentistry and Orthodontia 425 Walnut St. S. E.

HARRY C. LAWTON, D.D.S., Associate Professor of Prosthetic Dentistry, Orthodontia, and Dental Metallurgy 1064 Lombard Ave., St. Paul

THOMAS G. LEE, B.S., M.D., Professor of Comparative Anatomy 509 E. River Road

ELMER J. LUND, Ph.D., Assistant Professor of Zoology

ELIAS P. LYON, Ph.D., M.D., Professor of Physiology and Director of the Department 421 Union St. S. E.

WILLIAM MCDOUGALL, D.D.S., Associate Professor in Crown and Bridge Work 521 Syndicate Bldg.

RICHARD S. MAYBURY, D.D.S., Assistant Professor in Operative Dentistry 1931 4th Ave. S.

HERMANN A. MAVES, D.D.S., Associate Professor of Oral Surgery 505 Donaldson Bldg.

OWEN R. MEREDITH, First Lieutenant, U. S. Infantry, Assistant Professor of Military Science and Tactics

GEORGE W. MOSES, Major, U. S. Cavalry, Professor of Military Science and Tactics 1308 5th St. S. E.

HENRY F. NACHTRIEB, B.S., Professor of Animal Biology, Head of Department of Animal Biology and Curator of the Zoological Museum 905 6th St. S. E.

FORREST H. ORTON, D.D.S., Professor of Crown and Bridge Work 653 Goodrich Ave., St. Paul

ALFRED A. PAGENKOPF, D.D.S., Associate Professor of Crown and Bridge Work 1482 Grand Ave., St. Paul

MARK O. PATTRIDGE, D.D.S., Assistant Professor in Operative Dentistry 802 E. Lake St.

CARL H. PETRI, D.D.S., Assistant Professor in Prosthetic Dentistry and Dental Anatomy 1301 E. Franklin

GEORGE W. REYNOLDS, D.D.S., Associate Professor of Crown and Bridge Work 3811 10th Ave. S.

HAROLD E. ROBERTSON, B.A., M.D., Associate Professor of Pathology and Acting Director of the Department 507 Essex St. S. E.

WILLIAM A. ROLL, D.D.S., Assistant Professor in Crown and Bridge Work
521 Syndicate Bldg.

CHARLES E. RUDOLPH, D.D.S., Assistant Professor in Prosthetic Dentistry and Dental Anatomy

FREDERICK H. SCOTT, Ph.D., M.B., D.Sc., Associate Professor of Physiology
1307 6th St. S. E.

JOSEPH E. SHELLMAN, D.D.S., Assistant Professor in Operative Dentistry
903 Lowry Bldg., St. Paul

RICHARD E. SCAMMON, Ph.D., Associate Professor of Anatomy
200 Harvard St. S. E.

CHARLES PETER SIGERFOOS, Ph.D., Professor of Zoology
1023 University Ave. S. E.

THEODORE B. TAYLOR, Captain, U. S. Cavalry, Assistant Professor of Military Science and Tactics
1301 5th St. S. E.

JOSEPH M. THOMAS, Ph.D., Professor of Rhetoric, Head of Department
818 University Ave. S. E.

JAMES M. WALLS, D.M.D., Professor of Operative Dentistry
828 Lowry Bldg., St. Paul

OSCAR A. WEISS, D.M.D., Professor of Prosthetic Dentistry and Orthodontia
1602 Fremont Ave. N.

AMOS S. WELLS, B.A., D.D.S., Associate Professor of Crown and Bridge Work
Berkeley Hotel

CHARLES WIETHOFF, D.D.S., Associate Professor of Crown and Bridge Work
716 Donaldson Bldg.

M. RUSSELL WILCOX, M.D., Assistant Professor of Physiology
802 Donaldson Bldg.

JAMES B. WOOLNOUGH, Captain, U. S. Infantry, Assistant Professor of Military Science and Tactics

GEORGE D. ALLEN, M.A., Instructor in Animal Biology 1116 5th St. S. E.

BERT G. ANDERSON, D.D.S., Instructor in Prosthetic Dentistry and Orthodontia
923 Lowry Bldg., St. Paul

ANNE C. BENTON, B.A., Instructor in Pathology and Bacteriology
2024 Queen Ave. S.

CHARLES H. BLITMAN, C.E., Instructor in Drawing and Descriptive Geometry
1317 7th St. S. E.

K. PAUL CARSON, D.D.S., Instructor in Oral Surgery 3325 4th Ave. S.

LILLIAN COHEN, Ph.D., Instructor in Chemistry 415 E. 14th St.

DAVID CROWTHER, Instructor in Dental Mechanics

RUDOLPH W. DELTON, D.D.S., Instructor in Prosthetic Dentistry and Orthodontia
312 Walnut St. S. E.

MAX E. ERNST, LL.B., D.D.S., Instructor in Orthodontia and Dental Jurisprudence
614 Lowry Bldg., St. Paul

WILLIAM A. GREY, D.D.S., Instructor in Oral Surgery
923 Lowry Bldg., St. Paul

LEE H. HARKER, D.D.S., Instructor in Prosthetic Dentistry and Dental Anatomy
804 Pillsbury Bldg.

MARY V. HARTZELL, D.M.D., Instructor in Oral Surgery 1224 Mary Place
ARTHUR T. HENRICI, M.D., Instructor in Bacteriology 2443 Garfield Ave. S.
RAYMOND R. HENRY, D.D.S., Instructor in Operative Dentistry 828 Lowry Bldg., St. Paul
CYRIL A. HERRICK, B.A., Instructor in Rhetoric 1118 7th St. S. E.
WILLIAM C. JOHNSON, B.A., M.D., Instructor in Pathology 313 8th Ave. S. E.
FRANCIS B. KINGSBURY, Ph.D., Instructor in Physiology and Physiologic Chemistry 209 State St. S. E.
WOLF KRITCHEVSKY, Ph.D., Instructor in Chemistry 908 Logan Ave. N.
HAROLD J. LEONARD, B.A., D.D.S., Instructor in Oral Surgery 515 Syndicate Bldg.
JOSEPH M. LITTLE, D.D.S., Instructor in Operative Dentistry 1364 Summit Ave., St. Paul
EVERETT E. MACGIBBON, D.D.S., Instructor in Crown and Bridge Work 716 Donaldson Bldg.
JOHN F. MCCLENDON, Ph.D., Instructor in Physiology 1307 6th St. S. E.
FRANK H. MCDOUGALL, Ph.D., Instructor in Chemistry
LAWRENCE J. MORTENSON, E.E., Instructor in Drawing and Descriptive Geometry 1214 5th St. S. E.
WILLIAM C. NAEGELI, D.D.S., Instructor in Operative Dentistry 1600 Western Ave.
HERBERT C. NELSON, D.D.S., Instructor in Crown and Bridge Work 921 Lowry Bldg., St. Paul
CARL OTTO, D.D.S., Instructor in Crown and Bridge Work 921 Lowry Bldg., St. Paul
PAUL S. PARKER, D.D.S., Instructor in Prosthetic Dentistry, Dental Anatomy, and Operative Dentistry 310 Donaldson Bldg.
CHAUNCEY J. V. PETTIBONE, Ph.D., Instructor in Physiology and Physiologic Chemistry 112 Church St. S. E.
JOHN C. WEST, B.S., Instructor, Physical Education for Men 411 17th Ave. S. E.
RAY E. RAMAKER, D.D.S., Instructor in Operative Dentistry 512 Physicians' and Surgeons' Bldg.
BERT A. ROSE, Band Instructor 710 7th St. S. E.
CARL L. SCHUMANN, Ph.D., Instructor in Chemistry 317 17th Ave. S. E.
FRANK M. SMOYER, B.A., Instructor in Rhetoric and Public Speaking 2021 Girard Ave. S.
CHESTER A. STEWART, M.A., Instructor in Anatomy 1819 4th St. S. E.
RUTCHER SKAGERBERG, B.S., Instructor in Drawing and Descriptive Geometry 722 13th Ave. S. E.
EARL K. STRACHAN, Ph.D., Instructor in Chemistry 826 University Ave. S. E.
WILLIAM D. VEHE, D.D.S., Special Instructor in Porcelain Work 1010 Donaldson Bldg.
PERCY A. WARD, B.S., M.D., Instructor in Pathology and Bacteriology

MARGARET WARWICK, B.S., M.D., Instructor in Pathology
1516 7th St. S. E.
ANDREW J. WEISS, Instructor in Technics 3708 Stevens Ave.

ASSISTANTS

EDWARD D. ANDERSON, Assistant in Physiology
HAROLD P. DIEHL, Assistant in Pathology and Bacteriology
HAROLD C. HILLMAN, Assistant in Crown and Bridge Work
KANO IKEDA, Assistant in Pathology and Bacteriology
CLARENCE I. LILLEHEI, Assistant in Operative Dentistry
EDGAR H. NORRIS, Assistant in Anatomy
CHARLES H. PASKE, Assistant in Crown and Bridge Work
ADOLPH RINGOEN, Assistant in Animal Biology
LLOYD H. RUTLEDGE, Assistant in Anatomy
HELEN SANBORN, B.A., Assistant in Animal Biology
FAUS P. SILVERNALE, Assistant in Anatomy
EDWARD F. SLATER, Assistant in Physiology
ALBERT M. SNELL, Assistant in Physiology
LEHMAN WENDELL, Assistant in Anatomy
WALTER W. ZETTLER, Assistant in Bacteriology

GENERAL INFORMATION

CURRICULUM

The course in the College of Dentistry leads to the degree of Doctor of Dental Surgery and covers a period of four years collegiate study.

For statements of entrance requirements, registration, and fees, see Bulletin of General Information.

For schedule of lectures, announcements, changes in college rules, etc., see bulletin board. The Rules for the Guidance of Students are printed in a separate booklet; in this will also be found a list of the required instruments.

SIX-YEAR COURSE IN ARTS AND DENTISTRY, LEADING TO THE DEGREES OF BACHELOR OF ARTS AND DOCTOR OF DENTAL SURGERY

During the first three years of this course the student does his work in the College of Science, Literature, and the Arts, subject to the regulations governing other Arts students and must secure ninety credits, including fifteen credits in starred courses. The final year of the course in the College of Dentistry counts as the equivalent of the fourth year (thirty credits) of the Arts course. During the four years the student must earn one hundred and twenty honor points.

ADMISSION

General Requirements

1. English, three units.
2. Chemistry,* one unit, and Manual Training recommended.
3. Mathematics: Elementary Algebra, one unit; Plane Geometry, one unit.
4. Enough additional work to make in all fifteen units of which not more than four may be in Group F.

On account of the limited capacity of the College of Dentistry, not more than ninety freshmen can be admitted. Applications for admission should be in the Registrar's office not later than July 25.

Candidates will be selected according to quantity and quality of preparation, and when necessary their fitness shall be determined by an examination and conference with the Student Work Committee.

All other qualifications being equal, residents of Minnesota will be given prior consideration for vacancies existing at the date of their application.

---

* Those who have not had good training in preparatory Chemistry will take a combined course of ten credits in General Chemistry and Qualitative Analysis.

All freshmen students, entering the College of Dentistry must confer with the Dean of the College some time before their matriculation or immediately after.

EXPENSES

Freshman year	
Annual incidental fee	$100.00
Instruments	125.00
Books	25.00
Sophomore year	
Annual incidental fee	$175.00
Instruments	150.00
Books	35.00
Junior year	
Annual incidental fee	$175.00
Instruments	75.00
Books	25.00
Senior year	
Annual incidental fee	$175.00
Instruments	5.00
Books	10.00

SUMMER SESSION

A Summer Course of six weeks is offered in the Departments of Anatomy, Animal Biology, Bacteriology, Chemistry, Crown and Bridge Work, Dental Anatomy, Operative Dentistry, Orthodontia, Physiology, and Prosthetic Dentistry.

EXTENSION WORK

Instruction in all the departments of the College of Dentistry will be given to practitioners upon registration for not less than one quarter of the College year.

MILITARY DRILL

Military Drill will be required of all men in the freshman and sophomore classes.

PHYSICAL EDUCATION

A course is offered in Physical Education for Men and Women.

RULES AND REGULATIONS

Examinations, Standings, and Conditions

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.

No student will be allowed to omit any freshman work in order to make up entrance conditions, except by special permission of the department affected.

Students will not be permitted to substitute private work in any branch for the regular college courses.

Final examination in every required subject is held at the close of the work at the end of the semester or quarter, according to the extent of the course given. The examinations at the end of semester or quarter are only for those who are taking the courses, while the condition examinations are only for those who are attempting to remove conditions.

The final standing of any student in a given subject shall be determined as the result of (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' standing shall be determined at the end of each quarter by a conference of the departments in which the work is pursued during that year.

All standings shall be reported officially to and from the Registrar's Office at the end of each semester.

A uniform marking system has been adopted for the whole University. Four passing grades, indicated by the symbols *A, B, C,* and *D,* represent differing degrees of merit. The symbol *E* represents a condition, which may be removed by examination and by such supplementary work as the department imposing it may require. *F* stands for a failure and calls for a repetition of the work in course. *I* stands for incomplete and grants the student further time for the completion of the required work.

Regular examinations for the removal of conditions shall be given at no other time than (1) the week following the Easter recess and (2) the registration week in September.

Students having conditions will be subject to the action of the Student Work Committee.

A condition not removed at the first opportunity becomes a failure subject to the rules governing failures.

Failures necessitate the taking of the work again in class.

A student carrying less than the complete schedule of work may pay fees on a clock-hour basis.

A student who is conditioned in the majority of the subjects given in any year will become a *failed* student and must repeat the entire work of that year.

Students who carry *failures* 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.

Any student reported below grade in sixty per cent of his work at the close of a given semester shall not be allowed to re-enter the College of Dentistry except upon the specific approval of the faculty.

Probation.—Such student shall then be allowed to enter on probation; and, if reported by the middle of the semester or after as delinquent

in two or more subjects, he shall be dropped without further action for that year.

Work limited.—Students pursuing any continuous subject who have done such poor work in the first semester as to receive a condition or failure in such subject, shall not be allowed to elect another subject in place of that in which the condition or failure was received, but shall be required to devote their full time to the remaining subjects of the course.

Exception to this rule shall be made only by the Committee on Students' Work after full investigation.

Electives.—A student may elect a subject in another department if his standing in the regular course is satisfactory and on approval of the Student Work Committee.

Attendance and Discipline

All lectures, laboratory, and infirmary courses and clinics must be taken in full and must invariably be entered upon during the week in which they begin.

All students are required to provide themselves with instruments, books, tools, and materials as prescribed by the college.

Tardiness and absences are controlled by the principle that each student must do the full work of the course.

No student whose absences in any semester exceed four weeks in the aggregate shall be admitted to final examination without special permission of the Students' Work Committee.

Any student's registration may be refused or cancelled by the Registrar at the request of the Students' Work Committee on account of absences, indifference to study, poor scholarship, disorderly or immoral conduct, and for dishonesty in classroom or laboratory work.

The practice of dentistry by students, except under the direct supervision of a preceptor, is prohibited by law in the State of Minnesoat. Students violating this law will be suspended or expelled.

Except in cases of required work students are not allowed to obligate themselves in the Military Department, band, or other college activities, without permission from the Faculty.

Eligibility Regulations

No student shall take part in any public performance of a dramatic or musical club, or be eligible to election or appointment to official positions upon the boards of student publications, or take part in intercollegiate debates or oratorical contests, unless he has a clear record at the time.

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.

REQUIREMENTS FOR GRADUATION

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

COURSE OF STUDY

	First Semester		Second Semester		Total	
Freshman Year	Credits	Hours	Credits	Hours	Credits	Hours
Anatomy, Dental	1	16	2	64		
Animal Biology	3	96	3	96		
*Chemistry	5	160	5	160		
English, Rhetoric	3	48	3	48		
Military Science and Tactics						
Prosthetic Lecture and Technique	3	112	3	112		
†Technical Drawing	2	96	2	96		
Physical Education	1	16				
	18	544	18	576	36	1,120
Sophomore Year						
Anatomy, Gross	5	144	5	144		
Anatomy, Histology and Embryology	4	128				
Anatomy, Dental	3	96				
Chemistry, Organic	3	96				
Military Science and Tactics						
Operative Dentistry Technique			4	160		
Physiology and Physiological Chemistry			7	192		
Prosthetic Lectures and Technique	3	144	2	96		
	18	608	18	592	36	1,200
Junior Year						
Bacteriology, General and Special	4	112				
Clinical Practice	4	192	10	480		
Crown and Bridge Lec. and Technique	4	160				
Dental Metallurgy	1	16				
Operative Dentistry Lec. and Rec.	1	16	1	16		
Orthodontia Technique	2	96				
Pathology, General and Special			4	112		
Pharmacology			3	48		
Prosthetic Dentistry Lec. and Rec.	2	32				
	18	624	18	656	36	1,280
Senior Year						
Clinical Practice	12	576	12	576		
Crown and Bridge Work Lec. and Rec.	1	16	1	16		
Operative Dentistry Lec. and Rec.	1	16				
Oral Surg., Clin. Path. and Radiog. Lec. and Rec.			2	32		
Orthodontia Lectures and Recitations	1	16	1	16		
Pathology and Therapeutics	3	48				
Theory and Practice of Dentistry and Conference Course in Applied Economics, Jurisprudence, Psychology, Ethics and Art, Public Hygiene			2	32		
	18	672	18	672	36	1,344
					142	4,944

* Students who have had Elementary Chemistry will be allowed four advanced credits.

† Substitute allowed by the Student Work Committee.

One credit hour may be either one recitation hour through one semester, two laboratory hours with outside work, or three laboratory hours without outside work. One semester, sixteen weeks; one week, forty-eight hours.

DEPARTMENTAL STATEMENTS

Odd numbers indicate first-semester courses; even numbers, second-semester courses. A combination of the two (e.g., 5-6) indicates courses continuing through the year. In the case of courses repeated the second semester, the suffix *a* indicates first semester; the suffix *b*, second semester.

ANATOMY

Professors CLARENCE M. JACKSON, THOMAS G. LEE; Associate Professor CHARLES A. ERDMANN; Instructor CHESTER A. STEWART; Assistants JOHN A. KITTELSON, EDGAR H. NORRIS, LLOYD M. RUTLEDGE, FAUS P. SILVERNALE.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
5-6.	Gross Anatomy	10	Fr.	An. Biol.
8.	Histology and Embryology	4	Fr.	An. Biol.

5-6. GROSS ANATOMY. Lectures, recitations, demonstrations, and laboratory work in gross human anatomy. Includes descriptive anatomy, including osteology, with special emphasis upon the skull and the digestive tract; later a complete and careful dissection of the head and neck. Open only to dental students and especially arranged for their needs. JACKSON, ERDMANN, VAUGHN.

8. HISTOLOGY AND EMBRYOLOGY. Lectures, recitations, laboratory work, and demonstrations. Special emphasis will be laid upon the knowledge of the development and structure of the head, mouth, jaw, teeth, and other portions of the digestive system. JACKSON, LEE, STEWART, KITTELSON, MCKINLEY.

ANIMAL BIOLOGY

Professors HENRY FRANCIS NACHTRIEB, CHARLES P. SIGERFOOS; Assistant Professor ELMER J. LUND; Instructors GEORGE DELVIN ALLEN; Assistants ADOLPH RINGOEN, HELEN SANBORN.

COURSES

Introductory Course

No.	Title	Credits	Offered to	Prereq. courses
1-2.	General Zoology	6†	All	None

† Both semesters must be completed before credit is given for the first semester.

INTRODUCTORY COURSE

1-2. GENERAL ZOOLOGY. A survey of the animal kingdom, emphasizing the principles of structure, physiology, embryology, classification, and evolution of animals. Textbook, lectures, and quizzes. SIGERFOOS, LUND, ALLEN, RINGOEN, SANBORN.

CHEMISTRY

Professor GEORGE B. FRANKFORTER; Instructors LILLIAN COHEN, FRANK H. MCDOUGALL, CARL L. SCHUMANN.

COURSES

Division of General and Inorganic Chemistry

No.	Title	Credits	Offered to	Prereq. courses
21-22.	Inorganic and Qualitative Chemistry	10†	Those entering without Chemistry	None
3-4.	Adv. Gen. Chem. and Qualitative Analysis	6†	Fr., soph., jr.	Entrance credit in Chemistry
37.	Organic Chemistry	3	Soph.	3-4

† Both semesters must be completed before credit is given for the first semester.

21-22. INORGANIC AND QUALITATIVE CHEMISTRY. This includes a study of the non-metals, metals, and qualitative analysis, together with a thoro discussion of the fundamental laws and theories of chemistry. FRANKFORTER, COHEN.

3-4. ADVANCED GENERAL CHEMISTRY AND QUALITATIVE ANALYSIS. Lectures and laboratory work. A discussion of the general chemical theories and laws, with qualitative analysis. FRANKFORTER, MCDOUGALL, and Assistants.

37. ORGANIC CHEMISTRY. A course in the essentials of organic chemistry, with especial reference to compounds important in dentistry. Lectures, recitations, and laboratory work. FRANKFORTER, SCHUMANN, and Assistants.

CROWN AND BRIDGE WORK

Professor FORREST H. ORTON; Associate Professors PETER J. BREKHUS, ALFRED A. PAGENKOPF, GEORGE W. REYNOLDS, AMOS S. WELLS, CHARLES A. WIETHOFF; Assistant Professors WILLIAM MCDOUGALL, WILLIAM A. ROLL; Instructors EVERETT E. MACGIBBON, HERBERT C. NELSON, CARL OTTO.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Crown and Bridge Technique	4	Jr.	Dent. Anat. 3
2.	Crown and Bridge Practice	3	Jr.	1
3.	Crown and Bridge Practice	3	Sr.	2
4.	Crown and Bridge Practice	3	Sr.	3

1. CROWN AND BRIDGE TECHNIQUE. A course of lectures, demonstrations, and laboratory work that includes all the more important forms of crowns and bridges. PAGENKOPF, WELLS, REYNOLDS, NELSON, OTTO, MACGIBBON.

2. CROWN AND BRIDGE PRACTICE. A course of lectures and clinical practice covering the simpler forms of crown and bridge work. PAGENKOPF, WELLS, REYNOLDS, NELSON, OTTO, MACGIBBON.

3. CROWN AND BRIDGE PRACTICE. A course of lectures and clinical practice covering the entire field of crown and bridge work. ORTON, BREKHUS, MCDOUGALL, WIETHOFF, ROLL.

4. CROWN AND BRIDGE PRACTICE. Continuation of Course 3 as outlined above. ORTON, BREKHUS, MCDOUGALL, WIETHOFF, ROLL.

DENTAL ANATOMY

Associate Professor GEORGE M. DAMON; Assistant Professors OSCAR COOPERMAN, CARL H. PETRI, CHARLES E. RUDOLPH; Instructors LEE H. HARKER, PAUL S. PARKER.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Dental Anatomy	1	Fr.	None
2.	Dental Anatomy	2	Fr.	1
3.	Dental Anatomy	3	Soph.	2

1. DENTAL ANATOMY. A course of lectures and recitations on the anatomy and nomenclature of the teeth. DAMON.

2. DENTAL ANATOMY. The course will consist of lectures, recitations, and such laboratory work as drawing, dissection, modeling, and carving of the teeth. DAMON, COOPERMAN, PETRI, RUDOLPH, HARKER, PARKER.

3. DENTAL ANATOMY. Continuation of Course 1 as outlined above. DAMON, COOPERMAN, PETRI, RUDOLPH, HARKER, PARKER.

DENTAL METALLURGY

Professors ALFRED OWRE, HARRY C. LAWTON.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Dental Metallurgy	1	Jr.	Chem. 21-22

1. DENTAL METALLURGY. Lectures, recitations, and demonstrations, taking up the most important metals with special reference to those used in dentistry. OWRE, LAWTON.

DRAWING AND DESCRIPTIVE GEOMETRY

Professor WILLIAM H. KIRCHNER; Instructors LAWRENCE T. MORTENSON, RUTCHER SKAGERBERG.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
21-22.	Technical Drawing	4	All	None

21-22. TECHNICAL DRAWING. Theoretical and practical graphics, the reading and making of working plans. Projection, sketching, lettering, conventions, renderings, and translations. KIRCHNER, MORTENSON, SKAGERBERG.

MILITARY SCIENCE AND TACTICS

Major GEORGE W. MOSES, U. S. Cavalry, Professor of Military Science and Tactics, Head of the Department.

Assistants, Captain THEODORE B. TAYLOR, U. S. Cavalry, Professor of Military Science and Tactics; Captain JAMES B. WOOLNOUGH, U. S. Infantry, Professor of Military Science and Tactics; First Lieutenant OWEN R. MEREDITH, U. S. Infantry, Professor of Military Science and Tactics.

University Staff, BERT A. ROSE, Band Instructor.

REQUIRED WORK

All physically fit male students are required to take military training during the first two undergraduate years of their course unless they have secured such training at an approved institution endorsed by the Military Department. When this course is entered upon it must be carried to completion as a prerequisite for graduation. No credits are allowed for this work.

ELECTIVE WORK

(a) All juniors and seniors who have completed two years of drill may register for the course required by General Orders No. 49 War Department for members of the Reserve Officers' Training Corps. Such students sign a written agreement to continue in this corps for the remainder of the college course, the completion of this work is a prerequisite to promotion. Any student who for satisfactory reasons is permitted to withdraw from this course must reimburse the War Department for all moneys received.

Juniors and seniors who take the course required by General Orders No. 49, which includes two camps of four weeks each, will receive an allowance of thirty cents per day for subsistence while pursuing the course and will have all expenses paid to and from the encampments. They also are eligible for appointment as temporary second lieutenants in the Infantry branch of the Regular Army for six months with a salary of one hundred dollars per month upon graduation and commission in the Reserve Corps. The Reserve Corps furnishes officers for Citizens' Training Camps in time of peace and commission in the United States

Volunteers in time of war, such officers having preference for commissions in the volunteers immediately below experienced officers in the federal service.

The course includes three hours a week of drill and three of study in the Military Department and also includes recommended courses offered by the respective colleges which have a direct bearing on the work of the Corps, such as Military History and International Law in the Liberal Arts College. The work carries three credits in each semester in the Military Department, and such additional credits as the respective curricula of the colleges may permit.

(b) Any student having completed the two years of required Military Training may continue the work for credit in the third and fourth years. Credit for such work is allowed in practically all of the colleges of the University, the maximum being three credits a year.

OPERATIVE DENTISTRY

Professors JAMES M. WALLS, HENRY S. GODFREY; Associate Professor ROBERT O. GREEN; Assistant Professors RALPH W. COUNTRYMAN, NORMAN J. COX, RICHARD S. MAYBURY, MARK O. PATTRIDGE, JOSEPH F. SHELLMAN; Instructors WILLIAM C. NAEGELI, JOSEPH M. LITTLE, RAYMOND R. HENRY, PAUL S. PARKER, RAY E. RAMAKER.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
2.	Operative Technique	4	Soph.	Dent. Anat. 3
3.	Operative Practice	2	Jr.	1
4.	Operative Practice	3	Jr.	2
5.	Operative Practice	4	Sr.	3
6.	Operative Practice	4	Sr.	4

2. OPERATIVE TECHNIQUE. This course consists of lectures, recitations, demonstrations, and laboratory work of a technical nature. WALLS, GREEN, COUNTRYMAN, NAEGELI, PARKER, HENRY, RAMAKER.

3. OPERATIVE PRACTICE. This course consists of lectures, recitations, and clinical practice. WALLS, GREEN, COUNTRYMAN, SHELLMAN, NAEGELI, PARKER, HENRY, RAMAKER.

4. OPERATIVE PRACTICE. A course of lectures, recitations, conference work, demonstrations, and clinical practice covering the entire field of operative dentistry. WALLS, GODFREY, COX, HENRY, LITTLE, MAYBURY, PATTRIDGE, RAMAKER.

5. OPERATIVE PRACTICE. Continuation of Course 3 as outlined above. WALLS, GODFREY, SHELLMAN, COX, LITTLE, MAYBURY, NAEGELI, PATTRIDGE.

6. OPERATIVE PRACTICE. A course in the general practice of operative dentistry. WALLS, GODFREY, SHELLMAN, COX, LITTLE, MAYBURY, NAEGELI, PATTRIDGE.

ORAL SURGERY

Professor THOMAS B. HARTZELL; Associate Professors CHARLES A. GRIFFITH, HERMAN A. MAVES; Assistant Professor RAY R. KNIGHT; Instructors K. PAUL CARSON, WILLIAM A. GREY, HAROLD J. LEONARD, MARY V. HARTZELL.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
2.	Practice	3	Jr.	Path., Bact.
3.	Oral Surgery	2	Sr.	2
4.	Oral Surgery Practice	4	Sr.	3

2. PRACTICE. Demonstrations and practice in prophylaxis, treatment of pyorrhea, oral examinations and physical diagnosis, extraction of teeth, local and general anaesthesia, radiography, hospital dental practice, and oral surgery. HARTZELL, GRIFFITH, KNIGHT, MAVES, LEONARD, GREY, CARSON, HARTZELL.

3. ORAL SURGERY. This course is taught by lectures and recitations covering the field of surgical diseases of the oral cavity, extraction of teeth, anaesthesia, radiography, and, in conjunction with the course in Pathology and Therapeutics, the subject of metastatic infections due to mouth infections. HARTZELL, GRIFFITH.

4. Continuation of Course 3 as outlined above. HARTZELL, GRIFFITH, KNIGHT, MAVES, LEONARD, GREY, CARSON, HARTZELL.

ORTHODONTIA

Professor OSCAR A. WEISS; Associate Professors WILLIAM F. LASBY, HARRY C. LAWTON; Assistant Professor CARL O. FLAGSTAD; Instructor BERT G. ANDERSON, RALPH W. DELTON, MAX E. ERNST.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Orthodontia Technique	2	Jr.	Pros. Tech. 4
3.	Orthodontia Practice	2	Sr.	1
4.	Orthodontia Practice	2	Sr.	2

1. ORTHODONTIA TECHNIQUE. A course of lectures, recitations, and laboratory work in the technique of steel and the making of regulating appliances. LAWTON, DELTON.

3. ORTHODONTIA PRACTICE. A course of lectures, recitations, and clinical work on the theory and practice of orthodontia. Every student is

required to treat at least one irregularity of the teeth. WEISS, LASBY, FLAGSTAD, ANDERSON, ERNST.

4. ORTHODONTIA PRACTICE. A continuation of Course 2 as outlined above. WEISS, LASBY, ANDERSON, ERNST.

PATHOLOGY, BACTERIOLOGY, AND PUBLIC HEALTH

Professor HAROLD E. ROBERTSON; Associate Professors ELEXIOUS T. BELL, WINFORD P. LARSON; Assistant Professor MOSES BARRON; Instructors ARTHUR T. HENRICI, MARGARET WARWICK, PERCY A. WARD, ANNE G. BENTON; Assistants HAROLD S. DIEHL, KANO IKEDA.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
3.	Bacteriology	4	Jr.	Hist. 51
4.	Pathology	4	Jr.	Chem. 21-22

3. BACTERIOLOGY. DENTAL STUDENTS. The principles which govern the isolation and study of bacteria, with particular attention to the bacteria and other parasites of the mouth and teeth. Brief studies of pathogenic organisms which produce, or appear in rheumatism, their relation to infections of the teeth. 96 hours, 4 credits. HENRICI, DIEHL, IKEDA.

4. PATHOLOGY. DENTAL STUDENTS. The study and recognition of gross and microscopic disease processes. The principles of general pathology with special consideration of diseases peculiar to the mouth and teeth and important in dental practice. 96 credits, 4 credits. HENRICI, WARD, IKEDA.

PATHOLOGY AND THERAPEUTICS

Professor THOMAS B. HARTZELL; Instructor HAROLD J. LEONARD.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Pathology and Therapeutics	3	Sr.	Path., Bact. 51-52, 58-59

1. PATHOLOGY AND THERAPEUTICS. Lectures and recitations involving general pathology as a foundation of the special pathology of the teeth, peridental structures, and oral cavity, and including metastatic infections and neurological disturbances due to infections and irritations in the mouth. HARTZELL, LEONARD.

PHARMACOLOGY

Professor ARTHUR R. HIRSCHFELDER; Associate Professor EDGAR D. BROWN; Assistant Professor ROBERT A. HALL.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
2.	General Pharmacology	3	Jr.	Chem. 21, 22

2. GENERAL PHARMACOLOGY as applied to dentistry comprises a study of the properties, action, and therapeutic application of the principal drugs used in dentistry with exercises in prescription writing. HALL.

PHYSICAL EDUCATION

FOR MEN

Director LOUIS J. COOKE; Assistant Director WILLIAM K. FOSTER; Instructor JOHN C. WEST.

The purpose of the department is to provide all men of the University opportunity for exercise in order to maintain and build up their general health. It also provides special training for the correction of physical defects and functional derangements.

A physical examination is required of all new matriculants, and of all others using the department privileges, at the beginning of the year, and as often during their college course as their physical condition may indicate. Students taking the required work in physical education are examined also at the close of the year. A study of these records shows a marked improvement in the standard of health of the average student during his college course.

The gymnasium, swimming pool, and baths are open to all students of the University, who are free to use the apparatus and to pursue a course in physical training under the supervision of the director and his assistants.

Those students taking the required course in physical education who can not swim, must make a reasonable effort, as determined by the department, to pass the swimming and life-saving requirements, and will be assigned special hours for instruction.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Personal Hygiene	1	All	None

1. PERSONAL HYGIENE. Two hours per week; first six weeks of first semester. Examination at close of course. COOKE.

A special lecture on sex hygiene is given sometime during the first ten days of the autumn semester, with required attendance on the part of all freshmen.

PHYSIOLOGY

Professor ELIAS P. LYON; Associate Professors RICHARD OLDING BEARD, FREDERICK H. SCOTT; Assistant Professors M. RUSSELL WILCOX, JOHN F. MCCLENDON; Instructors CHAUNCEY J. V. PETTIBONE, FRANCIS B.

KINGSBURY; Assistants EDWARD D. ANDERSON, ALBERT M. SNELL, EDWARD F. SLATER.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
4.	Physiologic Chemistry	3	Soph.	Chem. 21, 22
6.	Physiology	4	Soph.	An. Biol.

4. PHYSIOLOGIC CHEMISTRY. A course of lectures and laboratory studies of the compounds occurring in the animal body; of the food-stuffs; the digestion and of urinalysis. PETTIBONE, KINGSBURY, and Assistants.

6. PHYSIOLOGY. Lectures and laboratory exercises. The study of the general functional properties of tissue cells; of muscle-nerve functions; of blood, the circulation, respiration, digestion, secretion, and excretion. LYON, BEARD, SCOTT, MCCLENDON, and Assistants.

PROSTHETIC DENTISTRY

Professor OSCAR A. WEISS; Associate Professors GEORGE M. DAMON, WILLIAM F. LASBY, HARRY C. LAWTON; Assistant Professors OSCAR COOPERMAN, CARL O. FLAGSTAD, CARL H. PETRI, CHARLES E. RUDOLPH; Instructors BERT C. ANDERSON, RALPH W. DELTON, LEE A. HARKER, PAUL S. PARKER, ANDREW J. WEISS.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Prosthetic Technique	3	Fr.	None
2.	Prosthetic Technique	3	Fr.	1
3.	Prosthetic Technique	3	Soph.	2
4.	Prosthetic Technique	2	Soph.	3
5.	Prosthetic Practice	2	Jr.	4
6.	Prosthetic Practice	1	Jr.	5
7.	Prosthetic Practice	1	Sr.	6
8.	Prosthetic Practice	1	Sr.	7

1. PROSTHETIC TECHNIQUE. This course consists of lectures and technique work in the laboratory, comprising impression materials and their uses and the different processes of plate work. DAMON, COOPERMAN, PETRI, RUDOLPH, HARKER, PARKER.

2. PROSTHETIC TECHNIQUE. Continuation of Course 1 as outlined above. DAMON, COOPERMAN, PETRI, RUDOLPH, HARKER, PARKER.

3. PROSTHETIC TECHNIQUE. The course consists of lectures, recitations, and laboratory work covering the principles and practice of plate work. LAWTON, DELTON, HARKER, PARKER.

4. PROSTHETIC TECHNIQUE. Continuation of Course 3 as outlined above. LAWTON, DELTON, HARKER, PARKER.

5. PROSTHETIC PRACTICE. A course of lectures, recitations, and clinical work covering the simpler forms of prosthetic practice. WEISS, LASBY, FLAGSTAD, ANDERSON.

6. PROSTHETIC PRACTICE. A course of lectures, recitations, and clinical work covering cleft palate and other special cases in addition to the general prosthetic practice. WEISS, LASBY, FLAGSTAD, ANDERSON.

7. PROSTHETIC PRACTICE. A course in general practice of prosthetics. WEISS, LASBY, FLAGSTAD, ANDERSON.

8. PROSTHETIC PRACTICE. A continuation of Course 7 as outlined above. WEISS, LASBY, FLAGSTAD, ANDERSON.

RHETORIC AND PUBLIC SPEAKING

Professor JOSEPH M. THOMAS; Instructors CYRIL A. HERRICK, FRANK SMOYER.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
3.	Composition and Rhetoric.....	3	Fr.	None
4.	Composition and Rhetoric.....	3	Fr.	None

3. RHETORIC AND COMPOSITION. Training in writing; study of the work of writers who have handled scientific subjects with clearness and power; outside reading. HERRICK, SMOYER.

4. RHETORIC AND COMPOSITION. A continuation of Course 3. HERRICK, SMOYER.

THEORY AND PRACTICE OF DENTISTRY

Professors ALFRED OWRE, BROR E. DAHLGREN, and Associates.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
2.	Theory and Practice of Dentistry....	2	Sr.	None

2. THEORY AND PRACTICE OF DENTISTRY. A lecture and conference course in the theory and practice of dentistry, Public Hygiene, Applied Economics, Jurisprudence, Psychology, Ethics, and Art. OWRE, DAHLGREN, and Associates.

STUDENTS

SENIORS

Abell, W. J.
Anderson, L. C.
Bergerson, L.
Bergh, I. G.
Birnberg, J. V.
Bodien, A. T.
Borovsky, Abe
Brink, F. T.
Bruss, E. T.*
Buehler, J. E.*
Chisholm, D. R.*
Cohler, M. J.
Colburn, D. N.
Connell, J. E.
Cook, G. W.
Dampier, D. G.
Danz, Beatrice
Diamond, H. A.
Durfee, L. M.
Farrell, S. M.*
Fee, G. B.
Feeney, H. S.
Fossun, E. A.
Freier, E. F.
Gabrielson, L. C.
Gardner, H. E.
Geddes, D. D.
Gerde, M. A.*
Girvin, C. W.*
Hansen, A. P.*
Hansen, E. L.
Harper, F. W.
Hartig, R. P. J.
Hartwig, J. I.
Haven, W. K.
Healy, C. J.
Hendricks, L. M.
Herrmann, M. P.*
Hillman, H. C.
Hoglund, H. A.
Holliday, Houghton*
Iverson, W. G.
Jernall, R. M.*
Johnson, R. L.
Just, Dagny
Kubesl,, E. J.
Leighton, E. G.
LeMay, R. B.*
Lillehei, C. I.*
Lindelein, C. O.
Lindquist, R. W.
Lorhammer, G. A.
McKenzie, M. D.*
Meintsma, Richard
Miller, M. A.
Neiman, Robert
Nelson, C. A.*
Nylander, V. T.
Olson, Alfred
Paske, C. H.*
Peterson, C. R.
Peterson, W. F.
Pfeiffer, R. H.*
Pierson, L. L.
Plonty, Earl
Radke, L. M.
Radke, W. L.*
Reinking, H. N.
Reynolds, W. D.
Ribbel, G. H.
Ringstrom, G. M.
Robinson, J. F.
Roelike, S. J.
Saevig, J. G.
Schuft, A. F.
Sell, C. A.
Shackell, Harold
Shanahan, R. F.
Simonson, A. E.*
Skon, A. E.*
Stevens, Marion
Swanson, C. A.
Talle, Ingeborg
Thorson, M. H.
Tucker, C. M.
Tucker, C. A.
Wedin, A. C.
Weibeler, C. J.
Weisman, H. L.
Wendell, Lehman*
West, E. C.*
Whitaker, V. D.
White, Mrs. E. S.*
White, F. I.
Wilson, O. P.*
Wolter, A. F.
Zettler, W. W.
Ziskin, D. E.

* Served as a Senior Adviser.

JUNIORS

Abrahams, O. H.
Albrecht, A. W.
Anderson, C. O.
Anderson, E. J.
Anderson, G. R.
Anderson, R. H.
Bang, C. B.
Beckenstein, I. S.
Brady, F. P.
Brandenborg, G. A.
Brooks, F. I.
Buck, W. V.
Carlson, M. H.
Dwire, G. J.
Eklund, C. L.
Farmer, E. A.
Faus, N. A.
Finnegan, R. L.
Flandrick, C. R.
Gilbert, L. I.
Gullings, I. O.
Hagberg, W. V.
Halvorsen, Jorgen
Haugberg, Elmer
Hiebert, G. J.
Hoitomt, R. M.
Homme, A. H. F.
How, R. M.
Johnson, G. A.
Johnson, Harvey
Johnson, H. E.
Johnson, R. E.
Kelsey, C. W.
Kirkpatrick, F. K.
Kirkpatrick, V. L.
LaFreniere, J. G.
Lauer, V. G.
Lee, C. W.
Lee, E. T.
Lucian, Arthur
McGinn, J. A.
McKinney, W. H.
Meachem, L. F.
Melander, O. A.
Miner, C. L.
Moos, L. C.
Nash, E. G.
Nellermoe, J. O.
Nelson, C. W.
Nelson, J. W.
Ness, H. B.
Nishioka, Masahito
Northfield, I. H.
Obermeyer, F. C.
Olsen, R. C.
Passer, C. W.
Pattridge, W. H.
Pearson, E. H.
Peterson, J. A.
Peterson, L. C.
Priske, L. R.
Robb, G. L. Jr.
Salisbury, J. A.
Shaw, W. S.
Silsby, Jay
Silver, V. L.
Simon, A. F.
Snyder, C. E.
Storberg, V. H.
Swennes, H. G.
Swenson, C. R.
Thomas, H. E.
Thornby, I. J.
Thorson, H. A.
Wachtler, W. R.
Wellman, H. W.
Werner, C. O.
Williams, S. G.
Woodruff, H. S.
Woods, L. F.
Wrucke, A. L.
Zimmerman, Emanuel

SOPHOMORES

Anderson, A. F.
Anderson, Harry
Anderson, L. C.
Aronson, A. V.
Babcock, W. L.
Bierman, C. W.
Brandt, H. R.
Britzius, K. E.
Carpenter, E. R.
Comartin, E. E.
Conway, J. H.
Cook, M. E.
Daly, T. L.
Daum, L. A.
Davidson, F. V.
Dille, W. O.
Dobson, N. J.
Egdahl, H. I.
Elliott, V. D.
Foster, J. M.
Foster, L. W.
Francis, V. B.
Fuller, B. F.
Gletne, J. S.
Graham, P. G.
Hallum, O. F.
Hawley, R. K.
Hedburg, R. L.
Jamieson, C. H.
Johnson, A. W.
Kline, R. P.
Kraft, R. M.
Krause, L. C.
Larson, F. A.
Larson, W. J.
Levy, M. M.
Long, G. D.
Lynde, J. K.
McGill, E. C.
Mara, S. G.
Medalie, W. L.
Meisser, J. G.
Melby, A. J.
Miszewski, A. H.
Mohn, E. J.
Mountain, M. D.
Murphy, S. L.
Newman, A. T.
Olson, O. T.
Paine, Ralph
Pederson, J. P.
Pink, David
Reed, R. R.
Rodman, D. E.
Rogstad, O. V.
Rose, O. A.
Rostad, H. D.
Rowell, W. J.
Sahr, W. L.
Searing, R. T.
Sivinski, M. A.
Skoedopole, F. L.
Smith, L. H.
Stafford, O. K.
Stone, H. C.
Stunkard, B. W.
Swenson, R. B.
Thiers, F. C.
Thomas, A. L.
Thurston, R. F.
Ulvestad, R. A.
Van Slyke, A. C.
Veblen, I. S.
Weiser, G. C.
Wild, H. C.
Williams, H. N.
Williams, W. T.
Witter, L. E.
Wolff, H. H.
Wrbitzky, B. P.

FRESHMEN

Abbott, V. B.
Ahmann, N. T.
Albinson, R. N.
Bergan, E. L.
Blunt, J. K.
Bradley, H.
Bryant, J. W.
Brzenski, B. J.
Bugenstein, S.
Bussard, O. T.
Bylund, S. O.
Cohen, M. J.
Collin, S. G.
Crolley, W. P.
Donaldson, C. F.
Downing, L. W.
East, C. D.
Fogarty, E. C.
Fruchtman, L.
Gjedrem, C. L.
Glanz, T. C.
Goldberg, M. W.
Gordon, M. G.
Grumstrup, E.
Hagen, W. H.
Hanson, R. V.
Hass, A. A.
Hawes, P. H.
Henley, V. J.
Hoel, H. C.
Howe, F. M.
Hurst, W. W.
Ioset, R. G.
Ioset, R. F.
Jacobson, R. A.
James, F. S.
Johnson, Alvin F.
Johnson, Arthur F.
Johnson, E. L.
Johnson, Myrtle K.
Johnson, R. M.
Jungmann, S.
Katz, A.
Kehne, H. A.
Kellett, G. B.
Kelly, M. P.
Kelly, R. W.
Kracek, F. C.
Lan, B.
Landers, H. J.
Larson, H. O.
Lawler, M. E.
Lund, E.
Lundquist, E. C.
Luttio, V. A.
McCray, L. H.
McIntire, H. E.
Malloy, J. P.
Marxen, N. J.
Miller, M. H.
Mohn, M. C.
Moulton, C. W.
Muller, E.
Nellermoe, D. L.
Nelson, A. L.
Nelson, V. O.
Norden, L. A.
Oster, L. T.
Patterson, A. G.
Prechel, A. E.
Quigley, M. W.
Ramsett, H. E.
Redman, D. A.
Reed, R. M.
Risk, P. A.
Rosenbloom, S. S.
Schwedes, C. H.
Segall, S.
Smith, Dayton
Sprafka, J. T.
Staples, C. W.
Stemper, J. N.
Sullivan, E. J.
Swanson, C. V.
Swanson, E. C.
Swanson, H. E.
Thornton, M. H.
VonBank, W. J.
Whitney, E. L.
Wiberg, P. B.
Williams, H. E.
Witzman, M.

The Bulletin *of the* University *of* Minnesota

The School of Mines Announcement for the Year 1917-1918

Catalog Series No. 10
Vol. XX No. 26 July 16 1917

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

1917

JULY

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

AUGUST

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

SEPTEMBER

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

OCTOBER

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

NOVEMBER

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

DECEMBER

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

1918

JANUARY

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

FEBRUARY

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

MARCH

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

APRIL

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

MAY

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	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

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

JULY

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

AUGUST

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

SEPTEMBER

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

OCTOBER

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

NOVEMBER

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

DECEMBER

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

UNIVERSITY CALENDAR

1917-1918

1917			
September	26	Wednesday	Registration closes for all students
September 26 – October 3		Week	Fees payable for all students
October	1	Monday	First semester evening extension classes begin
October	2-9	Week	Examinations for removal of conditions (except for Colleges of Agriculture and Forestry), and entrance examinations
October	10	Wednesday	First semester begins
October	15	Monday	Agricultural College, farm experience examinations
October	18	Thursday	School of Agriculture, first term begins
October	29	Monday	Senate meeting, 4:00 p.m.
November	5	Monday	Dairy School opens
November	28	Wednesday	Thanksgiving recess begins 9:00 p.m.
December	1	Saturday	Dairy School closes
December	3	Monday	Thanksgiving recess ends 8:00 a.m.
December	3-8	Week	Second semester condition examinations, Colleges of Agriculture and Forestry
December	3-8	Week	Short course for ice-cream makers
December	5	Wednesday	Medical School second quarter begins
December	20	Thursday	Senate meeting, 4:00 p.m.
December	21	Friday	School of Agriculture, first term closes
December	21	Friday	Christmas vacation begins 9:00 p.m.
1918			
December 31 – January 5		Week	Farmers' and Home Makers' Week Short Course
January	2	Wednesday	Christmas vacation ends 8:00 a.m.
January	2	Wednesday	School of Embalming begins, eight weeks' session
January	8	Tuesday	School of Agriculture, second term begins
January	25	Friday	First semester evening extension classes close
February	4	Monday	Second semester registration closes
February	4	Monday	Second semester evening extension classes begin
February	4-9	Week	Merchants' Short Course
February	11	Monday	Final examinations begin
February	11	Monday	Payment of fees for second semester closes

February	12	Tuesday	Lincoln's Birthday; a holiday
February	18	Monday	Second semester begins
February	21	Thursday	Senate meeting, 4:00 p.m.
February	22	Friday	Washington's Birthday; a holiday
March	27	Wednesday	School of Agriculture closes
March	28	Thursday	Easter recess begins 9:00 p.m.
April	1	Monday	Easter recess ends 8:00 a.m.
April	1-6	Week	Boys' and Girls' Week
April	1-6	Week	Condition examinations in certain colleges
April	15	Monday	Medical School fourth quarter begins
April	30	Tuesday	Traction Engineering Short Course begins
May	16	Thursday	Senate meeting, 4:00 p.m.
May	24	Friday	Second semester evening extension classes close
May	30	Thursday	Memorial Day; a holiday
May	31	Friday	Traction Engineering Short Course closes
June	8	Saturday	Final examinations begin 2:00 p.m.
June	15	Saturday	Second semester closes
June	16	Sunday	Baccalaureate service
June	17	Monday	Senior Class Day exercises
June	19	Wednesday	Alumni Day
June	20	Thursday	Forty-sixth Annual Commencement
June	21	Friday	Summer vacation begins
June	24	Monday	Summer Session begins

The University year for 1918-19 will begin Tuesday, September 17. Classes will begin September 25.

Program of Supplementary Examinations

Tuesday	Oct. 2	9-12 a.m.	Mechanics and Mathematics
		2-5 p.m.	Mining Engineering Subjects
Wednesday	Oct. 3	9-12 a.m.	Chemistry
		2-5 p.m.	Drawing and Descriptive Geometry
		2-5 p.m.	Mechanical Engineering Subjects
Thursday	Oct. 4	9-12 a.m.	Metallurgical Subjects
		2-5 p.m.	Physics
Friday	Oct. 5	9-12 a.m.	Electrical Engineering Subjects
		2-5 p.m.	Geology and Mineralogy

THE SCHOOL OF MINES

FACULTY

MARION LEROY BURTON, D.D., Ph.D., LL.D., President
1005 5th St. S. E.
CYRUS NORTHROP, LL.D., President Emeritus 519 10th Ave. S. E.
WILLIAM R. APPLEBY, M.A., Dean and Professor of Metallurgy
928 5th St. S. E.
OSCAR C. BURKHARD, M.A., Assistant Professor of German
719 E. River Road
PETER CHRISTIANSON, B.S., E.M., Professor of Metallurgy
217 Union St. S. E.
ELTING H. COMSTOCK, M.S., Professor of Mine Plant and Mechanics
1416 7th St. S. E.
WILLIAM H. EMMONS, Ph.D., Professor of Mineralogy and Geology
611 11th Ave. S. E.
HENRY A. ERIKSON, Ph.D., Professor of Physics 424 Harvard St. S. E.
JOHN J. FLATHER, Ph.B., M.M.E., Professor of Mechanical Engineering
315 11th Ave. S. E.
GEORGE B. FRANKFORTER, Ph.D., Professor of Chemistry
525 E. River Road
JULES T. FRELIN, B.A., Assistant Professor of Romance Languages
1206 5th St. S. E.
ROBERT W. FRENCH, B.S., Assistant Professor of Drawing
1018 16th Ave. S. E.
FRANK F. GROUT, M.S., Associate Professor of Geology and Mineralogy
617 4th St. S. E.
SAMUEL L. HOYT, E.M., Ph.D., Assistant Professor of Metallography
416 8th Ave. S. E.
A. WALFRED JOHNSTON, M.A., Assistant Professor of Geology
803 University Ave. S. E.
WILLIAM H. KIRCHNER, B.S., Professor of Drawing and Descriptive Geometry 722 10th Ave. S. E.
EDWIN M. LAMBERT, M.E., Assistant Professor of Mine Plant and Mechanics 1086 12th Ave. S. E.
FRANKLIN R. MCMILLAN, C.E., Assistant Professor of Structural Engineering 524 8th Ave. S. E.
JOHN F. MURPHY, Associate Professor of Mining 519 7th Ave. S. E.
EVERETT W. OLMSTED, Ph.D., Professor of Romance Languages
901 5th St. S. E.
LEVI B. PEASE, M.S., Professor of Metallurgy 1070 16th Ave. S. E.
TERENCE T. QUIRKE, E.M., Ph.D., Assistant Professor of Geology
315 11th Ave. S. E.
FRANK B. ROWLEY, Assistant Professor of Experimental Engineering
217 Beacon St. S. E.

WILLIAM T. RYAN, E.E., Assistant Professor of Electrical Engineering 3228 4th St. S. E.
CARL SCHLENKER, B.A., Professor of German 514 11th Ave. S. E.
GEORGE D. SHEPARDSON, M.A., M.E., D.Sc., Professor of Electrical Engineering 717 E. River Road
S. CARL SHIPLEY, B.S., M.E., Assistant Professor of Machine Construction 1517 E. River Road
CHARLES F. SHOOP, B.S., Assistant Professor of Experimental Engineering 811 Fulton St. S. E.
CHARLES F. SIDENER, B.S., Professor of Chemistry 1320 5th St. S. E.
CLINTON R. STAUFFER, Ph.D., Associate Professor of Geology 1023 University Ave. S. E.
STERLING TEMPLE, M.A., Assistant Professor of Chemistry 1758 Blair St., St. Paul
ANTHONY ZELENY, Ph.D., Professor of Physics 613 Fulton St. S. E.
THOMAS M. BRODERICK, Ph.D., Instructor in Geology 3204 Portland Ave.
ANDERS J. CARLSON, Instructor in Mining 520 Delaware St. S. E.
CHARLES H. CLEVENGER, M.S., Instructor in Mathematics and Mechanics 1214 7th St. S. E.
EDWARD W. DAVIS, B.S., Instructor in Mechanics and Mathematics 979 14th Ave. S. E.
ERNEST O. DIETERICH, Ph.D., Instructor in Physics 809 Essex St. S. E.
GERHARD DIETRICHSON, Ph.D., Instructor in Chemistry 429 Walnut St. S. E.
J. THEODORE GEISSENDOERFER, Ph.D., Instructor in German 967 14th Ave. S. E.
ERVIN W. MCCULLOUGH, E.M., Instructor in Metallurgy 934 E. Bayliss Ave., St. Paul
HOWARD D. MYERS, C.E., Instructor in Drawing 516 Oak St. S. E.
EDMUND NEWTON, E.M., Instructor in Metallurgy 941 14th Ave. S. E.
EDWARD P. QUIGLEY, Instructor in Forge Work 2923 Chicago Ave.
WILLIAM H. RICHARDS, Instructor in Carpentry 1423 W. 27th St.
EDWARD H. SIRICH, Instructor in Romance Languages 321 14th Ave. S. E.
RICHARD WISCHKAEMPER, M.A., Instructor in German 979 14th Ave. S. E.
ARNOLD KIRKPATRICK, Ph.B., Assistant in Chemistry 1703 Taylor Ave., St. Paul
ELOISE WEBSTER, Librarian 1514 W. 25th St.

GENERAL INFORMATION

The School of Mines was established by the Board of Regents in 1888, upon recommendation of the General Faculty of the University. The buildings and laboratories of the School are located on the main campus of the University. The mining districts of Minnesota are within a few hours, by rail, from Minneapolis. The heartiest coöperation exists between the various mine managements and the School, so that the mining properties are at all times open to parties from the school for observation and study trips. Practical surveying, geological field work, and underground work are carried on in one or more of the districts. Students in the School of Mines have, therefore, all the advantages afforded by a large university combined with ample opportunity for field observation and experience.

The School of Mines occupies the new building provided by the Legislature of 1913. In the basement are the assay and electro-metallurgical laboratories, together with machinery room, instrument room, balance room, furnace rooms, and necessary storerooms. On the first floor are the administrative offices, offices and lecture rooms of the departments of Metallurgy and Mine Plant and Mechanics. On the second floor are the offices, lecture rooms, and drafting rooms of the department of Mining, the ore dressing laboratory, and the library of the school. On the third floor are the offices, laboratories, and lecture rooms of the department of Metallography, junior drafting room, photographic dark rooms, blue printing room, and offices and computing rooms for the branch of the Experiment Station serving the Tax Commission.

DEGREES

In the School of Mines there are three regular courses of study, viz., Mining Engineering, Mining Engineering specializing in Geology, and Metallurgy, leading to the degree of Engineer of Mines (E.M.), Engineer of Mines in Geology [E.M. (Geology)], and Metallurgical Engineer (Met.E.) respectively.

The degree of Metallurgical Engineer may be conferred upon a candidate who received the degree of Engineer of Mines in four or five years, and vice versa, provided such candidate completes an additional year's work at the School and presents a suitable thesis.

Students in the College of Science, Literature, and the Arts, in the College of Engineering and Architecture, and in the School of Analytical and Applied Chemistry, who contemplate taking a degree in this School after completing their course, are recommended to select their electives with reference to as full a preparation as possible for the technical work of the course they propose to enter.

CLASSIFICATION OF SUBJECTS

The work falls under the following subdivisions, supplemented by thoro courses in mechanics, mathematics, surveying, physics, chemistry, and the necessary theory and practice of structural, mechanical and electrical engineering.

(a) *Geology*—to determine the location of the ore. (b) *Mineralogy*—to determine its nature. (c) *Assaying*—to determine if it has value for treatment. (d) *Mining Engineering*—to furnish material for treatment. (e) *Ore Testing*—to determine best methods of treatment. (f) *Ore Dressing*—furnishing products for metallurgical treatment. (g) *Metallurgy*—smelting and refining ores and ore dressing products; reduction to metals.

EXPERIMENT STATION

The School of Mines Experiment Station has been recently established to promote the development of the mining and mineral resources of the state, to assay specimens of ores, rocks, clays, and minerals; to make such assays free of charge for private parties subject to such regulations as the Board of Regents may deem necessary; to make mining and metallurgical experiments in the treatment of such substances and in the utilization of mining and metallurgical by-products; to investigate methods of mining and the use of explosives; to undertake such other mining and metallurgical problems as may seem desirable; to make all ore estimates for the Tax Commission and to do such other work along the lines above outlined as may be requested by other state departments. Coöperation has been effected with the Minnesota Geological Survey and the School of Chemistry.

The Experiment Station is prepared to assist citizens interested in these lines of work; to assay specimens of ore, rocks, clays, and minerals found within the state free of charge.

In submitting samples the sender must state the exact location where each sample was found, giving all possible additional information. This information, together with results of any test or analysis, will be on file and available to the public at the office of the Station. Citizens desiring free assay privileges must agree to give accredited representatives of the School of Mines Experiment Station and of the Geological Survey access to the property should they desire to visit the same for purposes of examination and geological study.

Correspondence will receive prompt attention, but consultations generally prove more satisfactory.

Each sample should be numbered for identification and bear the name and address of the sender. All shipments must be delivered to the Minnesota School of Mines, charges prepaid. Shipping tags will be furnished upon request.

Address all communications to William R. Appleby, Director, Minnesota School of Mines Experiment Station, The University of Minnesota, Minneapolis, Minnesota.

LIBRARY

The library occupies a well-lighted room, 55 feet by 61 feet, on the second floor of the School of Mines building. The books have been carefully selected and form a working collection of great value, not only to the faculty and students, but also the mining men of the state. Only books relating to mining, metallurgy, metallography, geology, and allied subjects are shelved in this library, the general University library as well as the public libraries of Minneapolis and St. Paul serving as reserve collections. The library is especially rich in complete sets of periodicals, transactions, and the reports of state and foreign mining departments. Foreign technical literature is well represented. A card index is kept of all articles of value and interest appearing in the leading periodicals.

ADMISSION

The courses leading to the degrees of Engineer of Mines, Engineer of Mines (in Geology), and Metallurgical Engineer may be completed in either four or five years. Students may enter the School of Mines without preparation in Higher Algebra and Solid Geometry. Such students must enter the five-year courses. It is recommended that students who come poorly prepared in Mathematics enter the five-year courses.

Students may be admitted to the School of Mines either by certificate or examination, or both.

ADMISSION BY EXAMINATION

Entrance examinations are offered at the University during registration week, October 2 to 5. Candidates entering by this method must pass examinations in fifteen units so chosen as to satisfy the requirements outlined below. Certificates from the College Entrance Examination Board and from the High School Board are accepted in lieu of examinations in the subjects they represent. Those desiring to take examinations should notify the Registrar of the University in writing not later than August 31.

ADMISSION BY CERTIFICATE

Graduates of the following courses, provided their preparation satisfies the requirements outlined below, may be admitted.

1. Any four-year course of a Minnesota state high school or other accredited school in the state.
2. A four-year course of schools in any other state accredited to the state university of that state.
3. The Advanced Latin and Advanced English courses of the Minnesota state normal schools.

The applicant for admission should request the principal or superintendent to forward to the Registrar of the University a complete tran-

script of his high-school or preparatory-school record showing the number of weeks and hours per week spent upon each study, with the grades entered as *passed, passed with credit,* or *passed with honor.* Credential blanks prepared by the University must be used; these blanks may be secured upon application to the Registrar. Upon receipt of the credentials at the University the Registrar will notify the applicant with regard to his admission.

ENTRANCE REQUIREMENTS

FIVE-YEAR COURSES

English, three units; Elementary Algebra and Plane Geometry, one unit each; ten additional units, of which not more than four may be in Group F.

FOUR-YEAR COURSES

Same as five-year courses with the addition of one-half unit each of Higher Algebra and Solid Geometry. It is recommended that students who enter these courses review Higher Algebra and Solid Geometry. Those unable to carry freshman mathematics satisfactorily will be required to re-register in the five-year course.

LIST OF ENTRANCE SUBJECTS

The term *unit* means not less than five recitations of forty minutes each per week for a period of thirty-six weeks. In manual subjects and kindred courses, it means the equivalent of ten recitation periods per week for thirty-six weeks.

GROUP A. ENGLISH. Four units.

GROUN B. LANGUAGES. Latin, Greek, German, French, Spanish, Scandinavian, one to four units each.

GROUP C. HISTORY AND SOCIAL SCIENCES. Ancient and Modern History, one unit each; English and Senior American History, one-half unit each; American Government, Economics, Economic History of England, and Economic History of the United States, one-half unit each; Commercial Geography, and History of Commerce, one-half or one unit each.

GROUP D. MATHEMATICS. Elementary Algebra and Plane Geometry, one unit each; Higher Algebra, Solid Geometry, and Trigonometry, one-half unit each.

GROUP E. NATURAL SCIENCES. Physics and Chemistry, one unit each; Botany and Zoology, one-half or one unit each; Physiology, Astronomy, Geology, and Physiography, one-half unit each.

GROUP F. VOCATIONAL SUBJECTS. Business Law and Business Arithmetic, one-half unit each; Elementary and Advanced Bookkeeping, one-

unit each; Stenography and Typewriting, one or two units. Freehand Drawing, Mechanical Drawing, and Shopwork, one or two units each. Agriculture, one to four units. Normal Training subjects, one to three units, provided the applicant has had one year of subsequent teaching experience.

DESCRIPTION OF SUBJECTS ACCEPTED FOR ADMISSION

A description of the subjects accepted for admission to the University will be found in the Bulletin of General Information, which will be sent to any address upon application to the Registrar, The University of Minnesota, Minneapolis.

UNCLASSED STUDENTS

No unclassed students will be admitted to the School of Mines.

ADMISSION TO ADVANCED STANDING

This University accepts records from all reputable colleges and universities for credit to advanced standing. Such records are accepted as far as they are equivalent to the work done in this institution. 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 number of weeks and hours per week spent upon each subject.
(c) Ground covered in laboratory work in case of laboratory subjects.
(d) The result. The exact grades should be stated, accompanied by an explanation of the marking system employed.

Students who desire to obtain advanced standing must present their applications and certificates to the departments concerned, obtain a written statement from the department, showing the exact credit allowed, and present this to the Enrollment Committee of the School of Mines.

EXPENSES

One half of the Annual Incidental Fee of $55, which includes all laboratory charges, is payable at the opening of each semester. Cards entitling the student to admission to classes will not be issued until the fees have been paid. Books and supplies for each year of the course cost approximately $25. Field-work expense during the sophomore year is estimated at $150 and for the junior year at $225.

DEPOSIT FEE

At the beginning of each year, in addition to the first semester incidental fee, a deposit fee of five dollars is required of every student to cover the following items:

Change of Registration..... $2.50
Examination for removal of condition at set time...$1.00 per subject
Rental of post-office box, University post-office (required of all) ..... $.50 per year
Locker rental, locker key deposit.....$.50 to $1.00 per year
Laboratory breakages, or damage to University property.
Penalties for late registration or late payment of fees.

A penalty fee of one dollar ($1) must be paid by all students who register or pay fees after the prescribed time. (See calendar, page 3.) After the day previous to that on which classes begin, the penalty for delay increases at the rate of twenty-five cents a day.

The unused balance of the deposit fee will be returned at the end of each year. If, at any time during the college year, the amount of charges against a student exceed the amount of the deposit, a second fee of five dollars ($5) will be required.

SPECIAL FEES

The following special items may be included in the expenses of a student:

Minnesota Union membership, required.....$1 per semester
Special examination for removal of condition, at other than the set time 5.00
Examination on subject taken out of class..... 5.00
No fee for such examinations on first entering the University, if taken within the first six weeks.
Military uniform, required of all freshmen and first-year students 15.00
Gymnasium suit 5.00

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 the expenses of worthy students during sickness. The loans are to be repaid, without interest, at the earliest convenience of the recipients.

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.

Seniors must be in regular attendance at all classes until after the final examinations held at the end of the second semester. Irregular attendance will debar a student from entering all final examinations.

THESIS

The thesis work is intended to bring in review and connect the work in Mining and Metallurgy, Geology and Mineralogy, Mechanical and Electrical Engineering, Mathematics and Mechanics.

It has been found that this purpose is most satisfactorily accomplished by assigning to each student a project, embracing the prospecting, development, and equipment of a group of mining claims, for candidates for the degree of Engineer of Mines; the investigation of a problem in mining geology, for candidates for the degree of Engineer of Mines (in Geology); and the investigation of a metallurgical problem, for candidates for the degree of Metallurgical Engineer.

As much latitude as possible will be allowed the student in the choice of type of deposit and location. He must select a suitable project during the summer preceding the senior year. Outlines are furnished setting forth the lines of investigation necessary to obtain the required data. The junior field work affords ample opportunity therefor.

Prior to the reopening of Field Work at the School of Mines, Tuesday, October 2, 1917, each student is required to submit to the department concerned an outline embodying the principal features of the project, together with a topographic map and a sufficient number of photographs to represent clearly the locality. Unless this outline is submitted when due and is accepted by the department, final registration for the first semester, senior year, will not be permitted.

Students may, if they so desire, take a reasonable number of samples on which to make assays and hand laboratory tests during the ore-testing laboratory work given in the first semester, senior year.

All preliminary work must be done and final work on the project must be under way by December 1. On April 7 the text of the thesis must be completed and submitted for final approval. Completed work (typewritten and bound) together with all tracings and one set of clear blue prints therefrom must be in and accepted not later than April 30. Theses will not be accepted or examined after these dates. Unless the above conditions are complied with no student can expect to graduate with his class.

These theses shall become the property of the School.

SPECIAL NOTES

Students failing to receive a semester mark of 75 per cent in any subject shall have the privilege of a supplementary examination before the opening of the following year.

Each student must obtain from the Registrar his average in all subjects and present himself for supplementary examinations, according to the program given on page 4.

Failure of the Registrar to notify a student of deficiencies will not be accepted as a reason for neglecting to report for necessary supplementary examinations. Students failing to report for supplementary examinations will be compelled to take work over in class as in case of failures.

Students failing to pass supplementary examinations will become members of the succeeding class and must register for those subjects in which they have failed. They may take in addition other subjects not more than one year in advance of their class, with the exception of mining and metallurgical courses, based upon requirements of the various courses and daily program. They may also take certain electives in other colleges provided suitable arrangements can be made.

Students failing to receive a semester mark of 50 per cent in any subject shall not be allowed to pursue any dependent subject.

The Faculty may exclude students from attending classes in any subject upon recommendation of the department concerned.

All students must report in time to make suitable arrangements with departments concerned in case of conflicts in program.

Students failing to present themselves for final examination 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.

All subjects elected in other colleges become part of the School of Mines curriculum. All students are required to receive credits in these subjects before graduation.

During the academic year students will be held responsible for the receipt of official communications sent to them through the University post-office. During the summer vacation they will be held responsible for the receipt of such communications sent to the home address given on registration blank for the preceding academic year, unless formal notification of their correct address is filed with the Registrar and the Dean.

COURSES OF STUDY

UNIFORM CURRICULUM TO END OF SOPHOMORE YEAR

The courses leading to the degrees of Engineer of Mines, Engineer of Mines in Geology, and Metallurgical Engineer, are uniform for the first three years of the five-year courses and for the first two years of the four-year courses.

Five-Year Courses

FIRST YEAR

First Semester

Chemistry 5*, General and Analytical, 5†
Mathematics 1, Computation and Mensuration, 4
Mathematics 3, Mine Accounting, 6
Mechanical Engineering 1, Shop Work, 6
Mineralogy 23, Elements of Mineralogy, 8
Military Drill

Second Semester

Chemistry 6, General and Analytical 7, Chem. 5
Mathematics 2, Algebra, 4
Mechanical Engineering 1, Shop Work, 6
Metallurgy 2, Assaying, 12, Chem. 5, Mineral. 23
Mineralogy 24, Descriptive Mineralogy, 4, Mineral. 23
Military Drill

FRESHMAN YEAR

First Semester

Chemistry 11, Quantitative Analysis, 7, Chem. 5, 6
Drawing 11, Engineering Drawing, 10
Geology 105, Elements of Rock Study, 4, Mineral. 24
Mathematics 5, Algebra and Trigonometry, 6, Math. 1, 2
Metallurgy 3, General and Iron, 3, Chem. 6, Met. 2
Military Drill

---

* Odd numbers indicate first-semester courses; even numbers, second-semester courses. A combination of the two (e.g., 5-6) indicates courses continuing through the year. In the case of courses repeated the second semester, the suffix *a* indicates first semester; the suffix *b*, second semester.

† Figure following the descriptive name of a course indicates number of hours a week. Course names following indicate prerequisite courses.

Second Semester

Chemistry 12, Quantitative Analysis, 7, Chem. 11
Drawing 12, Engineering Drawing, 8, Draw. 11
Mathematics 6, Trigonometry and Analytical Geometry, 6, Math. 5
Geology 1b, General Geology, 3, Mineral. 24
Geology 106, Petrology, 4, Geol. 105
Metallurgy 4, Wrought Iron and Steel, 3, Met. 3
Military Drill

SOPHOMORE YEAR

First Semester

Drawing 13, Descriptive Geometry, 2, Draw. 12, Math. 6
Mathematics 7, Calculus, 5, Math. 6
Geology 73, Historical and Economic Geology, 3, Geol. 106
Metallurgy 105, Base Metals, 4, Met. 4
Mining 1, Mine Surveying, 3, Math. 6
Physics 1, General, 3, Math. 6
Physics 3, General Laboratory Practice, 2, with Physics 1

Second Semester

Drawing 14, Drafting, 4, Draw. 13
Mathematics 8, Calculus, 3, Math. 7
Metallurgy 106, Precious Metals, 4, Met. 105
Mining 2, Mine Surveying, 3, Min. 1
Mining 6, 1
Physics 2, General, 3, Physics 1
Physics 4, General Laboratory Practice, 2, with Physics 2
Field Work. Months of May, June, July, and August
Mining 2f, Surveying, Min. 2, beginning about May 1
Geology 1f, Geol. 1b, 105, beginning about June 15
Underground Mining Work, beginning about July 1

Four-Year Courses

FRESHMAN YEAR

First Semester

Chemistry 5, General and Analytical, 5
Drawing 11, Engineering Drawing, 10
Mathematics 5, Algebra and Trigonometry, 6
Mineralogy 23, Elements of Mineralogy, 8
Military Drill

Second Semester

Chemistry 6, General and Analytical, 7, Chem. 5
Drawing 12, Engineering Drawing, 8, Draw. 11
Mathematics 6, Trigonometry and Analytical Geometry, 6, Math. 5
Metallurgy 2, Assaying, 12, Chem. 5, Mineral. 23
Mineralogy 24, Descriptive Mineralogy, 4, Mineral. 23
Military Drill

SOPHOMORE YEAR

First Semester

Chemistry 11, Quantitative Analysis, 7, Chem. 5, 6
Drawing 13, Descriptive Geometry, 2, Draw. 12, Math. 6
Geology 105, Elements of Rock Study, 4, Mineral. 24
Mathematics 7, Calculus, 5, Math. 6
Metallurgy 3, General and Iron, 3, Chem. 6, Met. 2
Mining 1, Mine Surveying, 3, Math. 6
Physics 1, General, 3, Math. 6
Physics 3, General Laboratory Practice, 2, with Physics 1
Military Drill

Second Semester

Chemistry 12, Quantitative Analysis, 7, Chem. 101
Drawing 14, Drafting, 4, Draw. 13
Geology 1b, General Geology, 3, Mineral. 24
Geology 106, Petrology, 4, Geol. 105
Mathematics 8, Calculus, 3, Math. 7
Metallurgy 4, Wrought Iron and Steel, 3, Met. 3
Mining 2, Mine Surveying, 3, Min. 1
Mining 6, 1
Physics 2, General, 3, Physics 1
Physics 4, General Laboratory Practice, 2, with Physics 2
Military Drill
Field Work. Months of May, June, July, and August
Mining 2f, Surveying, Min. 2, beginning about May 1
Geology 1f, Geol. 1b, 105, beginning about June 15
Underground Mining Work, beginning about July 1

COURSES IN MINING ENGINEERING

COURSES LEADING TO THE DEGREE OF E.M.

Five-Year Courses

JUNIOR YEAR

First Semester

Chemistry 25, Ore and Slag Analysis, 7, Chem. 12
Experimental Engineering 21, Steam Laboratory, 4, with Mech. 11
Geology 111, Ore Deposits, 4, Geol. 106
Mechanics 9, 5, Math. 8
Mechanics 11, Mine Plant, 5, Math. 8
Metallurgy 5, Ore Dressing, 4
Mining 9, 5, Min. 6

Second Semester

Experimental Engineering 22, Strength of Materials, 4, with Mech. 10
Geology 112, Problems in Ore Deposits, 4, Geol. 111
Mechanics 10, 6, Mech. 9
Mechanics 12, Mine Plant, 6, Mech. 11
Metallurgy 6, Ore Dressing 4, Met. 5
Mining 10, 5, Min. 9
Mining 4, Mine Mapping, 6, Min. 2f
Field Work. Months of May, June, July, and August
    Metallurgy 6f, beginning about May 1
    Mining 10f, beginning about May 15
    Underground Mining Work, beginning about June 1

SENIOR YEAR

First Semester

Electrical Engineering 53, Electric Power, 5, Physics, 3, 4
Mechanics 13, Water Power, 5, Mech. 10
Mechanics 15, Engineering Construction, 5, Mech. 10
Metallurgy 7, Ore Testing, 10, Met. 106, Min. 8
Mining 11, 5, Min. 10
Mining 13, Thesis, 2, Min. 10f

Second Semester

Experimental Engineering 24, Experimental Laboratory, 4, Exp. Eng. 21
Mechanics 16, Mine Plant Design, 10, Mech. 15
Metallurgy 8, Special Problems, 4, Met. 7
Mining 12, 5, Min. 11
Mining 14, Thesis, 12, Min. 13

Four-Year Courses

JUNIOR YEAR

First Semester

Experimental Engineering 21, Steam Laboratory, 4, with Mech. 11
Geology 73, Historical and Economic Geology, 3, Geol. 106, 1b
Mechanics 9, 5, Math. 8
Mechanics 11, Mine Plant, 5, Math. 8
Metallurgy 105, Base Metals, 4, Met. 4
Metallurgy 5, Ore Dressing, 4
Mining 9, 5, Min. 6

Second Semester

Experimental Engineering 22, Strength of Materials, 4, with Mech. 10
Mechanics 10, 6, Mech. 9
Mechanics 12, Mine Plant, 6, Mech. 11
Metallurgy 6, Ore Dressing 4, Met. 5
Metallurgy 106, Precious Metals, 4, Met. 105
Mining 10, 5, Min. 9
Mining 4, Mine Mapping, 6, Min. 2f
Field Work. Months of May, June, July, and August
    Metallurgy 6f, beginning about May 1
    Mining 10f, beginning about May 15
    Underground Mining Work, beginning about June 1

SENIOR YEAR

First Semester

Chemistry 25, Ore and Slag Analysis, 7, Chem. 12
Electrical Engineering 53, Electric Power, 5, Physics 3, 4
Geology 111, Ore Deposits, 4, Geol. 106
Mechanics 13, Water Power, 5, Mech. 10
Mechanics 15, Engineering Construction, 5, Mech. 10
Metallurgy 7, Ore Testing, 10, Met. 106, Min. 8
Mining 11, 5, Min. 10
Mining 13, Thesis, 2, Min. 10f

Second Semester

Experimental Engineering 24, Experimental Laboratory, 4, Exp. Eng 21
Geology 112, Problems in Ore Deposits, 4, Geol. 111
Metallurgy 8, Special Problems, 4, Met. 7
Mechanics 16, Mine Plant Design, 10, Mech. 15
Mining 12, 5, Min. 11
Mining 14, Thesis, 12, Min. 13

DEPARTMENT OF MINING ENGINEERING

The department is well supplied with samples of the smaller mine equipment, models, drawings, photographs, lantern slides, and mine maps. The lectures treat of prospecting, development, support of excavations, mining methods, mine administration, mining law, and the necessary allied subjects. The courses in Mining Engineering extend through the sophomore, junior, and senior years.

MINE SURVEYING

The work in surveying is given in the sophomore year and is designed solely for mining engineers. The work begins with the elements of plane surveying, with special reference to the computations necessary, followed by the higher theoretical work in plane surveying and its application to the problems met in underground surveying. Beginning with the first Monday in May, the class devotes seven weeks to field work at some convenient point on the Mesabi or Vermilion Range. The exact location will be announced in March of each year.

The students will be divided into squads of two to four. Each squad must provide itself with a 6-foot steel tape graduated to hundredths. The duration of the course will be seven weeks (5½ days of 8 hours each constitute a week). Each student will be required to complete satisfactorily the following exercises and surveys:

1. Chaining and taping
2. Compass work
3. Adjustment and use of wye and dumpy levels
4. Adjustment of mining transit
5. Reading angles
6. Traverse with transit and steel tape
7. Azimuth traverse with stadia
8. Determination of meridian, latitude, and time by solar and stellar observations
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
12. Exercises in plane table work and geological surveying
13. The survey of a mine

A full equipment of surveying instruments of the latest and best makes is furnished to each squad for this work.

This is followed by a course in Mine Mapping during the second semester of junior year.

Students who furnish satisfactory evidence of proficiency in this work may be given credit therefor. The department, however, reserves the right in any case to require such students to take a theoretical or a practical examination or both.

FIELD WORK IN MINING

Sophomore Year

After the close of the field work in Geology (last two weeks in June), members of the sophomore class are required to engage for six weeks in underground mining work on the Minnesota or Michigan iron ranges, for which they may receive wages.

Junior Year

Upon termination of the junior field work in Metallurgy (about May 15), the members of the junior class, who are candidates for the degree of Engineer of Mines, are required to devote two weeks to the study of mine plant and mine operation under the direction of the department. This work will be given in one of the leading western metal mining districts, exact location to be announced in April of each year. Thereafter, during the months of June, July, and August, the student is required to spend at least six weeks in actual underground mining work in the West, for which he may receive wages. The department will render all possible assistance in locating students in districts of their choice. Each student must keep a diary and record therein, in minute detail, all observations and sketches. He must in person submit this diary to the department on the date of the reopening of field work. In judging the character of the student's field work, equal importance will be attached to the completed report and to the original field notes. The department reserves the right to reject note-books considered below the standard that should be demanded of candidates for senior work.

Field work will reopen at the School of Mines, Tuesday, October 2, 1917. No senior will be registered after that date. Registration will cover Field Work, Electric Power, and Geology.

The final reports covering Field Work in Mining and Metallurgy must be prepared at the School of Mines under the direct supervision of the departments concerned: Metallurgy, October 2-9, inclusive; Mining and Mine Plant, October 10-22.

On October 22 all seniors who expect to graduate must register for the remaining subjects. Prior to this date the student must submit a typewritten report on field work fully illustrated with drawings, to scale, made from the field sketches, covering metallurgical and milling operations, and details of plant and equipment. Final registration will not be allowed until after reports on field work are accepted. All final reports, therefore, must be presented on or before October 22. These reports shall become the property of the School.

The completion of sophomore and junior field work is a requisite for graduation, and satisfactory evidence thereof must be submitted to the department. Should a student, for sufficient reasons, fail to complete this work in regular course, he may, with the consent of the department, be permitted to pursue his regular studies. In all such cases, however, the degree will be withheld until all field work is completed.

COURSES LEADING TO THE DEGREE OF E.M. (GEOLOGY)

JUNIOR YEAR

First Semester

Geology 73, Historical and Economic Geology 3, 106, 1b
Geology 151, Advanced General Geology 3, 73
Geology 131, Advanced Petrology 5, 106, 1b
German 1 or 21, 6
or
French 1 or 3, 3
Metallurgy 155, Metallography 4
Mining 9, 5, Min. 6
Elective 6

Second Semester

Geology 124, Structural and Metamorphic Geology 3, 73
Geology 132, Advanced Petrology 5, 131
Geology 144, Construction and Interpretation of Geologic Maps 3, 111
Geology 150, Field Geology 8, 124
Geology 152, Advanced General Geology 3, 151
German 3 or 22, 6, German 1 or 21
or
French 1 or 3, 6
Metallurgy 156, Metallography 4, 155
Mining 10, 5, Min. 9
Mining 4, Mine Mapping 6, Min. 2f

SENIOR YEAR

First Semester

Geology 111, Ore Deposits 4, 73
Geology 11, Paleontology 3, 1b
Mining 11, 5, Min. 10
Thesis 2
Elective 12

Second Semester

Geology 112, Problems in Ore Deposits 4, 111
Geology 12, Paleontology 3, 11
Mining 12, 5, Min. 11
Thesis 4
Elective 9

FIELD WORK IN GEOLOGY

At the end of the sophomore year mining students are required to devote about three weeks to geologic mapping. This course usually comes after a six weeks' course in surveying and the fields chosen are the Vermilion and Mesabi iron ranges of Minnesota. This work is intended to train the students in the interpretation of field relations and the preparation of geologic maps and cross sections.

The second field course in geology is required only of those students who are candidates for the E.M. in Geology degree. The course begins early in May and is completed in June. The course requires altogether about six weeks work, and the field chosen is the Black Hills region of South Dakota or some other western region. The student is trained in the interpretation of field data; in detailed mapping, underground and on the surface; in the preparation of geologic cross sections through mines; and he may gather material which will serve as a basis for future study in advanced courses the following year. The work conforms with the standards of official surveys as nearly as practicable. At the close of the field season the students are expected to obtain positions with mining companies either as miners or as engineers, or if openings are available, they may enter geological surveys for the season's work.

COURSES IN METALLURGY

COURSES LEADING TO THE DEGREE OF MET. E.

Five-Year Courses

JUNIOR YEAR

First Semester

Geology 111, Ore Deposits, 4, Geol. 106
Mechanics 9, 5, Math. 8
Mechanics 11, Mine Plant, 5, Math. 8
Metallurgy 5, Ore Dressing, 4, Geol. 23 and 24
Metallurgy 13, Ore Dressing Lab. 4, Geol. 23 and 24
Metallurgy 153, Metallography 7, Chem. 12, Physics 1 and 2
Mining 9, 5, Min. 6

Second Semester

Geology 112, Problems in Ore Deposits, 4, Geol. 111
Mechanics 10, 6, Mech. 9
Mechanics 14, Met. Plant, 2, Mech. 11
Metallurgy 6, Ore Dressing, 4, Met. 5 and 13
Metallurgy 14, Ore Dressing, Lab. 4, Met. 5 and 13
Mining 10, 5, Min. 9
Mining 4, Mine Mapping, 6, Min. 2f
Field Work. Months of May, June, July, and August
Metallurgy 6f, beginning about May 1
Mining 10f, beginning about May 15
Practical work in mills and smelters beginning about June 1

SENIOR YEAR

First Semester

Electrical Engineering, 53, Electric Power, 5, Physics, 3, 4
Mechanics 13, Water Power, 5, Mech. 10
Metallurgy 7, Ore Testing, 10, Met. 5, 6, 106
Metallurgy 11, Thesis, 8, Met. 106, Met. 5, 6, and 13
Metallurgy 109, Electrometallurgy, 8, Met. 3, 4, 105, 106

Second Semester

Metallurgy 8, Special Problems, 8, Met. 7
Metallurgy 10, Advanced Metallurgy 10, Met. 7
Metallurgy 16, Thesis, 18, Met. 11

Four-Year Courses

JUNIOR YEAR

First Semester

Geology 73, Historical and Economic Geology, 3, Geol. 106, 1b
Mechanics 9, 5, Math. 8
Mechanics 11, Mine Plant 5, Math. 8
Metallurgy 105, Base Metals, 5, Met. 4
Metallurgy 5, Ore Dressing, 4, Geol. 23 and 24
Metallurgy 13, Ore Dressing Lab. 4, Geol. 23 and 24
Metallurgy 153, Metallography 7, Chem. 12, Physics 1 and 2
Mining 9, 5, Min. 6

Second Semester

Mechanics 10, 6, Mech. 9
Mechanics 14, Met. Plant 2, Mech. 11
Metallurgy 6, Ore Dressing 4, Met. 5 and 13
Metallurgy 14, Ore Dressing Lab. 4, Met. 5 and 13
Metallurgy 106, Precious Metals, 5, Met. 105
Metallurgy 154, Metallography 7, Met. 153
Mining 10, 5, Min. 9
Mining 4, Mine Mapping, 6, Min. 2f
Field Work. Months of May, June, July, and August
Metallurgy 6f, beginning about May 1
Mining 10f, beginning about May 15
Practical work in mills and smelters beginning about June 1

SENIOR YEAR

First Semester

Electrical Engineering 53, Electric Power, 5, Physics 3, 4
Geology 111, Ore Deposits, 4
Mechanics 13, Water Power, 5, Mech. 10
Metallurgy 7, Ore Testing 10, Met. 5, 6, 105, and 106
Metallurgy 11, Thesis, 8, Met. 106, Met. 5, 6, and 13
Metallurgy 109, Electrometallurgy, 8, Met. 3, 4, 105, and 106

Second Semester

Geology 112, Problems in Ore Deposits, 4
Metallurgy 8, Special Problems, 8, Met. 7
Metallurgy 10, Advanced Metallurgy 10, Met. 7
Metallurgy 16, Thesis, 18, Met. 11

DEPARTMENT OF METALLURGY

This department is well supplied 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 ores, furnace and mill products, and bullion; different charges are tried and practical conclusions drawn.

Great importance is attached to the work in the laboratory. A large, well-ventilated furnace room in which are located muffle and crucible furnaces, and another room of similar dimensions equipped with desks, pulp and bead balances, afford accommodations to a large number of students. Ores of various metals of known value are given the students who are required to make up the necessary charges and submit their reports in detail. This work is offered to students completing the necessary courses in Mineralogy and Chemistry.

ORE DRESSING

The lectures and recitations in Ore Dressing extend through the junior year, and comprise 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 laboratory and testing plant of the School is utilized for practical illustrations.

ORE TESTING

The lectures treat of the use and purposes of all the machinery connected with the subject, supplemented by detailed drawings. There are complete testing works, connected with the department where the student may see the working of, and handle for himself crushers, rolls, and concentrating machinery, 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 courses run through the senior year and are 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 principal 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.

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, 94 by 66 feet, is built of brick and stone.

FIELD WORK IN METALLURGY

At the end of the junior year students are required to study practical operations at one or more smelters and mills. This work will begin about May 1. Not over three weeks' time will be devoted to this work.

Upon termination of the junior field work in Metallurgy and one week in Mining (not later than June 1), the members of the junior class who are candidates for the Degree of Metallurgical Engineer, are required to spend at least six weeks in practical work in one or more of the smelters or mills, for which they may receive wages. The department will render all possible assistance in locating students in districts of their choice. Each student must keep a diary and record therein, in minute detail, all observations and sketches. He must, in person, submit this diary to the department on the date of reopening of field work at the School. In judging the character of the student's field work equal importance will be attached to the completed report and to the original field notes. The department reserves the right to reject note-books considered below standard.

Field work will reopen at the School of Mines, Tuesday, October 2, 1917. No senior will be registered after that date. Registration will cover Field Work, Electric Power, and Geology.

The final reports covering field work in Metallurgy and Mining must be prepared at the School of Mines under the direct supervision of the departments concerned. The program covering this work is as follows: Metallurgy, October 2-9, inclusive; Mining and Mine Plant, October 10-22.

On October 22 all seniors who expect to graduate must register for the remaining subjects. Prior to this date the student must submit a typewritten report on field work fully illustrated with drawings, to scale, made from the field sketches, covering metallurgical and milling opera-

tions, and details of plant and equipment. Final registration will not be allowed until after reports on field work are accepted. All final reports, therefore, must be presented on or before October 22. These reports shall become the property of the School.

METALLOGRAPHY

Courses in Metallography are offered to seniors who are candidates for the degree of Metallurgical Engineer, students in the Colleges of Science, Literature, and the Arts, Engineering, Chemistry, and the Graduate School.

These courses deal with the microscopic examination of metals, alloys, and ores. The lectures treat of and describe the apparatus used in connection with this subject, the methods of preparing specimens, the physical, chemical, and metallurgical principles involved, and the interpretation of the results of microscopic examination. A collection of specimens, microphotographs, and lantern slides covering wrought iron, low carbon, structural, rail, and tool steels, brasses, bronzes, and other industrial alloys are available for study and comparison. The laboratory course includes the microscopic and pyrometric study of metals, alloys, and ores. The laboratory is equipped with microscopes, electric and portable gas furnaces, and pyrometers of the latest and improved types. A special dark room is available for the preparation of microphotographs.

DEPARTMENTAL STATEMENTS

EXPLANATION OF COURSE NUMBERS

Odd numbers indicate first-semester courses; even numbers, second-semester courses. A combination of the two (e.g., 5-6) indicates courses continuing through the year. The suffixes *a* and *b* apply to one-semester courses offered both semesters, *a* indicating the first semester and *b* the second semester (e.g., 3a,b; 4a,b). The suffix *f* indicates summer field work.

All undergraduate courses are numbered from 1 to 100. All courses open to undergraduates and graduates are numbered from 101 to 200. Strictly graduate courses are numbered from 201 up.

CHEMISTRY

Professors GEORGE B. FRANKFORTER, CHARLES F. SIDENER; Assistant Professor STERLING TEMPLE; Instructor GERHARD DIETRICHSON; Assistant ARNOLD KIRKPATRICK.

COURSES

No.	Title	Lect. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
5.	Gen. & Anal. Chemistry.....	3	2	All Fr.	..
6.	Gen. & Anal. Chemistry.....	1	6	All Fr.	5
11.	Quantitative Analysis	1	6	All Soph.	6
12.	Quantitative Analysis	1	6	All Soph.	11
24.	Iron & Steel Analysis.....	1	6	Elective	12
25.	Ore & Slag Analysis.....	1	6	Elective	12
144.	Electrochemistry	1	4	Elective	12

5-6. GENERAL AND ANALYTICAL CHEMISTRY. An introduction to descriptive, physical, and metallurgical chemistry and qualitative analysis. FRANKFORTER, TEMPLE, and Assistants.

11-12. QUANTITATIVE ANALYSIS. A general discussion of quantitative methods, with laboratory work in gravimetric analysis, first semester; followed by a discussion of standard solutions and the necessary stoichiometric calculations with laboratory work in volumetric analysis, second semester. SIDENER, and Assistants.

24. IRON AND STEEL ANALYSIS. Includes technical methods for the determination of the common constituents of iron ores, iron, and steel, with training in rapid work. SIDENER, and Assistants.

25. ORE AND SLAG ANALYSIS. Rapid technical method for the determination of certain constituents in ores and slags. SIDENER.

144. ELECTROCHEMISTRY. A discussion of electro-analytical methods and industrial electrochemical processes, and their underlying principles. DIETRICHSON.

DRAWING AND DESCRIPTIVE GEOMETRY

Professor WILLIAM H. KIRCHNER; Assistant Professor ROBERT W. FRENCH; Instructor HOWARD D. MYERS.

COURSES

No.	Title	Lect. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
11.	Engineering Drawing	..	10	All Fr.	..
12.	Engineering Drawing	..	8	All Fr.	11
13.	Descriptive Geometry	2	..	All Soph.	12, Math. 6
14.	Drafting	..	4	All Soph.	13

11. ENGINEERING DRAWING. Sketching, lettering, representation, parallel and radial projection, elements of engineering representation, details of machines and structures, interpretation of working drawings. KIRCHNER, MYERS.

12. ENGINEERING DRAWING. Continuation of Course 11 as outlined above. The elements of general drafting, mechanical drawing as a language. Lines, views, dimensions, standards, signs, abbreviations, and explanatory notes. Maps and sketches. Brushes and pen conventions. MYERS.

13. DESCRIPTIVE GEOMETRY. Projection; central and special cases, principles and applications, representation of lines, planes, and solids, and of their relations; tangencies, intersections, and developments. Recitations, lectures, and solution of problems. KIRCHNER.

14. DRAFTING. Graphics, machine drafting, and structural drafting. Instruction in drafting room methods. FRENCH.

ELECTRICAL ENGINEERING

Professor GEORGE D. SHEPARDSON; Assistant Professor WILLIAM T. RYAN.

COURSES

No.	Title	Lect. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
53.	Electric Power	2	2	Sr. E. M. & Met. E.	Physics 3, 4

53. ELECTRIC POWER. Elements of theory and practice of electrical measurements, wiring, dynamos, motors, and electric lighting. RYAN.

EXPERIMENTAL ENGINEERING

Assistant Professors CHARLES F. SHOOP, FRANKLIN R. MCMILLAN, FRANK B. ROWLEY.

COURSES

No.	Title	Lect. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
21.	Steam Laboratory	..	4	Jr. E. M. & Met. E.	With Math. 11
22.	Strength of Materials	..	4	Jr. E. M. & Met. E.	With Math. 10
24.	Experimental Laboratory	..	4	Sr. E. M. & Met. E.	21

21. STEAM LABORATORY. Exercises in valve setting, indicator practice, calibration of steam gauges, efficiency of screws and hoists. SHOOP.

22. STRENGTH OF MATERIALS. Laboratory work, investigating the strength and physical qualities of iron, steel, brass, cropper, belting, chains, beams, brick, and stone. MCMILLAN.

24. EXPERIMENTAL LABORATORY. Hydraulic measurements. Calibration of weirs, nozzles, meters, and other hydraulic apparatus, calorimetry; tests of pumps, engines, and boilers. ROWLEY.

GEOLOGY AND MINERALOGY

Professor WILLIAM H. EMMONS; Associate Professors CLINTON R. STAUFFER, FRANK F. GROUT; Assistant Professors A. WALFRED JOHNSTON, TERENCE T. QUIRKE; Instructor THOMAS M. BRODERICK.

COURSES

No.	Title	Lect. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
1b.	General Geology	3	..	All Soph.	24
1f.	Field Work	..	2 wks.	All Soph.	1b and 105
11.	Paleontology	3	..	Sr. E. M. (Geol.)	1b
12.	Paleontology	3	..	Sr. E. M. (Geol.)	11
23.	Elements of Mineralogy	4	4	All Fr.	..
24.	Descriptive Mineralogy	2	2	All Fr.	23
73.	Histor. & Econ. Geology	3	..	All Jr.	1b and 105
105.	Elements of Rock Study	..	4	All Soph.	24
106.	Petrology	..	4	All Soph.	105b
111.	Ore Deposits	4	..	Sr.E.M.&E.M.(Geol.)	106
112.	Problems in Ore Deposits	..	4	Sr.E.M.&E.M.(Geol.)	111
124.	Struct. & Metamorph. Geol.	3	..	Jr. E. M. (Geol.)	73 and 105
131.	Advanced Petrology	2	3	Jr. E. M. (Geol.)	106, 1b
132.	Advanced Petrology	2	3	Jr. E. M. (Geol.)	131
137.	Testing Econ. Minerals	1	4	Elective	24, 73
140.	Applied Petrology	1	4	Elective	See statement
144.	Construction & Interpretation of Geologic Maps	..	4	Elective	73
150.	Field Geology	..	..	Jr. E. M. (Geol.)	124
151.	Advanced General Geology	3	..	Jr. E. M. (Geol.)	73
152.	Advanced General Geology	3	..	Jr. E. M. (Geol.)	151
246.	Pre-Cambrian Geology	3	3	Elective	124
247.	Geol. & Exploration of Lake Superior region	3	..	Elective	124

1b. GENERAL GEOLOGY. A synoptical treatment of materials of the earth and of geologic processes. Physiographic, dynamic, and structural geology, with a brief introduction to Historical Geology. JOHNSTON.

1f FIELD WORK. About two weeks in June are spent in geologic mapping of selected areas in the iron districts of Minnesota. Involves preparation of geologic maps, and written reports.

11. PALEONTOLOGY. A study of fossil forms with special reference to those of geological importance. STAUFFER.

12. PALEONTOLOGY. Faunas and their correlation. A continuation of Course 11. STAUFFER.

23. ELEMENTS OF MINERALOGY. The crystal systems; morphological, physical, and chemical character of minerals; occurrence, genesis, and uses of minerals; classifications and description of common minerals. Determinative work in laboratory, blowpipe analysis, sight identification. BRODERICK, GROUT.

24 DESCRIPTIVE MINERALOGY. A continuation of Course 23, special attention being given to metalliferous and rock-forming minerals. Laboratory determination and sight identification. The use of the goniometer and microscope. Laboratory work, reference reading, and field excursions. BRODERICK, GROUT.

73. HISTORICAL AND ECONOMIC GEOLOGY. (a) Historical Geology. The geologic history of North America, with special reference to its syngenetic mineral deposits. (b) Economic Geology. A study of the non-metallic minerals of economic value, and discussions of the geologic guides to prospecting for these deposits. EMMONS, QUIRKE.

105. ELEMENTS OF ROCK STUDY. The occurrence and genesis of igneous sedimentary, and metamorphic rocks; their mineral and chemical composition; their structure, texture, and alteration. The classification and methods of identification and description of rocks. GROUT, BRODERICK.

106. PETROLOGY. The identification and study of minerals and rocks by optical methods; the study of igneous rocks, crystalline schists, and metamorphic rocks. The origin and classification of rocks. GROUT, BRODERICK.

111. ORE DEPOSITS. The nature, distribution, and genesis of ore deposits of the United States; relations of ore deposits to geologic structure; the deformation and superficial alteration of ore deposits. EMMONS.

112. PROBLEMS IN ORE DEPOSITS. Field excursions, map work, lectures on field and laboratory methods. EMMONS.

124. STRUCTURAL AND METAMORPHIC GEOLOGY. The conditions, processes, and results of metamorphism; structural features resulting from deformation under varying conditions of load. JOHNSTON.

131-132. ADVANCED PETROLOGY. Advanced optical methods. Criteria for rapid identification of minerals and rocks. The uses of schedules and tables. Standard rock types. Regional and genetic studies. Petrographic reports. GROUT.

137. TESTING ECONOMIC MINERALS. Methods of determining quality of mineral deposits, described and illustrated by laboratory tests of coal, oil, building stone, and metallic ores. GROUT.

140. APPLIED PETROLOGY. To follow or accompany Course 132. Determination of transparent and opaque ores and gangue minerals. Microscopic studies of paragenesis of ores and other mineral associations by means of reflecting light. Practical petrographic problems. GROUT.

144. CONSTRUCTION AND INTERPRETATION OF GEOLOGIC MAPS. Hours to be arranged. Methods of geologic examination; problems in construction and interpretation of geologic maps and sections, with special reference to underground mapping of metalliferous areas. QUIRKE.

150. FIELD GEOLOGY. Detailed and systematic work conforming with standards of official surveys. Preparation of geologic maps, structure sections, and reports; a study of the paragenesis of ores and their relations to geologic structures. Field for 1917-18, Black Hills, South Dakota. JOHNSTON, EMMONS.

151. ADVANCED GENERAL GEOLOGY. Geologic processes and their results; development of the North American continent. STAUFFER.

152. ADVANCED GENERAL GEOLOGY. A continuation of Course 151. STAUFFER.

246. PRE-CAMBRIAN GEOLOGY. The problems of pre-Cambrian correlation and structure; the pre-Cambrian stratigraphy of North America. Given in alternate years. Three credits. Not offered in 1916-17. JOHNSTON.

247. GEOLOGY AND EXPLORATION OF LAKE SUPERIOR REGION. The geology of the Lake Superior iron districts. The methods used in the exploration of iron ore; interpretation of drill cores; cartographic expression of drill data; models of drilled areas. The principles of magnetic surveying. Three credits. JOHNSTON.

GERMAN LANGUAGE AND LITERATURE

Professor CARL SCHLENKER; Assistant Professors OSCAR C. BURKHARD, SAMUEL KROESCH, WALTER R. MYERS; Instructors JAMES DAVIES, LYNWOOD G. DOWNS, J. THEODORE GEISSENDOERFER, RICHARD WISCHKAEMPER.

COURSES

No.	Tile	Rec. hrs.	Required of	Prerequisite courses
1a,b.	Beginning	6	Jr. E. M. (Geol.)	..
3a,b.	Intermediate	6	Jr. E. M. (Geol.)	1a,b.
5-6.	Prose and Poetry	6*	Elective	2 yrs. prep. German
11-12.	Rapid Reading	6*	Elective	3a or 3b
21-22.	Scientific Intermediate	6*	Elective	1-3 or equivalent
23-24.	Adv. Scientific Reading	6*	Elective	5-6 or 4 yrs. prep. Ger.

* Both semesters must be completed before credit is given for either semester.

1a,b. BEGINNING. Double course. Pronunciation, grammar, conversation, and composition; selected readings in easy prose and verse. KROESCH, MYERS.

3a,b. INTERMEDIATE. Double course. Selected texts in modern narrative and descriptive prose; selected lyrics and ballads; a drama of Lessing, Goethe, or Schiller. Assigned reading of texts outside of class. KROESCH, MYERS, FRARY.

5-6. PROSE AND POETRY. Geography, history, and legend. Review of German grammar throughout the year. BURKHARD, DOWNS.

11-12. RAPID READING. First semester: narrative prose; Hauff, Storm, Sudermann, Goethe's *Hermann und Dorothea*. Second semester: Plays of Lessing, Goethe, Schiller, Hebbel. Assigned readings and reports. DAVIES.

21-22. SCIENTIFIC INTERMEDIATE. This course aims to give students a reading knowledge of German for use in scientific studies. Wait's German Science Reader (or equivalent). GEISSENDOERFER, GRAVES.

23-24. ADVANCED SCIENTIFIC READING. Reading of monographs and periodicals. Not open to those who have credit for Course 7-8. May be supplemented by Course 20-30. WISCHKAEMPER.

MECHANICAL ENGINEERING

Professor JOHN J. FLATHER; Assistant Professor S. CARL SHIPLEY; Instructors EDWARD QUIGLEY, WILLIAM H. RICHARDS.

COURSES

No.	Title	Lab. hrs.	Required of	Prereq. courses
1a.	Pattern Making	6 (9 wks.)	1st-yr. E. M. & Met. E.	..
1b.	Foundry	6 (9 wks.)	1st-yr. E. M. & Met. E.	..
1c.	Forge	6 (9 wks.)	1st-yr. E. M. & Met. E.	..
1d.	Machine & Bench work	6 (9 wks.)	1st-yr. E. M. & Met. E.	..

1a. PATTERN MAKING. Use of tools, lathe and bench work, making of timber joints, core boxes, and flasks. RICHARDS.

1b. FOUNDRY. Molding, core making, mixing and casting metals. QUIGLEY.

1c. FORGE. Use of tools, forging, welding, tool dressing and tempering. QUIGLEY.

1d. MACHINE AND BENCH WORK. Use of tools and elementary machine operations. SHIPLEY.

METALLURGY

Professors WILLIAM R. APPLEBY, PETER CHRISTIANSON, LEVI B. PEASE; Assistant Professor SAMUEL L. HOYT; Instructor ERVIN W. MCCULLOUGH.

COURSES

No.	Title	Lect. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
2.	Assaying	4	8	All Fr.	Chem. 5, Mineral, 23
3.	Gen. Met. & Iron & Steel	3	..	Soph. E. M. & Met. E.	2, Chem. 6
4.	Wrought Iron & Steel	3	..	Soph. E. M. & Met. E.	3
5.	Ore Dressing	4	..	All Jr.	..
6.	Ore Dressing	4	..	All Jr.	..
6f.	Field Work in Metallurgy	..	10 dys	Jr. E. M. & Met. E.	Satisfactory completion of Jr. year
7.	Ore Testing	2	8	Sr. E. M. & Met. E.	106, 5
8.	Special Problems in Ore Testing	..	4	Sr. E. M. & Met. E.	7
10.	Advanced Metallurgy	2	8	Sr. Met. E.	7
11.	Thesis in Metallurgy	..	8	Sr. Met. E.	106, 5
13.	Ore Dressing Lab.	..	4	Jr. Met. E.	Geol. 23 & 24
14.	Ore Dressing Lab.	..	4	Jr. Met. E.	5 & 13
16.	Thesis & Specifications	..	18	Sr. Met. E.	11
105.	Met. of Base Metals	4	..	Jr. E. M. & Met. E.	4
106.	Met. of Precious Metals	4	..	Jr. E. M. & Met. E.	105
109.	Electrometallurgy	3	..	Sr. Met. E.	2, 4, 105, 106
153.	Metallography	3	4	Jr. Met. E.	Chem. 12, Phys. 1 & 2
154.	Metallography	3	4	Jr. Met. E.	Met. 153
157.	Metallog. for Engineers	3	4	Elective	Mech.Eng.3 & 4
158.	Adv. Met. for Engineers	3	4	Elective	Met. 157
160.	Metallog. for Chemists	2	2	Elective	Chem. 12
161.	Dental Metallography	3	..	Elective	..
163.	Advanced Metallog.	To be ar.		Elective	Met. 154
164.	Advanced Metallog.	To be ar.		Elective	..

2. ASSAYING. Determination of values of ores, metallurgical products, and bullion. APPLEBY and Assistants.

3. GENERAL METALLURGY AND METALLURGY OF IRON. Including the subjects of combustion, fuels, refractory materials and furnaces. Lectures and recitations on metallurgy of iron. CHRISTIANSON.

4. METALLURGY OF WROUGHT IRON AND STEEL. Puddling and hearth processes for the production of wrought iron. Cementation, crucible, Bessemer and open hearth processes for the production of steel. General principles and construction of furnaces. CHRISTIANSON.

5-6. ORE DRESSING. Examination of ores, crushing, sizing classification, and methods of mechanical separation. McCULLOUGH.

6f. FIELD WORK IN METALLURGY. Study of metallurgical operations at smelters and mills. Detailed report is required covering plants visited. CHRISTIANSON, PEASE.

7. ORE TESTING. Determinations of methods of ore treatment, stamping, concentration, cyanidation, roasting, amalgamation and flotation. CHRISTIANSON and Assistants.

8. Special Problems in Ore Testing. Continuation of Course 7. Assay of mill and smelter products so as to regulate smelting charges and roasting operations. Pease and Assistants.

10. Advanced Metallurgy. Pyrometry, calorimetry, metallurgical calculations to determine heat distribution and heat balance. Christianson.

11. Special Problems in Metallurgy. Research work preparatory to thesis. Appleby and Assistants.

13-14. Ore Dressing Laboratory. Practical problems in crushing, sizing, classification and concentration of minerals. McCullough.

16. Thesis and Specifications. Detailed investigations of ore treatment, with report including designs and specifications for suitable plants. Appleby and Assistants.

105. Metallurgy of the Base Metals. Lead, copper, zinc, and mercury. Consideration of smelting methods and principles involved in refining methods. Pease.

106. Metallurgy of the Precious Metals. Gold, silver, and platinum. Methods and principles of cyanidation, chlorination, amalgamation, and lixiviation as applied to the treatment of the above. Pease.

109. Electrometallurgy. Application of electricity to the production of heat for the smelting of ores and refining of metals. Comparative costs of the use of fuel and electricity for heating purposes, relative efficiencies of electric and fuel furnaces. Construction of high temperature furnaces and commercial plants. Christianson.

153-154. Metallography. Theory of metallic alloys. Metallographic technique. Properties of metals and alloys. Metallography of iron and steel and commercial alloys. Technical metallography. Hoyt.

157. Metallography for Engineering Students. Metallurgy of iron and steel. Microscopic and thermal analysis of steel and cast iron; heat and mechanical treatment. Laboratory work. Hoyt.

158. Advanced Metallography. Continuation of Met. 157. Metallography applied to engineering practice; commercial heat treatment; uses and properties of alloy steels. Engineering specifications involving the use of metals and alloys. Laboratory work. Hoyt.

160. Metallography for Chemical Students. The preparation of metallic alloys; their microscopical and thermal analysis. Steel and other commercial alloys with particular reference to chemical metallurgy. Corrosion of steel and non-ferrous alloys. Metallography applied to analytical chemistry. Hoyt.

161. Dental Metallography. Study of the dental alloys from the standpoint of metallography. Hoyt.

163-164. ADVANCED METALLOGRAPHY. Technical and scientific research. The study of steel rails, automobile and locomotive parts, tool steels etc. Special problems in metallography with outside reading. Seminar work on the recent advances in metallography. HOYT.

MINE PLANT AND MECHANICS

Professor ELTING H. COMSTOCK; Assistant Professor EDWIN M. LAMBERT; Instructors EDWARD W. DAVIS, CHARLES H. CLEVENGER.

COURSES

No.	Title	Lect. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
1.	Computation & Mensuration.	3	..	All 1st-yr. students	..
3.	Mine Accounting	..	6	All 1st-yr. students	..
4.	Algebra	4	..	All 1st-yr. students	..
5.	Algebra & Trigonometry.....	6	..	All Fr.	1 & 2
6.	Spherical Trig. & Anal. Geom.	6	..	All Fr.	5
7.	Calculus	5	..	All Soph.	6
8.	Calculus	3	..	All Soph.	7
9.	Mechanics	5	..	All Jr.	8
10.	Mechanics	6	..	All Jr.	9
11.	Mine Plant	5	..	Jr. E. M. & Met. E.	8
12.	Mine Plant	6	..	Jr. E. M.	11
13.	Hydraulics & Water-Power..	5	..	All Sr.	10
14.	Metallurgical Power Plant..	2	..	Jr. Met. E.	11
15.	Engineering Construction ...	1	4	Sr. E. M. & Met. E.	10
16.	Mine Plant Design.....	..	10	Sr. E. M.	15
18.	Mill and Smelter Design....	..	6	Sr. Met. E.	15

1 COMPUTATION AND MENSURATION. Demonstrations of most important theorems of solid geometry. Volumes, approximate volumes, prismoidal formula, etc. Approximate computation, graphs, and graphical computation, logarithms and logarithmic computation, areas and approximations of areas, use of slide rule. CLEVENGER.

3 ELEMENTARY MINE ACCOUNTING. Elementary accounting in general; applications to mine accounts; primary records, labor, supply, mine and mill products, and fund sheets; secondary records, invoice, labor and supply, mine and mill cost sheets, trial balance. LAMBERT.

4. ALGEBRA. Equations with one, two, or more unknown quantities, inequalities, involution and evolution, theory of exponents, surds, quadratic equations both numerical and literal, equations with one or more unknown quantities that can be solved by means of quadratic equations, progressions. CLEVENGER.

5 ALGEBRA AND TRIGONOMETRY. Functions and functional notation, factor and remainder theorems, factors and values of functions, determinants, development of functions, theory of equations, permutations and combinations; trigonometric ratios, right triangles, general definitions of trigonometric functions, analytic relations, addition formulas, trigonometric equations, and oblique triangles. CLEVENGER.

6. SPHERICAL TRIGONOMETRY AND ANALYTICAL GEOMETRY. General properties and solution of spherical triangles; systems of coördinates, loci-equations and properties of the straight line, transformation of coordinates, equations and properties of conics, general equations of the second degree, higher plane curves, space coördinates, point, plane, straight line, quadric surfaces. CLEVENGER.

7. CALCULUS. Nature of differentiation, elementary forms, geometric applications, rates, successive differentiation, maxima and minima, expansion of functions, indeterminate forms, partial derivatives, change of variable. LAMBERT.

8. CALCULUS. Elementary integration, undetermined coefficients, rational fractions, rationalization, formulas of reduction, hyperbolic functions, some differential equations of mechanics. LAMBERT.

9. MECHANICS. Composition and resolution of forces, laws of equilibrium, practical applications, rectilinear motion, circular motion, curvilinear motion in general, dynamics of rigid bodies, impact, work and energy; elementary mechanics of materials. CLEVENGER.

10. MECHANICS. Mechanical and elastic properties of materials of construction; beams, shafts, columns, reinforced concrete, hollow cylinders and spheres, rollers, plates; theory of internal stress. CLEVENGER.

11-12. MINE PLANT. Discussion of the machinery and appurtenances employed in the equipment of mines. Air compression, mechanical features of hoisting, pumping, ventilation, underground transportation. Electricity applied to mining. COMSTOCK.

13. HYDRAULICS AND WATER-POWER. Laws of the equilibrium, pressure, and flow of liquids, estimation of power to be developed at a power site, dams and appendages, theory of water wheels and turbines, speed control, power-house equipment, transmission. COMSTOCK.

14. METALLURGICAL PLANT. Power, air, and water supply for metallurgical plants. COMSTOCK.

15. ENGINEERING CONSTRUCTION. Theory of structures, loading, analytic and graphic resolution of stresses in framed structures, stresses in mining structures, design of mining structures. LAMBERT.

16. MINE PLANT DESIGN. A study of power possibilities, costs, etc., and designs of a power plant, surface equipment, and structures for a mine. COMSTOCK.

18. MILL AND SMELTER DESIGN. A study of the construction and mechanical equipment of mills and smelters in connection with thesis work. COMSTOCK.

MINING ENGINEERING

Associate Professor JOHN F. MURPHY; Instructor ANDERS J. CARLSON.

COURSES

No.	Title	Lect. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
1.	Mine Surveying	3	..	All Soph.	Math. 6
2.	Mine Surveying	3	..	All Soph.	1
2f.	Field Work	..	7 wks.	All Soph.	2
4.	Mine Mapping	..	6	All Jr.	2f
6.	Mining	1	..	All Soph.	..
9.	Mining	5	..	All Jr.	6
10.	Mining	5	..	All Jr.	9
10f.	Practical Mining	..	2 wks.	All Jr.	Satisfactory completion of Jr. yr.
11.	Mining	5	..	Sr. E. M. & E. M. (Geol.)	10
12.	Mining	5	..	Sr. E. M. & E. M. (Geol.)	11
13.	Thesis	..	2	Sr. E. M.	10f
14.	Thesis	..	12	Sr. E. M.	13

1, 2. MINE SURVEYING. Computation, platting, and problems with special reference to mine surveying. LAMBERT.

2f. FIELD WORK. Practice in general surveying during the month of May. Practice in underground surveying during the first two weeks of June. This work is given on the Iron Ranges. LAMBERT, CARLSON.

4. MINE MAPPING. Mine mapping in accordance with prevalent practice in the western mining districts. Ore and stripping estimates and mine maps based on Mesabi Range practice. MURPHY, CARLSON.

6 MINING. Introductory course in mining. MURPHY.

9. MINING. Occurrence of ore bodies, prospecting, churn and diamond drilling, drilling, blasting, excavation, tunneling and drifting. MURPHY.

10. MINING. Shaft sinking, underground mining methods, support of underground excavation. MURPHY.

10f. PRACTICAL MINING. Study of mining operations. Mine plant and equipment and practical mining work; a mine to be selected by department during months of May, June, July, and August. MURPHY, COMSTOCK, and Assistants.

11. MINING. Open pit mining, quarrying, coal mining, mining alluvial deposits. MURPHY.

12. MINING. Drainage, transportation, ventilation, mine sanitation and hygiene, mine examination, mine management, mining law, economics of mining. MURPHY.

13, 14. THESIS. Conference. Design and specifications of mining details required in thesis study. MURPHY and Assistants.

PHYSICS

Professors HENRY A. ERIKSON, ANTHONY ZELENY; Instructor ERNEST O. DIETERICH.

COURSES

No.	Title	Lect. or rec. hrs.	Lab. hrs.	Required of	Prereq. courses
1.	General Physics	3	..	All Soph.	Math. 6
2.	General Physics	3	..	All Soph.	1
3.	General Lab. Practice	..	2	All Soph.	With 1
4.	General Lab. Practice	..	2	All Soph.	With 2

1. GENERAL PHYSICS. Mechanics of solids and fluids, sound and heat. Treatment experimental rather than mathematical; the fundamental principles. ZELENY, DIETERICH.

2. GENERAL PHYSICS. Electricity, magnetism, and light. Treatment experimental; the fundamental principles, including those of radioactivity, ionization, X-radiation, and the electrical constitution of matter. ZELENY, DIETERICH.

3. GENERAL LABORATORY PRACTICE. Physical measurements in the mechanics of solids and fluids, and in heat and sound, giving the student a knowledge of experimental methods, and an intimate acquaintance with the fundamental facts of the subject. DIETERICH.

4. GENERAL LABORATORY PRACTICE. Physical measurements in electricity, magnetism, and light. DIETERICH.

ROMANCE LANGUAGES

Professor EVERETT WARD OLMSTED; Assistant Professor JULES T. FRELIN; Instructors EDWARD H. SIRICH, FRANCIS B. BARTON, HARRY E. ATWOOD.

COURSES

No.	Tile	Rec. hrs.	Required of	Prereq. courses
1b.	Beginning French	6	Jr. E. M. (Geol.)	..
3b.	Intermediate French	6	Jr. or Sr. E. M. (Geol.)	1b
5.	Survey French Lit.	3	Sr. E. M. (Geol.)	3b
6.	Survey French Lit.	3	Sr. E. M. (Geol.)	5

1b. BEGINNING FRENCH. Stress on accurate pronunciation, reading, reading vocabulary, and the essentials of grammar. Daily oral and written exercises (dictation and reproduction in French). FRELIN, SIRICH, ATWOOD, BARTON.

3b. INTERMEDIATE. French grammar, composition, and reading; increased use of French in the classroom. Selections from modern prose and poetry. FRELIN, ATWOOD, SIRICH, BARTON.

5-6. GENERAL SURVEY OF FRENCH LITERATURE. Lectures, recitations, and assigned readings. Designed to cover the whole period in historical outline. Selections from representative authors. SIRICH, ATWOOD, BARTON.

STUDENTS

SENIORS—15

Anderson, Edwin H., Oakes, N. D.
Cassilly, Thomas E., St. Paul
Coryell, Lewis S., Osceola, Wis.
Dennis, Richard C., Ashland, Wis.
Dopp, Lawrence, Ashland, Wis.
Elson, William H., St. Paul
Ernster, Omer F., Brainerd
Fearing, Edward J., Little Falls, Minn.
Hubbard, William E., Duluth
Kwong, Yih-Kum, Shanghai, China
Levorsen, A. Irving, Fergus Falls
Peterson, Paul A., St. Paul
Sweetman, Edwin A., Aitkin
Wallace, Carleton S., Minneapolis
Woodruff, John J., Minneapolis

JUNIORS—20

Ainsworth, Robert E., Minneapolis
Allard, Raymond W., St. Paul
Armstrong, Harold K., Minneapolis
Bailey, A. Kittredge, Minneapolis
Clark, Fred E., Minneapolis
Copeland, William A., St. Paul
Cowin, Percy G., Minneapolis
Dane, Carleton M., St. Paul
Dowdell, Ralph L., St. Paul
Foley, Lyndon L., Minneapolis
Frank, Harry, Minneapolis
Gannett, Roger W., Minneapolis
Hsieh, Chung, Kirin, China
Ingersoll, Guy E., Hibbing
Jerrard, Walter L., St. Cloud
McGilvra, Donald B., Minneapolis
Moga, John A., St. Paul
Nichols, Clifford R., Buhl
Quinn, Howard E., Melrose
Strand, Harry W., Marine Mills

SOPHOMORES—19

Abramson, Jake, Minneapolis
Barr, Joseph C., Riverton
Calhoun, Robert, Minneapolis
Berg, Locksley D., Dickinson, N. D.
Donaghue, Abner J., Minneapolis
Flom, Frank, Minneapolis
Frank, Elden J., Duluth
Frellsen, Sidney A., Minneapolis
Gandrud, Bennie W., Glenwood
Goldberg, Bert, St. Paul
Goldberg, Samuel B., St. Paul
Hosted, Joseph Orrin, Duluth
Mellem, Walter R., St. Paul
Miao, Yun Tai, Yunnanfu, China
Rockwell, Seass A., Fargo, N. D.
Sponberg, E. Clarence, Hibbing
Stark, James A., Duluth
Sullivan, Dan C., Stillwater
Wadsworth, Lawrence Hill, Minneapolis

FRESHMEN—19

ndersen, A. Clarence, Tyler
Arnold, Lewis E., Minneapolis
Bergsten, Axel, Florence, Wis.
Chadbourn, Charles H., Minneapolis
Davies, Herman F., Minneapolis
Donald, George A., Ashland, Wis.
Johnsen, Trygve, St. Paul
Johnston, Kenneth A., St. Paul
Mark, Israel C., Minneapolis
Mars, William P., Duluth
Munson, Arthur M., St. Paul
Olsen, Paul W., Minneapolis
Peterson, Clarence D. B., Minneapolis
Powers, Sheldon M., Minneapolis
Raiter, Clifford R., Minneapolis
Ringwood, Thomas E., Ashland
Rydlun, Edwyn G., Minneapolis
Thoeni, Victor T., Wyckoff, Minn.
Wheeler, James D., Minneapolis

FIRST YEAR—3

Carlson, Edwin N., Brainerd
Nelson, Ewart G., Kennedy
Plut, Frank J., Crosby

The Bulletin *of the* University *of* Minnesota

The College of Pharmacy Announcement for the Year 1917-1918

Catalog Series No. 11
Vol. XX No. 19 May 31 1917

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

1917

JULY

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

AUGUST

..	..	..	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
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

..	..	..	..	..	..	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	..	..	..	..	..

1918

JANUARY

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

FEBRUARY

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

MARCH

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

APRIL

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

MAY

..	..	..	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	..	..	..	..	..	..

JULY

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

AUGUST

..	..	..	..	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	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

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	..	..	..	..
..	..	..	..	..	..	..

The calendars appearing on pages 2, 3, and 4 are subject to change because of war conditions. It is entirely possible that the opening of the college year may be changed to October 10 or 17, the spring recess left variable, and the closing of the college year modified accordingly.

Announcement will be made through the newspapers of the state later in the year.

UNIVERSITY CALENDAR

1917-1918

1917			
September	12	Wednesday	Registration closes for all students
September	12-19	Week	Fees payable for all students
September	18-25	Week	Examinations for removal of conditions (except for Colleges of Pharmacy, Agriculture and Forestry), and entrance examinations
September	26	Wednesday	First semester begins
October	1	Monday	Agricultural College, farm experience examinations
October	1	Monday	First semester evening classes begin
October	1	Monday	School of Agriculture, first term begins
October	18	Thursday	Senate meeting, 4:00 p.m.
November	5	Monday	Dairy School opens
November	21	Wednesday	Medical School second quarter begins
November	28	Wednesday	Thanksgiving recess begins 9:00 p.m.
December	1	Saturday	Dairy School closes
December	3	Monday	Thanksgiving recess ends 8:00 a.m.
December	3-8	Week	Second semester condition examinations, Colleges of Agriculture and Forestry
December	3-8	Week	Short course for ice-cream makers
December	20	Thursday	Senate meeting, 4:00 p.m.
December	21	Friday	School of Agriculture, first term closes
December	21	Friday	Christmas vacation begins 9:00 p.m.
1918			
December / January	31 / 5	Week	Farmers' and Home Makers' Week Short Course
January	2	Wednesday	Christmas vacation ends 8:00 a.m.
January	2	Wednesday	School of Embalming begins, eight weeks' session
January	8	Tuesday	School of Agriculture, second term begins
January	23	Wednesday	Second semester registration closes
January	25	Friday	First semester evening classes close
January	28	Monday	Final examinations begin
January	30	Wednesday	Payment of fees for second semester closes
February	4	Monday	Second semester evening classes begin

February	4-9	Week	Merchants' Short Course
February	6	Wednesday	Second semester begins
February	11	Monday	Merchants' Short Course (three weeks) begins
February	12	Tuesday	Lincoln's Birthday; a holiday
February	21	Thursday	Senate meeting, 4:00 p.m.
February	22	Friday	Washington's Birthday; a holiday
March	2	Saturday	Merchants' Short Course (three weeks) closes
March	27	Wednesday	School of Agriculture closes
March	28	Thursday	Easter recess begins 9:00 p.m.
April	1-6	Week	Boys' and Girls' Week
April	3	Wednesday	Easter recess ends 8:00 a.m.
April	10	Wednesday	Medical School fourth quarter begins
April	8-13	Week	Condition examinations in certain colleges
April	30	Tuesday	Traction Engineering Short Course begins
May	16	Thursday	Senate meeting, 4:00 p.m.
May	25	Friday	Second semester evening classes close
May	30	Thursday	Memorial Day; a holiday
May	31	Friday	Traction Engineering Short Course closes
June	1	Saturday	Final examinations begin 2:00 p.m.
June	8	Saturday	Second semester closes
June	9	Sunday	Baccalaureate service
June	10	Monday	Senior Class Day exercises
June	12	Wednesday	Alumni Day
June	13	Thursday	Forty-sixth Annual Commencement
June	14	Friday	Summer vacation begins
June	17	Monday	Summer Session begins

The University year for 1918-19 will begin Tuesday, September 17. Classes will begin September 25.

THE COLLEGE OF PHARMACY

FACULTY

*George Edgar Vincent, Ph.D., LL.D., President 1005 5th St. S. E.
†Marion LeRoy Burton, D.D., Ph.D., LL.D., President 1005 5th St. S. E.
Cyrus Northrop, LL.D., President, Emeritus 519 10th Ave. S. E.
Frederick J. Wulling, Ph.G., Phm.D., LL.M., Dean, Professor of Pharmacology and Director of the University Medicinal Plant Gardens 3305 2nd Ave. S.
Gustav Bachman, Phm.D., Phm.M., Associate Professor of Pharmacy 2624 Fremont Ave. S.
Moses Barron, M.D., Assistant Professor of Clinical Microscopy 763 Holly St., St. Paul
Richard Olding Beard, M.D., Associate Professor of Physiology Hotel Hastings
Herbert F. Bergman, M.S., Assistant Professor of Botany 805 7th St. S. E.
Edgar D. Brown, Phm.D., M.D., Associate Professor of Pharmacology 3525 3rd Ave. S.
Frederick K. Butters, B.S., B.A., Assistant Professor of Botany 815 S. 7th St.
....., Professor of Botany
Louis J. Cooke, M.D., Director Physical Education for Men 909 6th St. S. E.
George B. Frankforter, Ph.D., Professor of Chemistry 525 E. River Road
Frank F. Grout, M.S., Assistant Professor of Geology and Mineralogy 617 4th St. S. E.
Ned L. Huff, M.A., Assistant Professor of Botany 1219 7th St. S. E.
William H. Hunter, Ph.D., Assistant Professor of Organic Chemistry 112 Church St. S. E.
Winford P. Larson, M.D., Associate Professor of Bacteriology 614 9th Ave. S. E.
Owen R. Meredith, Professor of Military Science and Tactics
George W. Moses, Major and Professor of Military Science and Tactics 1308 5th St. S. E.
Edwin L. Newcomb, P.D., Phm.M., Associate Professor of Pharmaceutical Botany and Pharmacognosy 719 6th Ave. S. E.
J. Anna Norris, M.D., Director Physical Education for Women 509 6th St. S. E.
Walter F. Rhinow, Brigade Adjutant 1022 16th Ave. S. E.

---

* Term of office ends June 30, 1917.
† Term of office begins July 1, 1917.

HAROLD E. ROBERTSON, B.A., M.D., Professor of Bacteriology 507 Essex St. S. E.
CHARLES H. ROGERS, B.S., Phm.M., Assistant Professor of Pharmaceutical Chemistry and Pharmacy 503 7th St. S. E.
CARL O. ROSENDAHL, Ph.D., Professor of Botany 2191 Commonwealth Ave., St. Paul
FREDERICK H. SCOTT, Ph.D., M.B., D.Sc., Associate Professor of Physiology 1307 6th St. S. E.
CHARLES F. SIDENER, B.S., Professor of Quantitative Chemistry 1320 5th St. S. E.
THEO. B. TAYLOR, Captain, Professor of Military Tactics and Science
JAMES B. WOOLNOUGH, Captain, Professor of Military Tactics and Science
ANNE H. BENTON, B.A., Instructor in Bacteriology 2024 Queen Ave. S.
OSCAR J. BLOSMO, Ph.C., M.S. in Phm., Instructor in Dispensing The Leamington
ROSCOE H. CARTER, B.A., M.S., Instructor in Chemistry 505 Washington Ave. S. E.
WILLIAM K. FOSTER, LL.M., Assistant Director Physical Education for Men 652 Erie St. S. E.
ARTHUR T. HENRICI, M.D., Instructor in Bacteriology 939 14th Ave. S. E.
MAY S. KISSOCK, B.A., Instructor, Physical Education for Women 521 6th St. S. E.
VALERIA G. LADD, B.A., Instructor, Physical Education for Women
EDWARD B. PECK, Ph.D., Instructor in Chemistry 329 19th Ave. S. E.
CHAUNCEY J. V. PETTIBONE, Ph.D., Instructor in Physiology 611 S. E. Delaware
BERT A. ROSE, Instructor of Band 710 7th St. S. E.
CARL L. SCHUMANN, Ph.D., Instructor in Chemistry 317 17th Ave. S. E.
HARVEY L. STALLARD, Ph.B., Assistant in Botany 805 S. E. 7th St.
ALICE H. TOLG, M.D., Instructor, Physical Education for Women 1200 W. 25th St.
JOHN C. WEST, B.S., Instructor, Physical Education for Men 411 17th Ave. S. E.
DONALD FOLSOM, M.A., Assistant in Botany 1110 S. E. 5th
C. NAUMANN MCCLOUD, Phm.D., M.D., Lecturer on First Aids to the Injured 524 Lowry Bldg., St. Paul
FLOYD E. JOYCE, B.A., Assistant in Chemistry 304 State St. S. E.
DEL D. TURNER, Ph.C., Assistant Laboratory Instructor 1205 5th St. S. E.

GENERAL INFORMATION

The twenty-sixth annual course of the College of Pharmacy begins and ends as per calendar on preceding pages.

ENTRANCE REQUIREMENTS

ADMISSION BY CERTIFICATE

Diplomas, certificates, or other evidences of the completion of a regular four-year high school course, or its educational equivalent, are required for admission. (In accordance with an informal agreement between the College and the State Pharmaceutical Association covering the period ending with 1920, in certain meritorious cases exceptionally good drug-store or pharmaceutical laboratory experience may be accepted in place of a minor fraction of high school work). While at present a diploma from an accredited high school admits to the College, prospective applicants are strongly urged to prepare themselves in four years of English, two years of Latin, two years of either German or French, higher algebra, plane geometry, physics, and botany and, if possible, chemistry and physiology. In the near future completion of these subjects will be made prerequisites to entrance.

ADMISSION BY EXAMINATION

Students may take examinations in subjects for which they have no certificates. A high school training covers fifteen units, a unit being a school year of standard work in a given subject. State High School Board certificates and College Entrance Examination Board certificates are accepted in lieu of examinations.

NEW STUDENTS

All applicants for admission should request their high school principals or superintendents to send a complete transcript of their records to the Registrar of the University as early as possible and not later than September 1. Upon receipt of the credentials the Registrar will notify the applicant concerning his admission and will forward directions for registration. See calendar, page 3, for registration dates.

OLD STUDENTS

In August the Registrar will send to all students who were in college the preceding year complete registration material. Those who fail to receive this by August 20 should write for proper blanks. See calendar for dates of registration and payment of fees.

FEES AND OTHER EXPENSES

The annual incidental fee of $55 includes all laboratory fees, and is payable, one half at the beginning of each semester. Certificates entitling the student to admission to classes will not be issued until the fees have been paid.

All students are required to pay the following fees:

Annual deposit covering all laboratories, etc.	$5.00
Minnesota Union membership, (required of men), a semester	1.00
Condition examination fee, each subject	1.00
Military uniform	18.00*
Gymnasium suit, for those electing this work	5.00

Those desiring to take special work may pay fees on a clock hour basis, the rate being $3 an hour; e.g., a student doing 15 hours of work a week throughout the semester, would pay $45.

GRADUATION REQUIREMENTS

Regular attendance at lectures, recitations, and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven eighths of the total work of the course.

Every person upon whom any degree is conferred must be of good moral character and at least twenty-one years old; must have attended three full lecture and laboratory courses, the last at this College, and must have passed examinations in the subjects required for graduation.

Drug-store experience is not a requirement for graduation.

ADVANCED STANDING

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies, and must pass the examinations of all departments in which they desire credit, if such examinations are deemed necessary by the professors in charge. Students will not be permitted to substitute private work in any branch for the regular course work.

UNCLASSED STUDENTS

Unclassed or special students may enter at any time provided there is laboratory room for them. They will not be rated in their work or examined unless they make special request therefor. Work completed will be credited should the students subsequently enter the regular course, providing they meet the full entrance requirements.

---

* Subject to change, depending on cost of material.

EXAMINATIONS AND STANDINGS

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 and practical tests and quizzes that are held at frequent intervals during the year, and, with them, form largely the basis of final determination of fitness for promotion or graduation.

The standing of students is indicated by the letters A, B, C, D, (A highest, D lowest passing mark), E (conditioned), I (incomplete), and F (failure). Conditions may be removed as indicated below. Incomplete work must be made up before the next final examination in the subject.

In order to become eligible for final examinations students are required to attend at least seven eighths of the lectures in each course. This does not apply to laboratory courses which must be taken in full and must be entered during the first week in which they begin.

Students having conditions in more than two major or in more than three minor subjects of the first year can not 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 and during the week following Easter vacation. The dates are usually posted in June and March. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given. A fee of one dollar is charged for a condition examination. Failure at the condition examination necessitates a repetition of the subject. Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

Absence will not be excused unless satisfactory reasons are given. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension. Students are strongly advised to be present at the beginning of the school year. Any of the facilities afforded by the University are open to the students of this College, subject to the approval of the Dean. Opportunity is afforded to do advanced work in all branches. Text-books may be obtained after coming to the University.

Students find their time fully occupied. Practicing pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities.

MEDICINAL PLANT LABORATORY AND GARDEN

Students receive instruction in medicinal plant culture and in the harvesting, drying, preparing, and milling of drugs in the very representative medicinal plant garden and in the plant laboratory and conservatory. The garden and plant laboratory have been added to increase the

educational facilities of the College. The College has no experience or information concerning the commercial cultivation of medicinal plants.

DISPENSARY PRESCRIPTION PRACTICE

The seniors under competent direction and supervision dispense the prescriptions written by the physicians in the Out-Patient Department of the University Hospitals. During the past year upwards of twenty thousand prescriptions were filled, most of them formulated ones, only a negligible percentage calling for proprietaries.

ELECTIVES IN OTHER UNIVERSITY COLLEGES

Students may elect certain subjects in other University Colleges, if such election does not interfere with their regular work. Subjects elected must be approved by the Dean and must be satisfactorily completed before the student can graduate.

COLLEGE TRAINING FOR PHARMACISTS

The recognition of the need of substantial college training for pharmacists finds expression in many ways. In New York, South Carolina, Pennsylvania, Hawaii, Wisconsin, Ohio, Louisiana, Iowa, Illinois, and Washington, such training is obligatory either by law or by rule of the boards of pharmacy. In a number of other states credit is given for college work. In Minnesota graduates from recognized colleges are required to have only two years of practical experience while all others must have four years of drug-store experience before they become eligible for examination by the State Board of Pharmacy for full license to practice in Minnesota. Graduates of the three-year course who have gained practical experience concurrently with their college work need only one additional year of drug-store experience before they become eligible for examination for full registration.

SCHOLARSHIPS

MINNESOTA STATE PHARMACEUTICAL ASSOCIATION SCHOLARSHIP

The Minnesota State Pharmaceutical Association at its last meeting voted the sum of $75 to be awarded annually to that student who is a citizen of the United States and who has resided in Minnesota for at least five years and who has earned the highest general rating in the work of the second year of the regular course in this College. If such student should discontinue attendance at the College, the said sum is to be awarded to the student next highest in standing who meets the other requirements.

THE FAIRCHILD SCHOLARSHIP

Mr. Samuel W. Fairchild offers a scholarship in the sum of $300 to be awarded to that first year student in any of the colleges holding

membership in the American Conference of Pharmaceutical Faculties who has had two years of drug store experience, is a high-school graduate and who passes the best competitive examination to be conducted by or under the auspices of a committee made up of members appointed jointly by the American Pharmaceutical Association, the American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy. Fuller particulars may be had from the Dean of the College.

POSITIONS FOR GRADUATES

The demand for graduates of this College has always been greater than the supply and is continually growing. Practically all members of the senior class are engaged before graduation. This College is recognized in all states, including those in which standards of efficiency have been established.

STATE BOARD OF PHARMACY

The State Board of Pharmacy meets at the College four times each year to examine candidates for registration. For information concerning the board or state examinations, address the Secretary of the Board, Mr. E. A. Tupper, 745 E. Fourteenth St., Minneapolis, Minnesota.

THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

This College is a member of the American Conference of Pharmaceutical Faculties, whose object is the promotion of higher pharmaceutical education. Through the influence of the Conference higher standards of education are being adopted from time to time by its members and others, evidenced by the fact that several states by law or by board of pharmacy ruling recognize the standards set by the Conference. Member-colleges must maintain certain minimum entrance and graduation requirements. This College exceeds these requirements.

THE NORTHWESTERN BRANCH OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

The Northwestern Branch of the American Pharmaceutical Association, composed of the representative pharmacists of the Northwest, has its headquarters at the College of Pharmacy. About four meetings are held annually. Students of pharmacy are eligible to membership in the branch, but are privileged to attend the meetings without becoming members.

COMMUNICATIONS

Address communications not relating to registration to the Dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minnesota.

For further information see General Information bulletin.

COURSES OF STUDY

Four graded courses are authorized by the Regents leading respectively to the degrees Pharmaceutical Chemist, Bachelor of Science in Pharmacy, Master of Science in Pharmacy, and Doctor of Science in Pharmacy. Only the course leading to the first degree is described in this bulletin, but a limited number of applicants for advanced standing in the courses leading to the second and third degrees will be accepted now. These courses are graded and the lower is a prerequisite for any higher. They cover respectively three, four, five, and six or more years.

THE REGULAR COURSE

This course now extends over a period of three full University years. The lengthening of the regular course from two to three years has been approved by the Minnesota State Pharmaceutical Association and by the Minnesota State Board of Pharmacy. The curriculum of this course is described in the following pages, but its division among the three years has not been fully decided.

THE FOUR-YEAR COURSE

This course leads to the degree Bachelor of Science in Pharmacy and includes all of the regular three-year course and will probably include Rhetoric 1 and 2 (six credits), any modern language (six credits), and Principles of Accounting (six credits). In addition the course will probably include Mineralogy 24, Crystallography 16, Physiology 2, thesis, and physics. The degree for this course can not be granted except for four years of work in residence, of which at least the fourth year must be completed at this College.

THE REGULAR THREE-YEAR COURSE

(Subject to Change)

FIRST YEAR

First Semester	*Second Semester*
Botany	Botany
General Chemistry	Qualitative Chemistry
Military Drill	Military Drill
Pharmacy	Pharmacy
Pharmaceutical Chemistry	Pharmaceutical Chemistry
Pharmacognosy	Pharmacognosy
Inorganic Materia Medica	Inorganic Materia Medica
Personal Hygiene	Organic Materia Medica

SECOND YEAR

First Semester	*Second Semester*
Materia Medica	Materia Medica
Organic Chemistry	Organic Chemistry
Pharmacognosy	Pharmacognosy
Military Drill	Military Drill
Organic Pharmacy	Organic Pharmacy

THIRD YEAR

First Semester

Pharmacy, including Dispensing, U. S. P. Testing
Bacteriology
Dispensary Practice
Physiology
Therapeutics and Toxicology

Second Semester

Pharmacy, including Dispensing, U. S. P. Testing, Assay, and National Formulary
Dispensary Practice
Business Law
First Aids

DEPARTMENTAL STATEMENTS

BACTERIOLOGY

Professor HAROLD E. ROBERTSON; Assistant Professor WINFORD P. LARSON; Instructors ARTHUR T. HENRICI, ANNE G. BENTON.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
5b.	General Bacteriology	5	Sr.	None

5b. GENERAL BACTERIOLOGY. Preparation of culture media. The morphology of bacteria. Methods of staining and of identification. Anaerobic bacteria. Principles of sterilization and disinfection. Examination of air, water, milk. Relation of bacteriology to the industries. ROBERTSON, LARSON, HENRICI, BENTON.

BOOK RESEARCH AND SEMINAR WORK

Throughout the year students are required to do book research and seminar work in the pharmaceutical library during certain hours released for the purpose from the pharmaceutical laboratory and other periods. Beginning with the coming year it is proposed to provide regularly in the college schedule two two-hour periods a week during the second semester of the graduating year for this kind of work. A room has been reserved for this purpose in the Pharmacy Building. To make this work of the utmost value the pharmaceutical library is being enlarged.

BOTANY AND MICROSCOPY

Professors ....., CARL OTTO ROSENDAHL; Assistant Professors HERBERT F. BERGMAN, FREDERICK K. BUTTERS, NED L. HUFF; Instructor HARVEY L. STALLARD; Assistant DONALD FOLSOM.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
17.	General Botany	5	Fr.	None
18.	Greenhouse Work.....	1	Fr.	17

17. GENERAL BOTANY. A study of the external forms of flowering plants with the relations, modifications, and functions of their several organs; special study of the flower with the outlines of the classification of flowering plants. Lectures, laboratory work, and field work. ....., ROSENDAHL, BUTTERS, HUFF.

18. GREENHOUSE WORK. The facilities of the greenhouse applied in the study of outer morphology. BUTTERS.

CHEMISTRY

Professors GEORGE B. FRANKFORTER, CHARLES F. SIDENER; Associate Professor WILLIAM H. HUNTER; Instructors EDWARD B. PECK, CARL L. SCHUMANN; Assistants FLOYD E. JOYCE, ROSCOE H. CARTER.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
3.	General Chemistry	5	Fr.	None
4.	Qualitative Analysis	5	Fr.	3
7.	Quantitative Analysis	3	Jr., sr.	4
13-14.	Organic Chemistry	6	Jr.	3 and 4

3. GENERAL CHEMISTRY. A study of chemical properties of the non-metallic and metallic elements. PECK, CARTER.

4. QUALITATIVE ANALYSIS. This course covers the common reactions of the metals and acids and their qualitative separation. The ionic theory and the law of mass action are discussed with especial reference to qualitative reactions. PECK, CARTER.

7. QUANTITATIVE CHEMISTRY. A study of the principles of gravimetric, volumetric, and gasometric estimation. SIDENER.

13-14. ORGANIC CHEMISTRY. This course includes work in both the aliphatic and aromatic series and the preparation of the more important compounds. HUNTER, SCHUMANN, JOYCE.

CLINICAL MICROSCOPY

Professor HAROLD E. ROBERTSON; Assistant Professor MOSES BARRON.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Clinical Chemistry and Microscopy	1	Sr.	None

1. CLINICAL CHEMISTRY AND MICROSCOPY. Includes (a) the macroscopic study of urine, its colors, sediments, and finer chemical tests and (b) the microscopic study of urine sediments, blood, pus, epithelial cells, casts, etc. ROBERTSON, BARRON.

DISPENSARY PRESCRIPTION PRACTICE

Instructor OSCAR J. BLOSMO.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1-3.	Prescription Practice	2½	Sr.	Pharm. 5

1-3. DISPENSARY PRESCRIPTION PRACTICE. The prescription dispensing for the Out-Patient Department of the University Hospitals is in charge

of the College of Pharmacy. The senior students do the prescription work under competent direction. BLOSMO.

FIRST AIDS TO THE INJURED

Lecturer CHARLES N. MCCLOUD and Assistant.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
2.	Emergency Cases	⅔	Jr., sr.	None

2. EMERGENCY CASES. A series of twelve hour lectures and demonstrations designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician. MCCLOUD.

MATERIA MEDICA

Associate Professor EDWIN L. NEWCOMB; Professor WULLING and Assistants.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1-2.	Inorganic Materia Medica	2	Soph., jr.	None
4-3.	Organic Materia Medica	4	Soph., jr., sr.	1

1-2. INORGANIC MATERIA MEDICA. This course runs concurrently and in close relationship with Pharmacy 8 and 11. WULLING and Assistants.

4-3. ORGANIC MATERIA MEDICA. The identity, sources, habitat, family, constituents, and preparations of the U. S. P., and of some unofficial vegetable drugs are studied in this course. NEWCOMB and Assistants.

MILITARY SCIENCE AND TACTICS

Major GEORGE W. MOSES, U. S. Cavalry, Professor of Military Science and Tactics, Head of the Department.

Assistants, Captain THEODORE B. TAYLOR, U. S. Cavalry, Professor of Military Science and Tactics; Captain JAMES B. WOOLNOUGH, U. S. Infantry, Professor of Military Science and Tactics; First Lieutenant OWEN R. MEREDITH, U. S. Infantry, Professor of Military Science and Tactics.

University Staff, WALTER F. RHINOW, Brigade Adjutant; BERT A. ROSE, Band Instructor.

REQUIRED WORK

All physically fit male students are required to take military training during the first two undergraduate years of their course unless they have secured such training at an approved institution endorsed by the Military Department. When this course is entered upon it must be carried to completion as a prerequisite for graduation. No credits are allowed for this work.

ELECTIVE WORK

(a) All juniors and seniors who have completed two years of drill may register for the course required by General Orders No. 49 War Department for members of the Reserve Officers' Training Corps. Such students sign a written agreement to continue in this corps for the remainder of the college course, the completion of this work is a prerequisite to promotion. Any student who for satisfactory reasons is permitted to withdraw from this course must reimburse the War Department for all moneys received.

Juniors and seniors who take the course required by General Orders No. 49, which include two camps of four weeks each, will receive an allowance of thirty cents per day for subsistence while pursuing the course and will have all expenses paid to and from the encampments. They also are eligible for appointment as temporary second lieutenants in the Infantry branch of the Regular Army for six months with a salary of one hundred dollars per month upon graduation and commission in the Reserve Corps. The Reserve Corps furnishes officers for Citizens Training Camps in time of peace and commission in the United States Volunteers in time of war, such officers having preference for commissions in the volunteers immediately below experienced officers in the federal service.

The course includes three hours a week of drill and three of study in the Military Department and also includes recommended courses offered by the respective colleges which have a direct bearing on the work of the Corps, such as Military History and International Law in the Liberal Arts College. The work carries three credits in each semester in the Military Department, and such additional credits as the respective curricula of the colleges may permit.

(b) Any student having completed the two years of required Military Training may continue the work for credit in the third and fourth years. Credit for such work is allowed in practically all of the colleges of the University, the maximum being three credits a year.

PHARMACY

Professor WULLING; Associate Professor GUSTAV BACHMAN; Assistant Professor CHARLES H. ROGERS; Instructor OSCAR J. BLOSMO; Assistant DEL D. TURNER.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	History of Pharmacy	½	Fr., jr.	None
3.	Metrology	3	Fr., jr.	None
5.	Physics of Pharmacy	3	Fr., jr.	3
7.	Pharmaceutical Processes	3½	Fr., jr.	5
2.	Pharmacopoeial Preparations	5	Fr., jr.	7
4.	Pharmacy Quiz	3	Fr., jr.	3, 5, 7, 2
6.	Identification Inorganic U. S. P. Preparations	1	Fr., jr.	2

No.	Title	Credits	Offered to	Prereq. Courses
9.	Pharmaceutical Chemical Philosophy	1½	Fr., jr.	None
11.	The Pharmaceutical Chemistry of the Non-metals	1½	Fr., jr.	9
8.	U. S. P. Inorganic Salts	3	Fr., jr.	9
13.	Classification of Pharmaceutical Organic Compounds	1	Jr., sr.	8
15-16.	U. S. P. Organic Compounds and Their Preparations	3	Jr., sr.	13
17.	Pharmacopoeial Qualitative Analysis.	5	Jr., sr.	11
18.	Pharmacopoeial Quantitative Analysis	2	Jr., sr.	17
19.	Prescription Incompatability	½	Jr., sr.	9, 13
21-22.	Prescription Dispensing	12	Jr., sr.	19, 2
23.	Manufacture U. S. P. Salts	4	Jr., sr.	8
10.	National Formulary	1	Jr., sr.	23
12.	Pharmaceutical Assay	1½	Jr., sr.	10
14.	Synthetic Remedies	½	Jr., sr.	15
16.	Homeopathic Pharmacy	½	Jr., sr.	21
25-26.	Identification U. S. P. Salts	1½	Jr., sr.	8, 15
18.	Microchemistry	....	.....	.....
27-28.	Mathematics of Pharmacy	1	Soph., jr.	3

1. History of Pharmacy. This course embraces the study of the history of pharmacy, including the U. S. Pharmacopoeia through all of its revisions and the literature of pharmacy. Wulling.

3. Metrology. A critical study of weights and measures and balances; specific gravity, specific volume; alligation, etc. Wulling, Rogers.

5. The Physics of Pharmacy. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. Wulling, Rogers, Turner.

7. Pharmaceutical Processes. A study of the various laboratory processes employed in pharmaceutical manufacture. Rogers.

2. Pharmacopoeial Preparations. This course includes the study and preparation of official bodies for which the Pharmacopoeia gives formulae and processes. Wulling, Rogers, Turner.

4. Pharmacy Quiz. A thoro review of the work covered in Courses 3, 5, 7, and 2. Rogers.

6. Identification of Inorganic U. S. P. Preparations. The study of the appearance and physical properties of inorganic official preparations. Rogers, Turner.

9. Pharmaceutical Chemical Philosophy. This course treats of the principles underlying chemistry and elucidates chemical facts and phenomena in their pharmaceutical aspects. Wulling.

11. The Pharmaceutical Chemistry of the Non-Metals. A study of the description, properties, pharmacy, and manufacture of the non-

metals used in pharmacy, including their U. S. P. preparations. WULLING.

8. U. S. P. INORGANIC SALTS. Especial reference to sources, description, properties, and manufacture. WULLING.

13. CLASSIFICATION OF PHARMACEUTICAL ORGANIC COMPOUNDS. A preparation for Pharmacy 15-16. WULLING, ROGERS.

15-16. U. S. P. ORGANIC COMPOUNDS AND THEIR PREPARATIONS. Includes the critical study of cellulin and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes, and animal fats, alkaloids, glucosides, animal drugs and products, etc. ROGERS.

17. PHARMACOPOEIAL QUALITATIVE ANALYSIS. A critical study of the identity, purity, limit, and percentage tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound. BACHMAN, TURNER.

18. PHARMACOPOEIAL QUANTITATIVE ANALYSIS. This course includes the gravimetric, volumetric, and gasometric determinations of the U. S. Pharmacopoeia, but not pharmaceutical assay (12). WULLING, BACHMAN.

19. PRESCRIPTION INCOMPATIBILITY. Therapeutic, pharmaceutical, and chemical incompatability is taken up in lecture and recitation work preliminary to Course 21-22. BACHMAN.

21-22. PRESCRIPTION DISPENSING. This course runs concurrently and in coöperation with Dispensary Prescription Practice 1, 3, and includes the critical study of the prescription and practical work in dispensing a wide range of prescriptions taken from actual medical practice. BACHMAN, BLOSMO, TURNER.

23. MANUFACTURE OF U. S. P. SALTS. The preparation of about forty official salts included in this course. ROGERS, BACHMAN, TURNER.

10. NATIONAL FORMULARY. This lecture and laboratory course includes a partial study of the National Formulary and the making of a number of its more important preparations. BACHMAN, TURNER.

12. PHARMACEUTICAL ASSAY. The quantitative determination of alkaloidal and other active constituents of a number of the potent organic drugs and preparations. BACHMAN, TURNER.

14. SYNTHETIC REMEDIES. The study of the pharmaceutical chemistry of synthetic chemicals in medical use. WULLING, ROGERS.

16. HOMEOPATHIC PHARMACY. A brief exposition of the principles underlying the preparation of homeopathic remedies, including some laboratory work. WULLING, BACHMAN.

25-26. IDENTIFICATION OF U. S. P. SALTS. The study of the physical identity of the more important official inorganic and organic salts. BACHMAN, ROGERS, TURNER.

18. MICROCHEMISTRY. Work in the microchemistry of pharmacy is included in the work of a number of other courses, but will soon be offered as a separate course. WULLING, BACHMAN, NEWCOMB, ROGERS.

27-28. MATHEMATICS OF PHARMACY. While students are required to have a preparation in arithmetic, algebra, and geometry before entering, they receive frequent drills throughout the year. Examinations in the subject are required. WULLING, BACHMAN, BLOSMO, ROGERS.

PHARMACEUTICAL AND BUSINESS LAW

Professor FREDERICK J. WULLING.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
2.	Law for Pharmacists	⅔	Sr.	None
4.	Minnesota Pharmacy Laws	⅓	Sr.	None

2 LAW FOR PHARMACISTS. The lectures introduce the subjects of contracts, agency, commercial paper, insurance, etc., in their application to the practice of pharmacy and discuss the liability of retail pharmacists. WULLING.

4. MINNESOTA PHARMACY LAWS. The study of the statute laws of Minnesota affecting the practice of pharmacy. The lectures are given by special lecturers experienced in the application and operation of pharmacy laws.

PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY

Assistant Professor FRANK F. GROUT, and Assistant.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
24.	Mineralogy	1	Sr., grad.	None
66.	Crystallography	1	Sr., grad.	24

24. MINERALOGY. A study of the occurrence and properties of minerals of pharmaceutical importance; ores of metals used in pharmacy; nonmetallic minerals and mineral waters in their mineralogic and geologic relation. GROUT.

66. CRYSTALLOGRAPHY. A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks. GROUT.

PHARMACOGNOSY

Associate Professor EDWIN L. NEWCOMB and Assistants.

COURSES

No.	Title	Courses	Offered to	Prereq. courses
1.	Medicinal Plant Study		Fr.	None
3.	The Cryptogams	4	Fr.	1
5-6.	Pharmaco-histology		Fr.	3, Mat. Med. 4
9.	Drug Collection		Jr.	5
11-12.	The Angiosperms	10	Jr.	5
2.	Field Work		Jr.	1

1. MEDICINAL PLANT STUDY AND DRUG PREPARATIONS. The principles underlying the preparation of plant drugs, including the study of plants cultivated in the medicinal plant garden, and herbarium work. NEWCOMB and Assistants.

3. THE PHARMACOGNOSY OF THE CRYPTOGAMS. In this course some of the drugs and economic products obtained from the cryptogams are studied. NEWCOMB and Assistants.

5-6. PHARMACO-HISTOLOGY. Includes the micrometry and the detailed study of the inner structure of parts of the higher plants as illustrated by about forty official and unofficial drugs. NEWCOMB and Assistant.

9. DRUG COLLECTION AND PREPARATION. Scientific methods of drug collection and preparation of about fifty drugs from plants grown in the medicinal plant garden. NEWCOMB and Assistants.

11-12. PHARMACOGNOSY OF THE ANGIOSPERMS. Includes the scientific study of the official crude and powdered seeds, roots, rhizomes, barks, woods, pith, flowers, fruits, leaves, herbs, exudations, animal drugs, etc., and their adulteration. NEWCOMB and Assistants.

2. FIELD WORK. The classes are taken on field searches for native medicinal plants. The study of the distinguishing characteristics of certain orders, families, and genera of medicinal plants is included in this work. NEWCOMB.

PHYSICAL EDUCATION

FOR MEN

Director LOUIS J. COOKE; Assistant Director WILLIAM K. FOSTER; Instructor JOHN C. WEST.

The purpose of the department is to provide all men of the University opportunity for exercise in order to maintain and build up their general health. It also provides special training for the correction of physical defects and functional derangements.

A physical examination is required of all new matriculants, and of all others using the department privileges, at the beginning of the year, and as often during their college course as their physical condition may indicate. Students taking the required work in physical education are examined also at the close of the year. A study of these records shows a marked improvement in the standard of health of the average student during his college course.

The gymnasium, swimming pool, and baths are open to all students of the University, who are free to use the apparatus and to pursue a course in physical training under the supervision of the director and his assistants.

Those students taking the required course in physical education who can not swim, must make a reasonable effort, as determined by the department, to pass the swimming and life-saving requirements, and will be assigned special hours for instruction.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Personal Hygiene	None	All	None

1. PERSONAL HYGIENE. Two hours per week; first six weeks of first semester. Examination at close of course. COOKE.

A special lecture on sex hygiene is given sometime during the first ten days of the autumn semester, with required attendance on the part of all freshmen.

PHYSICAL EDUCATION

FOR WOMEN

Assistant Professor J. ANNA NORRIS; Instructors MAY S. KISSOCK, ALICE H. TOLG, VALERIA LADD.

This department aims to look after the health of its women students. It gives physical examination and advice to all newly entering students; conducts systematic yearly consultations with and examines, when necessary, all upper class students; gives courses in hygiene; organizes physical work to meet the various needs and physical tastes of students; coöperates closely with the Women's Athletic Association in encouraging and organizing athletic sports; investigates cases of illness in dormitory and boarding houses.

The office is open at regular hours to all students who desire consultation regarding their physical condition.

A new gymnasium building, finished in 1916, affords adequate space and equipment for all activities.

For further information, see bulletin of the College of Science, Literature, and the Arts.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
13.	Personal Hygiene	3	Fr., jr., sr.	None

13. PERSONAL HYGIENE. The essential knowledge of the care of the body, including a brief consideration of its anatomy and a study of its physiology, the prevention of contagious diseases, and first aid to the injured. NORRIS.

PHYSIOLOGY

Associate Professors RICHARD OLDING BEARD, FREDERICK H. SCOTT; Instructor CHAUNCEY J. V. PETTIBONE.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Physiology	3	Fr., jr., sr.	None
2.	Urinalysis	1	Jr., sr.	1
4.	Physiologic Chemistry	4	Jr., sr.	1

1. PHYSIOLOGY. The work covers the study of physiological functions and the action of drugs and their effect upon the various systems. BEARD, SCOTT, PETTIBONE.

2. URINALYSIS, QUALITATIVE AND QUANTITATIVE (Postgraduate). Includes the qualitative analysis of representative specimens of urine and the quantitative determination of chlorides, urea, ammonia, total nitrogen, sugar and albumin, together with the preparation of reagents. BEARD, SCOTT.

4. PHYSIOLOGIC CHEMISTRY (Postgraduate). A study of proteids, carbohydrates, fats, muscle, bone, gastric juice, saliva, pancreatic juice, bile, glycogen, blood lymph, chyle, milk. Spectroscopic examination of the blood and the use of polariscope. BEARD, SCOTT.

THERAPEUTICS AND TOXICOLOGY

Associate Professor EDGAR D. BROWN.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
2.	Therapeutics and Toxicology	2	Sr.	Pharmacognosy 11 and 12; Mat. Med. 1

2. THERAPEUTICS AND TOXICOLOGY. Drugs are studied in groups as governed by their medical and toxic properties. Remedial measures other than those depending upon drugs are fully considered. Poisonous action and doses of drugs also receive consideration. BROWN.

STUDENTS

1916-17

FIRST-YEAR STUDENTS

Anderson, Harley E., Whalan
Bergin, Robert W., Blackduck
Blomquist, Bernhardt E., Forreston
Clark, Walker E., Ladysmith, Wis.
Cohler, Sara B., St. Paul
Constantinides, Panayiottis C., Cairo, Egypt
Costello, William J., Grand Rapids
Davidson, Lyn Raymond, Minneapolis
Eddy, Gayle J., Morris
Gibbs, George N., Minneapolis
Giller, Morris, Minneapolis
Gross, Howard S., Watertown, S. D.
Guilbert, Oliver W., Waseca
Hawlish, Henry J., Hopkins
Holec, Rose L., New Prague
Hovland, Guy B., Dawson
Jackman, Jesse H., Jr., St. Paul
Jensen, Arthur P., Rochester
Kinch, Harvey M., Glendive, Mont.
Kingman, Gerhart I., East Grand Forks
Langeland, Bert T., Zumbrota
Madsen, Leo J., Rochester
Mahaney, Gerald, Eau Claire, Wis.
Martin, Floyd, Minneapolis
Martin, Royce C., Glendive, Mont.
Mattson, Ames P., Braham
Mayo, James B., McLaughlin, S. D.
Nelson, Dewey, Parkers Prairie
Netz, Charles V., Owatonna
Newhouse, Edna V. L., Spring Grove
Niles, Ernest G., St. Paul
Quast, William J., Janesville
Riley, Philip J., Round Lake
Sackett, Fred J., Lanesboro
Schultz, William H., Montevideo
Svarry, Elby V., Princeton
Thompson, Arthur, Cyrus
Thompson, Maurice A., Blair, Wis.
Ulven, Clarence O., Adams
Wallace, Beryl E., Duluth
Wasielewski, Henry R., Minneapolis
Winzenburg, Charles P., Granada

Special First-Year Students

Gormley, George A., Minneapolis
Sharpless, Clarence F., Minneapolis

SECOND-YEAR STUDENTS

Adler, Birdie H., Redwing
Allen, Alvin C., Minneapolis
Amberg, Raymond M., Grand Rapids
Aurness, Rolf C., Minneapolis
Bajpai, Ram L., Nagpur, India
Berg, Leonard A., Barron, Wis.
Blanchette, Philip E., Anoka
Berkuvitz, Benjamin, St. Louis Park
Bleser, Karl E., Milbank, S. D.
Carlson, Archie H., Willmar
Carlson, Roy W., Willmar
Eichinger, Howard E., Canby
Flanders, Claire L., Ellsworth, Wis.
Fossen, Cora B., Starbuck
Fournier, Ben, Minneapolis
Gardner, Frances M., Minneapolis
Hatch, Theo. L., Minneapolis
Haugen, Selmer, Henning
Helland, Albert I., Hendrum
Johnson, Walter M., New Richland
Landru, Norwood G., Hendricks
Larson, Selma E., Wanamingo
Layne, George E., Rushford
Lindoo, Earl Bud, Ladysmith, Wis.
Mike, Charles W., Tower
Mulrean, Anna, Minneapolis
Novack, Claude A., Minneapolis
Oehlke, Edmund W. T., Newport
Oleson, Sydney M., Hutchinson
Olson, Chester J., Dassel
Olson, Silas C., Porter
Petersen, Elmer D., Fulda
Peterson, Arthur L. E., Dawson
Shea, Cecil J., Virginia
Stein, Louis, Virginia
Strimling, Abraham, Minneapolis
Strimling, William, Minneapolis
Sahol, Gotthard J., Fergus Falls
Stratte, Alf K., Dawson
Stucky, Paul H., Waseca
Sundry, Evans, Kenyon
Swenson, James C., Mabel
Taylor, Romayne, Minneapolis
Tuttle, Francis A., Minneapolis
Vaaler, Raymond A., Grand Forks, N. D.
Vadheim, Peter, Tyler
Williams, Harry W., Virginia
Wong, Jee Foun, Canton, China

THIRD-YEAR STUDENTS

Casey, Roy E., Chisholm
Colliton, Ora A., St. Paul
Distad, G. Raymond, Moorhead
Frank, Robert Wells, Mt. Union, Pa.
Gotlieb, David P., St. Paul
Iverson, Ida, Decorah, Iowa.
Peterson, Verner C. J., Minneapolis
Strate, Herbert A., St. Paul
Sugarman, Joseph B., Minneapolis
Townsend, Royal E., Ivanhoe

FOURTH-YEAR STUDENTS

Lee, Muyng Sup, Ham-hung, Korea

SIXTH-YEAR STUDENTS

Blosmo, Oscar J., Minneapolis
Rogers, Charles H., Minneapolis

The Bulletin *of the* University *of* Minnesota

The School of Chemistry
Announcement for the Year
1917-1918

Catalog Series No. 12
Vol. XX No. 35 August 25 1917

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

1917

JULY

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

AUGUST

..	..	..	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
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

..	..	..	..	..	..	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	..	..	..	..	..

1918

JANUARY

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

FEBRUARY

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

MARCH

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

APRIL

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

MAY

..	..	..	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	..	..	..	..	..	..

JULY

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

AUGUST

..	..	..	..	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	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

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	..	..	..	..
..	..	..	..	..	..	..

UNIVERSITY CALENDAR

1917-1918

1917			
September	26	Wednesday	Registration closes for all students
September 26 – October 3		Week	Fees payable for all students
October	1	Monday	First semester evening extension classes begin
October	2-9	Week	Examinations for removal of conditions (except for Colleges of Agriculture and Forestry), and entrance examinations
October	10	Wednesday	First semester begins
October	15	Monday	Agricultural College, farm experience examinations
October	18	Thursday	Senate meeting, 4:00 p.m.
October	29	Monday	School of Agriculture, first term begins
November	5	Monday	Dairy School opens
November	28	Wednesday	Thanksgiving recess begins 9:00 p.m.
December	1	Saturday	Dairy School closes
December	3	Monday	Thanksgiving recess ends 8:00 a.m.
December	3-8	Week	Second semester condition examinations, Colleges of Agriculture and Forestry
December	3-8	Week	Short course for ice-cream makers
December	5	Wednesday	Medical School second quarter begins
December	20	Thursday	Senate meeting, 4:00 p.m.
December	21	Friday	School of Agriculture, first term closes
December	21	Friday	Christmas vacation begins 9:00 p.m.
1918			
December 31 – January 5		Week	Farmers' and Home Makers' Week Short Course
January	2	Wednesday	Christmas vacation ends 8:00 a.m.
January	2	Wednesday	School of Embalming begins, eight weeks' session
January	8	Tuesday	School of Agriculture, second term begins
January	25	Friday	First semester evening extension classes close
February	4	Monday	Second semester registration closes
February	4	Monday	Second semester evening extension classes begin
February	4-9	Week	Merchants' Short Course

February	11	Monday	Final examinations begin
February	11	Monday	Payment of fees for second semester closes
February	12	Tuesday	Lincoln's Birthday; a holiday
February	18	Monday	Second semester begins
February	21	Thursday	Senate meeting, 4:00 p.m.
February	22	Friday	Washington's Birthday; a holiday
March	27	Wednesday	School of Agriculture closes
March	28	Thursday	Easter recess begins 9:00 p.m.
April	1	Monday	Easter recess ends 8:00 a.m.
April	1-6	Week	Boys' and Girls' Week
April	1-6	Week	Condition examinations in certain colleges
April	15	Monday	Medical School fourth quarter begins
April	30	Tuesday	Traction Engineering Short Course begins
May	16	Thursday	Senate meeting, 4:00 p.m.
May	24	Friday	Second semester evening extension classes close
May	30	Thursday	Memorial Day; a holiday
May	31	Friday	Traction Engineering Short Course closes
June	8	Saturday	Final examinations begin 2:00 p.m.
June	15	Saturday	Second semester closes
June	16	Sunday	Baccalaureate service
June	17	Monday	Senior Class Day exercises
June	19	Wednesday	Alumni Day
June	20	Thursday	Forty-sixth Annual Commencement
June	21	Friday	Summer vacation begins
June	24	Monday	Summer Session begins

The University year for 1918-19 will probably begin Tuesday, September 17. Classes will begin September 25.

THE SCHOOL OF CHEMISTRY

FACULTY

MARION LEROY BURTON, Ph.D., D.D., LL.D., President
1005 S. E. 5th St.

CYRUS NORTHROP, LL.D., President Emeritus 519 10th Ave. S. E.

GEORGE B. FRANKFORTER, Ph.D., Dean and Professor of Chemistry
525 E. River Road

EDWARD E. NICHOLSON, M.A., Dean of Student Affairs 914 S. E. 7th St.

CEPHAS D. ALLIN, LL.B., M.A., Professor of Political Science
509 S. E. 6th St.

WILLIAM R. APPLEBY, M.A., Professor of Metallurgy and Dean of the School of Mines 928 S. E. 5th St.

RICHARD O. BEARD, M.D., Associate Professor of Physiology
University of Minnesota

GEORGE N. BAUER, Ph.D., Professor of Mathematics
1201 E. River Road

ROY G. BLAKEY, Ph.D., Assistant Professor of Economics
112 S. E. Church St.

EDGAR D. BROWN, Phm.D., M.D., Associate Professor of Pharmacology
3525 3d Ave. S.

FREDERIC K. BUTTERS, B.S., B.A., Assistant Professor of Botany
815 S. 7th St.

PETER CHRISTIANSON, B.S., E.M., Professor of Metallurgy
217 S. E. Union St.

LOUIS J. COOKE, M.D., Director of the Gymnasium 909 S. E. 6th St.

IRA H. DERBY, Ph.D., Assistant Professor of Chemistry
2157 Commonwealth Ave., St. Paul

HAL DOWNEY, Ph.D., Associate Professor of Animal Biology
802 S. E. 4th St.

E. DANA DURAND, Ph.D., Professor of Economics 629 S. E. 5th St.

J. FRANKLIN EBERSOLE, M.A., Assistant Professor of Economics
630 S. E. 7th St.

WILLIAM H. EMMONS, Ph.D., Professor of Geology and Mineralogy and Head of Department 1225 S. E. 7th St.

HENRY A. ERIKSON, Ph.D., Professor of Physics 424 S. E. Harvard St.

JOHN J. FLATHER, Ph.B., M.M.E., Professor of Mechanical Engineering
315 11th Ave. S. E.

DANIEL FORD, M.A., Assistant Professor of Rhetoric

ROBERT W. FRENCH, B.S., C.E., Assistant Professor of Drawing
1018 16th Ave. S. E.

FRANK F. GROUT, M.S., Associate Professor of Mineralogy
617 S. E. 4th St.

ROBERT A. HALL, Ph.D., Assistant Professor of Pharmacology
409 S. E. Oak St.

EVERHART P. HARDING, Ph.D., Associate Professor of Chemistry
817 S. E. Essex St.
ARTHUR D. HIRSCHFELDER, B.S., M.D., Professor of Pharmacology
2364 Lake of the Isles Blvd.
SAMUEL L. HOYT, E.M., Ph.D., Assistant Professor of Metallography
416 8th Ave. S. E.
NED L. HUFF, M.A., Assistant Professor of Botany 1219 S. E. 7th St.
WILLIAM H. HUNTER, Ph.D., Associate Professor of Chemistry
112 S. E. Church St.
A. WALFRED JOHNSTON, M.A., Assistant Professor of Geology
803 University Ave. S. E.
FRANCIS B. KINGSBURY, Ph.D., Assistant Professor of Physiology and Physiologic Chemistry
WILLIAM H. KIRCHNER, B.S., Professor of Drawing and Descriptive Geometry 722 10th Ave. S. E.
WINFORD P. LARSON, M.D., Associate Professor of Pathology, Bacteriology and Public Health 614 9th Ave. S. E.
ELIAS P. LYON, Ph.D., M.D., Professor of Physiology
421 S. E. Union St.
JOHN F. MCCLENDON, Ph.D., Assistant Professor of Physiology
715 University Ave. S. E.
FRANK H. MACDOUGALL, Ph.D., Assistant Professor of Chemistry
LOUIS W. MCKEEHAN, Ph.D., Associate Professor of Physics
930 17th Ave. S. E.
JOHN V. MARTENIS, M.E., Assistant Professor of Mechanical Engineering 215 S. E. Harvard St.
OWEN R. MEREDITH, First Lieutenant, U. S. Infantry, Assistant Professor of Military Science and Tactics 504 University Ave. S. E.
THOMAS WARNER MITCHELL, Ph.D., Assistant Professor of Economics
2349 Bourne Ave., St. Paul
GEORGE W. MOSES, Major, U. S. Cavalry, Professor of Military Science and Tactics 1308 S. E. 5th St.
WALTER R. MYERS, Ph.D., Assistant Professor of German
608 S. E. Oak St.
HENRY F. NACHTRIEB, B.S., Professor of Animal Biology
905 S. E. 6th St.
EDWARD E. NICHOLSON, M.A., Assistant Professor of Chemistry
914 S. E. 7th St.
J. ANNA NORRIS, M.D., Director of Physical Education for Women
505 S. E. 6th St.
SIDNEY F. PATTISON, M.A., Assistant Professor of Rhetoric
1280 Raymond Ave., St. Paul
LEVI B. PEASE, M.S., Professor of Metallurgy 1070 16th Ave. S. E.
CHAUNCEY J. V. PETTIBONE, Ph.D., Assistant Professor of Physiology and Physiologic Chemistry 611 S. E. Delaware St.
ANNA H. PHELAN, Ph.D., Assistant Professor of Rhetoric
612 10th Ave. S. E.

TERENCE T. QUIRKE, E.M., Ph.D., Assistant Professor of Geology
315 11th Ave. S. E.

FRANK B. ROWLEY, B.S., M.E., Assistant Professor of Drawing
217 S. E. Beacon St.

WILLIAM T. RYAN, E.E., Assistant Professor of Electrical Engineering
3228 S. E. 4th St.

WILLIAM A. SCHAPER, Ph.D., Professor of Political Science
625 S. E. Fulton St.

CARL SCHLENKER, B.A., Professor of German 514 11th Ave. S. E.

FREDERICK H. SCOTT, Ph.D., M.B., D.Sc., Associate Professor of Physiology 1307 S. E. 6th St.

GEORGE D. SHEPARDSON, M.A., M.E., D.Sc., Professor of Electrical Engineering 717 E. River Road

S. CARL SHIPLEY, B.S., M.E., Assistant Professor of Machine Construction 1517 E. River Road

CHARLES F. SHOOP, B.S., Assistant Professor of Experimental Engineering 811 S. E. Fulton St.

CHARLES F. SIDENER, B.S., Professor of Chemistry 1320 S. E. 5th St.

CHARLES P. SIGERFOOS, Ph.D., Professor of Zoology
1023 University Ave. S. E.

CHARLES E. SKINNER, M.A., Assistant Professor of Rhetoric
113 S. E. State St.

HERMON L. SLOBIN, Ph.D., Assistant Professor of Mathematics
1805 Hamline Ave. S. E.

JOHN T. TATE, Ph.D., Assistant Professor of Physics 1316 S. E. 4th St.

THEODORE B. TAYLOR, Captain, U. S. Cavalry, Associate Professor of Military Science and Tactics 1301 S. E. 5th St.

STERLING TEMPLE, Ph.D., Assistant Professor of Chemistry
1758 Blair St., St. Paul

JOSEPH M. THOMAS, Ph.D., Professor of Rhetoric
818 University Ave. S. E.

JOSEPHINE E. TILDEN, M.S., Professor of Botany
2235 Como Ave. W., St. Paul

ANTHONY L. UNDERHILL, Ph.D., Assistant Professor of Mathematics
612 10th Ave. S. E.

HELEN A. WHITNEY, M.A., Assistant Professor of Rhetoric
425 S. E. 4th St.

M. RUSSELL WILCOX, M.D., Assistant Professor of Physiology
802 Donaldson Bldg.

JAMES B. WOOLNOUGH, Captain, U. S. Infantry, Associate Professor of Military Science and Tactics 712 10th Ave. S. E.

JEREMIAH S. YOUNG, Ph.D., Professor of Political Science
1120 S. E. 6th St.

ANTHONY ZELENY, Ph.D., Professor of Physics 613 E. River Road

GEORGE DELWIN ALLEN, M.S., Instructor in Animal Biology
1203 S. E. 7th St.

WILLIAM ANDERSON, M.A., Instructor in Political Science
4219 Colfax Ave. N.

Ross Allen Baker, Ph.D., Instructor in Chemistry 130 E. 18th St.
Fred W. Bentley, B.S., Instructor in Drawing and Descriptive Geometry
Anne Benton, B.A., Instructor in Bacteriology 2024 Queen Ave. S.
Frank W. Bliss, M.S., Instructor in Chemistry 1016 17th Ave. S. E.
Thomas M. Broderick, M.A., Instructor in Geology
512 S. E. Delaware St.
Lillian Cohen, Ph.D., Instructor in Chemistry 415 E. 14th St.
William S. Cooper, Ph.D., Instructor in Botany 1523 W. Lake St.
Lloyd M. Crosgrave, M.A., Instructor in Economics
510 S. E. Ontario St.
Ernest O. Dieterich, Ph.D., Instructor in Physics 809 S. E. Essex St.
Gerhard Dietrichson, Ph.D., Instructor in Chemistry
429 Walnut St. S. E.
Lynwood G. Downs, Instructor in German 1312 S. E. 7th St.
William K. Foster, L.L.M., Instructor in Physical Education for Men
652 S. E. Erie St.
Isaac W. Geiger, Ph.D., Instructor in Chemistry
15 Barton Ave. S. E.
J. Theodore Geissendoerfer, Ph.D., Instructor in German
967 14th Ave. S. E.
Willis W. Grant, Instructor in Mechanical Engineering
2342 Langford Ave., St. Paul
Arthur R. Graves, Instructor in German 407 S. E. 4th St.
E. Dow Gilman, B.S., C.E., Instructor in Experimental Engineering
602 S. E. Essex
Lawrence M. Henderson, Ph.D., Instructor in Chemistry
605 S. E. Delaware St.
Arthur T. Henrici, M.D., Instructor in Bacteriology
939 14th Ave. S. E.
James T. Hillhouse, Ph.D., Instructor in Rhetoric
112 S. E. Church St.
Francis A. Hobart, Instructor in Mechanical Engineering
512 S. E. Delaware St.
Albert C. Hodge, Instructor in Economics 615 9th Ave. S. E.
Albert C. James, M.B.A., Instructor in Economics Hotel Maryland
Kenneth H. Kingdon, Ph.D., Instructor in Physics
*May S. Kissock, B.A., Instructor in Physical Education for Women
521 S. E. 6th St.
Paul E. Klopsteg, M.A., Instructor in Physics 1506 S. E. 4th St.
Ernest P. Kuhl, Ph.D., Instructor in Rhetoric 1616 Melbourne Ave.
Valeria Ladd, B.A., Instructor in Physical Education for Women
1445 E. River Road
Robert J. McFall, Ph.D., Instructor in Economics 124 S. E. State St.
Franklin R. McMillan, C.E., Assistant Professor of Structural Engineering 524 8th Ave. S. E.

* Absent on leave 1917-18.

WALLACE H. MARTIN, M.E., Instructor in Mechanical Engineering 1475 Cleveland Ave., St. Paul
LAWRENCE J. MORTENSON, B.S., E.E., Instructor in Drawing and Descriptive Geometry
HOWARD D. MYERS, B.S. in C.E., Instructor in Drawing and Descriptive Geometry 329 19th Ave. S. E.
AMOS F. MOYER, M.E., Instructor in Experimental Engineering 1624 LaFond St., St. Paul
EDWARD B. PECK, Ph.D., Instructor in Chemistry
WILLIAM A. PATON, M.A., Instructor in Economics 500 S. E. Delaware St.
EDWARD P. QUIGLEY, Instructor in Forge Work 2923 Chicago Ave.
ALLEN QUIMBY, Instructor in Foundry Practice
WILLIAM H. RICHARDS, Instructor in Shop Work 1423 W. 27th St.
MARTIN B. RUUD, Instructor in Rhetoric 303 S. E. Walnut St.
CARL L. SCHUMANN, Ph.D., Instructor in Chemistry 317 17th Ave. S. E.
RUTCHER SKAGERBERG, B.S., E.E., Instructor in Drawing and Descriptive Geometry 1312 S. E. 4th St.
J. WARREN STEHMAN, M.A., Instructor in Economics 306 10th Ave. S. E.
WOLDEMAR M. STERNBERG, B.S. in Chem. Eng., Instructor in Chemistry 510 S. E. Ontario St.
ARTHUR J. TIEJE, Ph.D., Instructor in Rhetoric 1028 S. E. 6th St.
ALICE J. H. TOLG, M.D., Instructor in Physical Education for Women 1200 W. 25th St.
H. LEE WARD, Ph.D., Instructor in Chemistry 425 S. E. Walnut St.
JOHN C. WEST, JR., B.S., Instructor in Physical Education for Men 411 17th Ave. S. E.
RICHARD WISCHKAEMPER, M.A., Instructor in German 977 14th Ave. S. E.
LEE E. WOLGEMUTH, Instructor in Mechanical Engineering 306 10th Ave. S. E.

ASSISTANTS

HERMAN BAKKEN, B.A., Assistant in Chemistry 500 S. E. Beacon St.
BOZETECH C. BREN, B.S., Assistant in Chemistry
ARTHUR R. CADE, B.S., Assistant in Chemistry 1810 Portland Ave.
ROSCOE H. CARTER, B.A., M.S., Assistant in Chemistry 500 S. E. Beacon St.
ALBERT E. COXE, B.S., Assistant in Chemistry
DONALD C. FARLEY, Assistant in Chemistry 3200 36th Ave. S.
ALAN S. HUMPHREYS, B.S., Assistant in Chemistry 516 12th Ave. S. E.
ALONZO G. MAYERS, B.S., Assistant in Chemistry
NORMAN H. MOORE, B.S., M.A., Assistant in Chemistry
ALLEN T. NEWMAN, B.S., M.S., Assistant in Chemistry 1778 Lyndale Ave. S.
ANNA PETERSON, B.A., Assistant in Chemistry 215 9th Ave. S. E.
OLAF S. RASK, B.S., Assistant in Chemistry
J. RUSSEL WINSLOW, B.S., Assistant in Chemistry

GENERAL INFORMATION

The School of Chemistry is now housed in the new fireproof laboratory. The building is located on the main axis of the new campus. It contains about one hundred and fifty rooms devoted to various lines of chemical work. The general, qualitative, and quantitative laboratories are of special interest. Each is well equipped and large enough to accommodate approximately six hundred students. There are also organic laboratories, and several suites of rooms devoted to industrial (including photography), technology, and research work. The laboratory contains a good working chemical library and a growing technological museum.

The School of Chemistry offers three courses. Two of these, the Analytical and the five-year course in Arts and Chemistry, offer the student a thoro training in pure chemistry and the allied sciences—aiming to lay a broad foundation for a later more specialized training. They prepare the student for work as a graduate assistant or as instructor in a college, for scientific positions in the state and government service, and for analytical and research positions; the type of position which the graduate is fitted to occupy being dependent upon his personality and ability.

The four-year Analytical Course leads to the degree of Bachelor of Science in Chemistry, while the five-year course leads to the degree of Bachelor of Arts after four years, and Bachelor of Science in Chemistry at the end of the fifth.

The third or Applied Course extends over five years, leading to the degree of Bachelor of Science at the end of four years and Chemical Engineer at the end of the fifth. The course aims to fit the student to take a position in the manufacturing department of a chemical industry, and give him the fundamental knowledge upon which he may build his success. It is becoming more and more the practice in the chemical industries to fill the higher positions from the men who have had a chemical engineering training or its equivalent.

Assistants.—The School of Chemistry now employs nine assistants at $500 per annum, who give from 12-15 hours per week to the teaching of chemistry. The object of these assistantships is to provide the departments with efficient assistance, especially in connection with large laboratory classes; and to give the assistants as wide an experience as possible in teaching under competent direction. In addition to the teaching each assistant is expected to pursue some line of research whether or not he is working for a higher degree.

School of Chemistry Society.—The School of Chemistry Society is an organization of students of the school which meets once a month to consider topics of general interest. The society also occasionally procures lecturers to deliver addresses, which are open to the public.

American Chemical Society.—A local section of the American Chemical Society has been organized in Minnesota with headquarters at the University. All students interested are cordially invited to attend its meetings.

The following rule of the College of Science, Literature, and the Arts, applies to candidates for the B.A. degree in the Five-Year Course in Arts and Chemistry: "Requirements for graduation are expressed in credit hours, indicating amount of work; and in honor points, indicating grade of work. Honor points are computed as follows: each credit hour with the grade of A carries three honor points; each credit hour with the grade of B, two honor points; each credit hour with the grade of C, one honor point."

In all these courses a credit is such an amount of work as will require three hours a week of a student's time. One hour of recitation is assumed to require two hours of preparation at home. In the case of laboratory work which does not require outside preparation, three hours of work count for one credit. The credit allowed for lectures varies from one-third to one credit a lecture a week, depending on the amount of outside preparation required of the student for the lecture.

Figures following the descriptive name of a course indicate the number of credits.

EXPLANATION OF COURSE NUMBERS

Odd numbers indicate first-semester courses; even numbers, second-semester courses. A combination of the two (e.g., 5-6) indicates courses continuing through the year. The suffixes *a* and *b* apply to one-semester courses offered both semesters, *a* indicating the first semester and *b* the second semester (e.g., 3a,b; 4a,b).

All undergraduate courses are numbered from 1 to 100. All courses open to undergraduates and graduates are numbered from 101 to 200. Strictly graduate courses are numbered from 201 up.

COURSES OF STUDY

ANALYTICAL CHEMISTRY

FRESHMAN YEAR

Chemistry 5-6, General and Analytical, 10
Drawing 21-22, Technical, 4
Mathematics 5 and 9b, Algebra, Trigonometry, and Analytical Geometry, 10
Geology 21, Elements of Mineralogy, 3 (first semester)
*Metallurgy 2, Assaying, 4 (second semester)
Rhetoric 1-2, Rhetoric and Composition, 6
Military Drill, three hours
Physical Education for Men, one hour (first semester only)
or
Physical Education for Women, three hours

SOPHOMORE YEAR

Animal Biology, 1-2, General Zoology, 6
or
Botany 1-2, General, 6
or
Mathematics 11a and 51b, Calculus, 6
Chemistry 9, Inorganic Preparations, 2 (first semester)
Chemistry 10, Glass Blowing, 1 (second semester)
Chemistry 11-12, Quantitative Analysis, 8
German 1-2 or 5-6 or 21-22, 12 or 6
Physics, 1-2, General, 6
Physics 3-4, Laboratory, 2
Military Drill, three hours

JUNIOR YEAR

First Semester

†Chemistry 15, Photochemistry, 2
Chemistry 23, Iron and Steel Analysis, 2
Chemistry 35, Organic Chemistry, 4
Chemistry 121, Physical, 2
Chemistry 123, Physico-chemical Laboratory, 1

---

* Women must take Geology 22 instead of Metallurgy 2.

† During the junior and senior years the student, if prepared, has the privilege of specializing for not less than two semesters along one of the following lines: Organic Chemistry, Physical Chemistry, Analytical Chemistry, Applied Chemistry, Phytochemistry, Physiological Chemistry, Geochemistry, Bromatology.

Geology 1, General, 3
‡Metallurgy 3, General and Iron, 3

Second Semester

Chemistry 106, Mineral and Ore Analysis, 2
Chemistry 36, Organic, 4
†Chemistry 114, Organic Analysis, 3
Chemistry 122, Physical, 2
Chemistry 124, Physico-chemical Laboratory, 1
Chemistry 144, Electrochemistry, 2
‡Metallurgy 4, Wrought Iron and Steel, 3

SENIOR YEAR

First Semester

Chemistry 17, Inorganic Colloquium, 2
Chemistry 109, Water Analysis, 1
Chemistry 131, Food Analysis, 2
Chemistry 135, Gas and Coal Analysis, 2
Chemistry 141, Industrial, 3
†Chemistry 143, Sugar, 1
†‡Metallurgy 105, Base Metals, 4
Thesis, 2

Second Semester

Chemistry 18, Organic Colloquium, 2
Chemistry 132, Food Analysis, 2
†Chemistry 134, Microchemistry, 1
Chemistry 162, History, 2
†‡Metallurgy 106, Precious Metals, 4
or
Bacteriology 58, General, 4
Thesis, 5

---

† During the junior and senior years the student, if prepared, has the privilege of specializing for not less than two semesters along one of the following lines: Organic Chemistry, Physical Chemistry, Analytical Chemistry, Applied Chemistry, Phytochemistry, Physiological Chemistry, Geochemistry, Bromatology.

‡ Not open to women. An elective may be taken in any science with the approval of the Students' Work Committee.

FIVE-YEAR COURSE IN ARTS AND CHEMISTRY

FRESHMAN, SOPHOMORE, AND JUNIOR YEARS

During the first three years of the course the student is registered in the College of Science, Literature, and the Arts, and subject to its rules. (See Bulletin of the College of Science, Literature, and the Arts.) In or-

der to obtain the degree of Bachelor of Arts at the end of his fourth year and Bachelor of Science in Chemistry at the end of the fifth, he must complete at least ninety credit hours, including fifteen credit hours in starred courses, in the College of Science, Literature, and the Arts during the first three years. These ninety credits must embrace the following subjects and groups of subjects. (For definition of terms and groups, see Bulletin of the College of Science, Literature, and the Arts.)

(1) At least eighteen credits in Group A of the College of Science, Literature, and the Arts, six credits of this to be Rhetoric 1-2, and at least twelve credits of it to be in German.

(2) Eighteen credits or more in Group B of the College of Science, Literature, and the Arts.

(3) The following courses:

General Chemistry and Qualitative Analysis, or equivalent
Quantitative Analysis, one year
Technical Drawing, 21-22, one year
Geology 21, one semester
*Metallurgy 2 (men) or Geology 22 (women), one semester
Biological Science, one year
General Physics with laboratory work, one year
Mathematics, ten credits
Glass Blowing, one credit.

SENIOR YEAR

During his fourth year he must complete the work required in the junior year of the Analytical Course of the School of Chemistry, and during the four years he must earn 120 honor points (see page 20).

The degree of Bachelor of Arts is voted by the College of Science, Literature, and the Arts at the end of the fourth year, when the student must present a total of not less than one hundred and twenty approved credits, including the two minors above mentioned and at least fifteen credits in courses starred in the Bulletin of the College of Science, Literature, and the Arts. Credits in professional work taken during the fourth year are accepted provided such work has a prerequisite of at least two years of college work.

In this way the student has at the end of the fourth year completed practically all of the required work of the first three years in the School of Chemistry, and also such other work as will enable him to fulfill the requirements for the B.A. degree.

POST-SENIOR YEAR

The fifth year is the same as the fourth year of the course in Analytical Chemistry, and upon its completion he will be entitled to the degree of Bachelor of Science in Chemistry.

---

* Not open to women, who will take Geology 22 instead of Metallurgy 2.

*APPLIED CHEMISTRY

FRESHMAN YEAR

Chemistry 5-6, General and Analytical, 10
Drawing 1, Freehand (first semester), 1½
Drawing 2, Mechanical (second semester), 1½
Drawing 3 and 4, Descriptive Geometry, 3
Mathematics 5 and 9b, Algebra, Trigonometry, and Analytical Geometry, 10
Geology 21, Elements of Mineralogy, 3 (first semester)
Metallurgy 2, Assaying, 4 (second semester)
Rhetoric 1-2, Rhetoric and Composition, 6
Military Drill, three hours

SOPHOMORE YEAR

Chemistry 11-12, Quantitative Analysis, 8
Drawing 7-8, Drafting, 4
Mathematics 11a and 51b, Calculus, 6
Mechanical Engineering 1-2, Elementary Shop Practice, 4
Physics 21-22, Elements of Mechanics, 6
Military Drill, three hours

JUNIOR YEAR

Chemistry 10, Glass Blowing, 1 (second semester)
Chemistry 35-36, Organic, 8
Chemistry 106, Mineral and Ore Analysis, 2 (second semester)
German 1-2 or 5-6 or 21-22, 12 or 6
Physics 161, Electricity and Magnetism, 4‡ (first semester)
Physics 42, Heat, 3 or Physics 162, Electrical Measurements, 3 (second semester)
Mechanical Engineering 3-4, Pattern Making, Foundry and Machine Shop, 6
Mechanical Engineering 15, Mechanism and Kinematics, 4

SENIOR YEAR

First Semester

Chemistry 23, Iron and Steel Analysis, 2
Chemistry 109, Water Analysis, 1
Chemistry 121, Physical, 2
Chemistry 123, Physico-chemical Laboratory, 1
†Geology 1, General, 3

---

* Not open to women.

† Students wishing to specialize in Electrochemistry, Gas Engineering, or Sugar Technology, may elect special subjects in place of subjects marked thus.

‡ Students not expecting to take Physics 162 in the second semester, may omit the laboratory in Physics 161, and will then receive three credits.

Chemistry 143, Sugar, 1
Metallurgy 3, General and Iron, 3
Mechanical Engineering 129, Steam Engines and Boilers, 3

Second Semester

Chemistry 122, Physical, 2
Chemistry 124, Physico-chemical laboratory, 1
Chemistry 144, Electrochemistry, 2
†Economics 1b, Elements, 3
Mechanical Engineering 116, Machine Design, 4
Metallurgy 4, Wrought Iron and Steel, 3
Political Science 1b, American Government, 3

POST-SENIOR YEAR

First Semester

Chemistry 135, Gas and Coal Analysis, 2
Chemistry 141, Industrial, 3
†Elective, 3 to 6
Electrical Engineering 157, Electric Power, 3
Thesis, 4

Second Semester

†Chemistry 132, Food Analysis, 3
Chemistry 142, Industrial, 3
Electrical Engineering 158, Electric Power, 3
†Elective, 2 or 3
Political Science 26, Commercial Law, 2
Thesis, 4

---

† Students wishing to specialize in Electrochemistry, Gas Engineering, or Sugar Technology, may elect special subjects in place of subjects marked thus.

DEPARTMENTAL STATEMENTS

CHEMISTRY

Professors GEORGE B. FRANKFORTER, CHARLES F. SIDENER; Associate Professors EVERHART P. HARDING, WILLIAM H. HUNTER; Assistant Professors IRA H. DERBY, FRANK H. MACDOUGALL, EDWARD E. NICHOLSON, STERLING TEMPLE; Instructors ROSS ALLEN BAKER, FRANK W. BLISS, LILLIAN COHEN, ISAAC W. GEIGER, LAWRENCE M. HENDERSON, EDWARD B. PECK, CARL L. SCHUMANN, WOLDEMAR STERNBERG, H. LEE WARD; Assistants HERMAN BAKKEN, ARTHUR R. CADE, ROSCOE H. CARTER, DONALD C. FARLEY, WALTER M. LAUER, ALAN S. HUMPHREYS, WILLIAM METHLEY, ANNA PETERSON.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Division of General and Inorganic Chemistry			
1-2.	General Chemistry	6	Those entering without Chemistry	None
21-22.	Inorganic and Qual. Chem.	10	Those entering without Chemistry	None
3-4.	Adv. Gen. Chem. and Qual. Anal.	6	Fr., soph., jr.	Entrance credit in Chemistry
5-6.	Gen. and Anal. Chem.	6 or 10	Fr. in Chemistry and Mines	Entrance credit in Chemistry
7-8.	Qualitative Analysis	6	Soph., jr., sr.	1-2
9.	Inorganic Preparations	2	Soph., jr.	3-4, 5-6, 7-8, or 21-22
10.	Glass Blowing	1	Soph., jr., sr.	None
17.	Inorganic Colloquium	2	Sr.	11-12
19.	Gen. Chem. and Qual. Anal.	5	Fr. in Eng.	None
20.	Teachers' Course	2	Jr., sr.	3-4, 5-6, 7-8, or 21-22
29.	Chem. for Engineers	3	Fr. in Eng.	Entrance credit in Chemistry
30.	Chem. for Engineers	3	Fr. in Eng.	19 or 29
33.	Gen. Chem. and Qual. Anal.	5	Fr. in Schools of Agr. & For.	None
51a,b.	Chem. for Nurses	..	Nurses	None
161.	Chemical Literature	1	Sr., grad.	3-4, 5-6, 7-8, or 21-22, 35-36
162.	History of Chemistry	2	Sr., grad.	35-36
167-168.	Adv. Inorganic Chemistry	4	Sr., grad.	2 yrs. College Chem.
169-170.	Chem. of the Rare Elements	4	Jr., sr., grad.	11-12
	Division of Analytical Chemistry			
11-12.	Quantitative Analysis	8	Soph., jr., sr.	3-4, 5-6, 7-8, or 21-22
23.	Iron and Steel Analysis	2	Jr., sr., grad.	11-12
25.	Ore and Slag Analysis	3	Sr. in Mines	11-12
106.	Mineral and Ore Analysis	2	Jr., sr.	11-12
107-108.	Adv. Quantitative Analysis	4 or 6	Sr., grad.	11-12
109.	Water Analysis	1	Sr., grad.	11-12

No.	Title	Credits	Offered to	Prereq. courses
	Division of Organic Chemistry			
13-14.	Medical Organic Chemistry	6	Medical, pre-medical, and pharmacy	3-4 or 7-8 or 21-22
18.	Organic Colloquium	2	Sr.	35-36
35-36.	Organic Chemistry	8	Soph., jr., sr.	3-4 or 7-8
37.	Dental Organic Chemistry	..	Dental	3-4
113.	Toxicology	2	Sr., grad.	35-36
114.	Organic Analysis	3	Jr., sr., grad.	35-36
115.	Adv. Organic Chemistry	2	Sr., grad.	35-36
116.	Theoretical Organic Chem.	2	Sr., grad.	35-36
117.	Coal Tar Dyes	2	Sr., grad.	35-36
118.	Chem. of the Essential Oils	2	Sr., grad.	35-36
119.	Chem. of Newer Medicinal Compounds	2	Sr., grad.	35-36
	Division of Physical Chemistry			
91a,b.	Medical Physical Chemistry	4	Medical	13-14
121-122.	Physical Chemistry	4	Jr., sr., grad.	11-12
123-124.	Physico-chemical Lab.	2	Jr., sr., grad.	See statement
125-126.	Adv. Physical Chemistry	6	Sr., grad.	121-122
127.	Radiochemistry	2	Jr., sr., grad.	7-8 or 11-12
128.	Lab. course in Radiochemistry	2	Jr., sr., grad.	127
129-130.	Adv. Physico-chemical Lab.	3 to 6	Sr., grad.	123-124
171.	Osmotic and Diffusion Phenomena in Solutions	3	Sr., grad.	121-122, 123-124, 125
172.	Colloids and Colloidal Mixtures.	3	Sr., grad.	121-122, 123-124, 125
173.	Thermochemistry and Chemical Affinity	3	Sr., grad.	121-122, Math. 51
173-174.	Electrochemistry	6	Sr., grad.	121-122, 123-124
	Division of Technological Chemistry			
27-28.	Chemistry in Every Day Life	4	Jr., sr.	3-4, 7-8 or 21-22
38.	Power Plant Chemistry	3	Soph. M. E.	26
39-40.	Fuels and Their Utilization	2	Sr., grad. and Jr. M. E.	135 or 38
41.	Gas Manufacture	2	Sr., grad. and Jr. M. E.	135 or 38
131.	Food Analysis	2	Sr., grad.	11-12
132.	Food Analysis	2	Sr., grad.	11-12
134.	Microchemistry	1	Sr., grad.	11-12
135.	Gas and Coal Analysis	2	Sr., grad.	11-12
136.	Lubricants	2	Jr., sr.	11-12
137.	Paint Analysis	2	Sr., grad.	11-12
	Division of Industrial Chemistry			
15.	Photochemistry	2	Jr., sr.	3-4, 5-6, 7-8, or 21-22
16.	Color Photography	2	Jr., sr.	15
49.	Ceramics	2	Jr., sr.	11-12, 35-36
141.	Industrial Chemistry	3	Sr., grad.	11-12
142.	Industrial Chemistry	3	Sr., grad.	35-36, 141
143.	Sugar Chemistry	1	Sr., grad.	35-36
144.	Electrochemistry	2	Jr., sr., grad.	11-12
145.	Electric Furnaces	2	Jr., sr., grad.	11-12
147.	Electrochemical Preparations	2	Jr., sr., grad.	11-12, 35-36
150.	Industrial Chemical Calculations.	3	Sr., grad.	121, Math. 51
153.	Elements of Photo-engraving	2	Sr., grad.	15
154.	Adv. Photo-engraving	2	Sr., grad.	153
155.	Wood Chemistry	2	Jr., sr., grad.	35-36
156.	Technology of Paper Pulp	2	Jr., sr., grad.	155

DIVISION OF GENERAL AND INORGANIC CHEMISTRY

1-2. General Chemistry. A study of the metallic and non-metallic elements and the underlying laws and theories of chemistry. Cohen and Assistants.

3-4. Advanced General Chemistry and Qualitative Analysis. Lectures, recitations, and laboratory work. A discussion of the general chemical theories and laws, with qualitative analysis. Frankforter, Dietrichson, and Assistants.

3-4a,b. Advanced General Chemistry and Qualitative Analysis. As above, for students in the Colleges of Agriculture and Forestry. Frankforter, Baker, Henderson, Ward, and Assistants.

3-4. Advanced General Chemistry and Qualitative Analysis. As above, for dental students. Frankforter, MacDougall, and Assistants.

3-4. Advanced General Chemistry and Qualitative Analysis. As above, for students of pharmacy. Frankforter, Peck, and Assistants.

5-6. General and Analytical Chemistry. An introduction to descriptive, physical, and metallurgical chemistry and qualitative analysis. Temple and Assistants.

7-8. Qualitative Analysis. 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. Nicholson, Bliss, and Assistants.

9. Inorganic Preparations. The preparation of inorganic salts. Laboratory work. Harding.

10. Glass Blowing. Demonstration of glass manipulation. The construction and repair of simple glass apparatus. Three hours laboratory practice per week. One credit. Baker.

17. Colloquium in Inorganic Chemistry. A systematic review. Baker.

19. General Chemistry and Qualitative Analysis. Designed for engineers who have had no high school chemistry, in preparation for Course 30. See statement under 29. Frankforter, Bliss, and Assistants.

20. Teachers' Course. Offered to those who are interested in the teaching of chemistry. Temple.

21-22. Inorganic and Qualitative Analysis. This includes a study of the non-metals, metals, and qualitative analysis, together with a discussion of the fundamental laws and theories of chemistry. Cohen.

29. CHEMISTRY FOR ENGINEERS. An advanced course for engineers; general chemistry, with an introduction to analytical chemistry and chemical theories. FRANKFORTER, BLISS, and Assistants.

30. CHEMISTRY FOR ENGINEERS. A continuation of Course 29. FRANKFORTER, BLISS, and Assistants.

33. GENERAL CHEMISTRY AND QUALITATIVE ANALYSIS. Designed for students in the Colleges of Agriculture and Forestry who have had no high school chemistry; in preparation for Course 4b. FRANKFORTER, BAKER, HENDERSON, WARD.

51a,b. ELEMENTARY CHEMISTRY FOR NURSES. A brief study of the fundamentals of inorganic chemistry. COHEN.

161. CHEMICAL LITERATURE. The course aims to familiarize the students with chemical literature and will include required reading, reports, and bibliographical work. HENDERSON.

162. HISTORY OF CHEMISTRY. History of the development of chemical theories and laws. COHEN.

167-168. ADVANCED INORGANIC CHEMISTRY. Designed to systematize and broaden the student's knowledge of inorganic chemistry. Based largely on Periodic System. Important types of chemical reactions with reference to their analytical and industrial significance. Lectures, recitations, and assigned reading. Two credits a semester. Prerequisite: two years of college chemistry. BAKER.

169-170. CHEMISTRY OF THE RARE ELEMENTS. The descriptive chemistry of the rare elements and their analytical separation. NICHOLSON.

DIVISION OF ANALYTICAL CHEMISTRY

11-12. QUANTITATIVE ANALYSIS. Includes a general discussion of quantitative methods, with laboratory work in gravimetric analysis, first semester, followed by a discussion of standard solutions and the necessary stoichiometric calculations, with laboratory work in volumetric analysis, second semester. SIDENER, STERNBERG, GEIGER.

23. IRON AND STEEL ANALYSIS. Includes technical methods for the determination of the common constituents of iron ores, iron and steel, with training in rapid work. SIDENER, STERNBERG, GEIGER.

25. ORE AND SLAG ANALYSIS. Rapid technical methods for the determination of certain constituents in ores and slags. SIDENER.

106. MINERAL AND ORE ANALYSIS. Theory and practice in accurate analysis of silicate rocks, and the rapid determination of certain constituents of ores. SIDENER.

107-108. ADVANCED QUANTITATIVE ANALYSIS. The work in this course

will be adapted as far as possible to the needs and desires of the individual student. SIDENER.

109. WATER ANALYSIS. The course includes an exhaustive discussion of the chemical and sanitary properties of water. FRANKFORTER.

139-140. QUANTITATIVE ANALYSIS. See Bulletin of the Graduate School. SIDENER.

DIVISION OF ORGANIC CHEMISTRY

13-14. MEDICAL ORGANIC CHEMISTRY. An outline of the chemistry of carbon, includes the preparation of some of the more important organic compounds. Special emphasis is laid on the parts of organic chemistry most important in medicine. Medical, pre-medical, and pharmacy students. 208 hours; six credits. HUNTER, SCHUMANN, and Assistants.

18. COLLOQUIUM IN ORGANIC CHEMISTRY. A thoro quiz in general organic chemistry. FRANKFORTER.

35-36. ORGANIC CHEMISTRY. Includes the aliphatic and the aromatic series, with the preparation of the more important compounds. FRANKFORTER, SCHUMANN, and Assistants.

37. DENTAL ORGANIC CHEMISTRY. A course in the essentials of organic chemistry, with especial reference to compounds important in dentistry. Lectures, recitations, and laboratory work. FRANKFORTER, SCHUMANN, and Assistants.

113. GENERAL TOXICOLOGY. A discussion of the chemistry of the various poisonous compounds, both organic and inorganic; also methods of their isolation from animal tissue, together with tests for same. DERBY.

114. ORGANIC ANALYSIS. Practice in elementary analysis, determination of special groups, and identification of pure compounds. HUNTER.

115. ADVANCED ORGANIC CHEMISTRY. Selected topics: constitution work, quinones, etc.; the study of organic reactions. HUNTER.

116. THEORETICAL ORGANIC CHEMISTRY. This course will take up theories which apply especially to carbon compounds, such as relation of properties to constitution, carbon valence theory, etc. HUNTER.

117. THE COAL-TAR DYES. The chemistry of the coal-tar dyes and their intermediate products. FRANKFORTER.

118. THE CHEMISTRY OF THE ESSENTIAL OILS. A discussion of the constituents of the essential oils, including the terpenes and perfumes. FRANKFORTER.

119. CHEMISTRY OF THE NEWER MEDICINAL COMPOUNDS. Includes a discussion of the chemistry of synthetic organic substances which have medicinal properties. (Continued in Pharmacology second semester.) FRANKFORTER, HUNTER.

175-176. ORGANIC CHEMISTRY. See Graduate School Bulletin. FRANKFORTER.

DIVISION OF PHYSICAL CHEMISTRY

91a,b. MEDICAL PHYSICAL CHEMISTRY. Course for medical students only. Deals particularly with topics involved in their work, such for example as transpiration and diffusion of gases and dissolved substances, osmotic pressure, chemical equilibrium, and reaction velocity, thermochemistry and electrochemistry. DERBY.

121-122. PHYSICAL CHEMISTRY. A consideration of the theories and laws, phenomena and processes which form the basis of chemical science. Charts, models, and experiments are employed to supplement and illustrate the discussions. Open only to those who have had or are taking Course 35-36. MACDOUGALL.

123-124. PHYSICO-CHEMICAL LABORATORY. Physico-chemical methods and measurements. Open only to students pursuing Course 121-122, or who have had it or its equivalent. MACDOUGALL.

125-126. ADVANCED PHYSICAL CHEMISTRY. The theories of chemistry treated systematically from the standpoint of thermo-dynamics and the molecular theory. Suited to the needs of candidates for the higher degrees and all others interested in the advances of modern physical chemistry. DERBY.

127. RADIOCHEMISTRY. The occurrence, methods of isolation, and physico-chemical properties of the radioactive substances, together with a brief consideration of the chemical, geological, and biological bearing of the subject. HENDERSON.

128. LABORATORY COURSE IN RADIOACTIVITY. To follow Course 127. HENDERSON.

129-130. ADVANCED PHYSICO-CHEMICAL LABORATORY. Advanced measurements in physical chemistry adapted to the desires and qualifications of the individual student. Assigned reading will accompany the experimental work. DERBY, MACDOUGALL.

171. OSMOTIC AND DIFFUSION PHENOMENA IN SOLUTION. A study of the solution process and properties of solutions with reference to solubility, osmotic pressure, diffusion, etc. This course is of importance to students in Geology, Biology, and Physiology. A knowledge of calculus is desirable. DERBY.

172. COLLOIDS AND COLLOIDAL MIXTURES. Aqueous and non-aqueous solutions of colloids. Preparation, methods of study, and observation

of solute with reference to adsorption, swelling, solubility, brownian movement, osmosis, electrical properties, etc. Of special interest to the biologist and physiologist. DERBY.

173. THERMOCHEMISTRY AND CHEMICAL AFFINITY. Special attention given to reactions of technical importance. Will include a study of chemical equilibrium and reaction velocity, of catalysis and chemical affinity in general. MACDOUGALL.

174. ELECTROCHEMISTRY. The modern theories of solutions and the principles of thermodynamics in their application to electro-chemical energy transformations, electrical quantity, and electro-motive force. MACDOUGALL.

Laboratory work to accompany Courses 125, 126, 171, 172, 173, 174 may be arranged for by electing the desired number of credits in Courses 129 and 130.

DIVISION OF TECHNOLOGICAL CHEMISTRY

27. CHEMISTRY IN EVERY DAY LIFE. A discussion of the inorganic substances used in every day life. GEIGER.

28. CHEMISTRY IN EVERY DAY LIFE. A discussion of the organic substances used in every day life. GEIGER.

38. POWER PLANT CHEMISTRY. Methods of sampling and analyzing coal, liquid fuels, and gases and methods of determining their calorific value for heat efficiency and control work. Boiler waters, their examination, character, treatment. Lectures, laboratory work. For engineers only. HARDING and Assistants.

39-40. FUELS AND THEIR UTILIZATION. A descriptive study of fuels and their combustion, either directly or after their conversion into gas or coke, and of regenerative furnaces. Lectures and library work. HARDING.

41. GAS MANUFACTURE. The larger part of the time will be devoted to a consideration of the problems involved in the manufacture of the various industrial gases and the purification of coal gas and water gas. Lectures and library work. HARDING.

131. FOOD ANALYSIS. Includes the chemical analysis of the various food products and the detection of the common adulterants. HARDING.

132. FOOD ANALYSIS. Continuation of Course 131. HARDING.

134. MICROCHEMISTRY. Includes the precipitation, examination, and identification of minute quantities of substances, and the examination of food materials, fibers, etc., by means of the microscope. HARDING.

135. GAS AND COAL ANALYSIS. Comprises the methods of collecting and storing gases preliminary to their analysis; methods of manufacturing

commercial gases, their chemical analysis, calorific and photometric; also ultimate and proximate analysis of coals and their calorific determination. HARDING.

136. LUBRICANTS. Comprises the chemical and physical examination of oils and greases, and a study of the sources, properties, and uses of lubricants. Two credits, second semester. BLISS.

137. PAINT ANALYSIS. Comprises the quantitative separation of pigments and vehicles; a chemical and physical examination of the vehicles; and qualitative and quantitative analyses of the pigments. HARDING.

DIVISION OF INDUSTRIAL CHEMISTRY

15. PHOTOCHEMISTRY. Includes a discussion of the general principles of photochemistry and their application to dry-plate photography and the ordinary printing processes. PECK.

16. COLOR PHOTOGRAPHY. Theory and practice in the preparation and use of orthochromatic and panchromatic plates; photography in natural colors. PECK.

49. CERAMICS. Lectures, conferences, and laboratory work on the working and burning of clays for brick, stoneware, pottery, etc. TEMPLE.

141. INDUSTRIAL CHEMISTRY. Includes the discussion of methods and apparatus used in chemical technology, the testing of commercial chemical products, and excursions. TEMPLE.

142. INDUSTRIAL CHEMISTRY. Continuation of Course 141. TEMPLE.

143. SUGAR CHEMISTRY. Includes the technology of sugar manufacture. NICHOLSON.

144. ELECTROCHEMISTRY. A discussion of electro-analytical methods and industrial electrochemical processes, with their underlying principles. DIETRICHSON.

145. ELECTRIC FURNACES. Theory and practice in the design, construction, and operation of electric furnaces. DIETRICHSON.

147. ELECTROCHEMICAL PREPARATIONS. Theory and practice in the electrochemical preparation of organic and inorganic substances. DIETRICHSON.

150. INDUSTRIAL CHEMICAL CALCULATIONS. Practice in mathematical treatment of chemical data as applied to chemical industry. Lectures, recitations, required reading, and reports on individual problems. PECK.

153. ELEMENTS OF PHOTOENGRAVING. Includes a study of the preparation of wet plates, zinc etchings, and heliogravures. PECK.

154. ADVANCED PHOTOENGRAVING. Includes the preparation of screen negatives and copper half-tones. PECK.

155. WOOD CHEMISTRY. Includes a general survey of the chemistry of the carbohydrate group, special attention being given to the resins, the terpenes, cellulose and lignocellulose. FRANKFORTER.

156. TECHNOLOGY OF PAPER PULP. Preparation of the various wood products, as pure cellulose, commercial wood pulp and paper. Special attention will also be given to factory control of these processes. TEMPLE.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. Research Work in Inorganic Chemistry. FRANKFORTER.
203-204. Research Work in Inorganic Chemistry. BAKER.
205-206. Research Work in Inorganic Chemistry. DIETRICHSON.
207-208. Research Work on the Rare Elements. NICHOLSON.
211-212. Research Work in Quantitative Analysis. SIDENER.
221-222. Research Work in Organic Chemistry. FRANKFORTER.
223-224. Research Work in Organic Chemistry. HUNTER.
227-228. Research Work on Oils and Varnishes. SCHUMANN.
231-232. Research Work in Physical Chemistry. DERBY.
233-234. Research Work in Physical Chemistry. MACDOUGALL.
235-236. Research Work in Physical Chemistry. PECK.
237-238. Research Work in Radioactivity. HENDERSON.
241-242. Research Work on Foods. HARDING.
243-244. Research Work on Fuels. HARDING.
251-252. Research Work in Industrial Chemistry. TEMPLE.
253-254. Research Work in Applied Electrochemistry. DIETRICHSON.
255-256. Research Work in Photochemistry. PECK.

ANIMAL BIOLOGY

Professors HENRY F. NACHTRIEB, CHARLES P. SIGERFOOS; Associate Professor HAL DOWNEY; Instructor GEORGE DELWIN ALLEN.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1-2.	General Zoology	6	Fr., soph.	None
7-8.	Histology and Embryology	6	Fr., soph.	1-2
12.	Histological Technique (See Anatomy Schedule)	3	Fr., soph.	1-2, 7
15-16.	General Physiology	6	Fr., soph.	12 cr. in An. Biol. or Zool. 1-2 and Chem. 13-14 or 35-36

1-2. GENERAL ZOOLOGY. A survey of the animal kingdom, emphasizing the principles of structure, physiology, embryology, classification, and evolution of animals. Textbooks, lectures, quizzes, and laboratory work. SIGERFOOS, ALLEN.

7-8. HISTOLOGY AND EMBRYOLOGY. A comparative microscopic study of the origin and structure of the tissues of vertebrates and invertebrates, and of the organs of mammals. A preparatory course for most of the advanced courses. Textbook, lectures, and laboratory. DOWNEY and Assistant.

15-16. GENERAL PHYSIOLOGY. The functional characteristics of living substances as seen in the cell, tissues, organs, and organisms; theories of the origin of life and death. Textbook, lectures, demonstrations, and laboratory. NACHTRIEB and Assistant.

For other and more advanced courses, see the Bulletin of the College of Science, Literature, and the Arts.

BOTANY

Professors CARL OTTO ROSENDAHL, JOSEPHINE E. TILDEN; Assistant Professors HERBERT F. BERGMAN, NED L. HUFF; Instructor WILLIAM S. COOPER; Assistants DONALD FOLSOM, FRANCES L. LONG, HARVEY STALLARD.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
1a,b.	General Botany	3	All	None
2.	Structural Botany	3	All	Approved High School Botany, 1 or 3a
4.	Field and Garden Botany	3	All	Approved High School Botany, 1, 2, or 3a
	Intermediate Courses			
7-8.	Taxonomy	3 or 6	Soph., jr., sr.	6 credits; see note under course
9-10.	Physiology and Ecology	3 or 6	Soph., jr., sr.	6 credits
11-12.	Industrial Botany	3 or 6	Soph., jr., sr.	6 credits, including 2 or 3

INTRODUCTORY COURSES

1a,b. GENERAL BOTANY. A study of the external form and organs of flowering plants, root, stem, leaf, fruit and seed, and of their relations to each other, together with simple greenhouse experiments to illustrate the various functions. HUFF, BERGMAN, FOLSOM, LONG, STALLARD.

2. STRUCTURAL BOTANY. A study of the microscopic structure of flowering plants, the cell, tissues and tissue systems, as seen in the root, stem, leaf, etc. HUFF, STALLARD.

4. FIELD AND GARDEN BOTANY. Greenhouse, garden and field study of the form, behavior, naming, and relationships of flowering plants, together with individual problems in the pollination, reproduction and

propagation of common flower types. BERGMAN, COOPER, FOLSOM, LONG, STALLARD.

INTERMEDIATE COURSES

Either semester of the following courses open to students with the proper prerequisites.

7-8. TAXONOMY. A general study of the classification and relationships of flowering plants. Laboratory and field practice in the determination of species, together with lectures and quizzes. Course 8 (but not 7) open to those who have taken Course 4. ROSENDAHL.

9-10. PHYSIOLOGY AND ECOLOGY. Greenhouse and field study of physical factors and plant responses, absorption, transport, water, loss, nutrition, growth, fertilization, reproduction, and adaptation: field study of habitat, migration, competition, invasion, and succession. COOPER.

11-12. INDUSTRIAL BOTANY. Laboratory study of the plants which are useful to man, including those which furnish food, shelter, clothing, etc. TILDEN.

DRAWING AND DESCRIPTIVE GEOMETRY

Professor WILLIAM H. KIRCHNER; Assistant Professor ROBERT W. FRENCH; Instructors HOWARD D. MYERS, FRED W. BENTLEY, LAWRENCE J. MORTENSON, RUTCHER SKAGERBERG.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1-2.	Engineering Drawing	3	Fr.	See statement
3-4.	Descriptive Geometry	3	Fr.	See statement
7-8.	Graphics	6	Soph.	1-2, 3-4
21-22.	Technical Drawing	4	All	None

1. ENGINEERING DRAWING. The elements of drafting. Drawing as a language. Lines, views, sections, dimensions, isometric and oblique projection. Sketching and lettering. Details of castings. Interpretation of working drawings. FRENCH, MYERS, MORTENSON.

2. ENGINEERING DRAWING. A continuation of Course 1. Details of machine parts and assembly drawings. General conventional signs, abbreviations, standards, and explanatory notes. Tracing and blue printing. FRENCH, BENTLEY, SKAGERBERG.

3. DESCRIPTIVE GEOMETRY. Introductive course in descriptive geometry. Systems of representation, methods, loci, and constructive geometry. Recitations and drawing room exercises. Taken concurrently with Course 1. Open to students who have had Solid Geometry and are in Mathematics 71, or equivalent. KIRCHNER, MYERS, BENTLEY.

4. DESCRIPTIVE GEOMETRY. Central projection and special cases. Representations of lines, planes, and solids and of their relations; tangen-

cies, intersections, and development. Recitations, lectures, and the solution of problems. Taken concurrently with Course 2, and Mathematics 72, or equivalent. KIRCHNER, MYERS, MORTENSON.

7. GRAPHICS. Developments and intersections, shades and shadows, and perspective. Descriptive Geometry applied to the solution of such problems as occur in Sheet Metal work, equipment layouts, skew belting, spiral conveyors. FRENCH, MYERS, BENTLEY.

8. GRAPHICS. Working drawings of machinery . Assembly drawings, outline drawings, diagrammatic, layout, and detail drawings. Drafting room methods and systems. BENTLEY, SKAGERBERG.

21-22. TECHNICAL DRAWING. Theoretical and practical graphics, the reading and making of working plans. Projection, sketching, lettering, conventions, renderings, and translations. MORTENSON.

ECONOMICS

Professor E. DANA DURAND; Assistant Professors ROY G. BLAKEY, THOMAS WARNER MITCHELL; Instructors LLOYD M. CROSGRAVE, ALBERT C. HODGE, ALBERT C. JAMES, ROBERT J. MCFALL, WILLIAM A. PATON, J. WARREN STEHMAN.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
3-4.	General Economics	6*	Soph., jr., sr.	None
10.	Industries and Commerce of the United States	3	Soph., jr., sr.	None
13.	Economic Geography of Foreign Countries	3	Soph., jr., sr.	3 credits
34.	Business Management	3	Soph., jr., sr.	3
35-36.	Accounting Principles	6*	Soph., jr., sr.	None
43a,b.	Banking	3	Soph., jr., sr.	3
145.	The Modern Business Corporation	3	Jr., sr., grad.	6 credits inc. 3
146.	Public Utilities	3	Jr., sr., grad.	145

* Both semesters must be completed before credit is given for the first semester.

GENERAL COURSES

3a,b-4a,b. GENERAL ECONOMICS. Principles that underlie the present industrial order and main economic problems of today. BLAKEY, JAMES, STEHMAN, and others.

PRODUCTION

10. INDUSTRIES AND COMMERCE OF THE UNITED STATES. Agricultural, mining, and manufacturing industries and internal and foreign commerce. Leading individual industries, geographical distribution, methods of organization, production and marketing, and relationships to one another. Textbook, lectures and assigned readings. MCFALL.

13. ECONOMIC GEOGRAPHY OF FOREIGN COUNTRIES. Economic basis of

modern civilization; localization of industries; principal extractive, manufacturing, and distributive industries of leading foreign countries, especially markets for American manufacturers. Textbook with lectures and special reports. McFall.

34. Business Management. The principles of efficiency in business operation and forms of organization to apply them; the typical departments of a business; their functions, office organization and administration. Textbook, assigned readings, and lectures. Mitchell, Hodge.

35-36. Principles of Accounting. The purpose and principles of account classification; capital and revenue; accruals; valuation; depreciation; preparation and interpretation of balance sheets, income accounts, and other statements; corporation accounts. A laboratory course with supplementary lectures. Mitchell, Hodge, Paton.

43a,b. Principles and Practice of Banking. Contemporary banking institutions, their organization and operation; loans, reserves, note issues, clearing houses, domestic and foreign exchange; the banking systems of foreign countries; and the Federal Reserve banks of the United States.

145. Modern Business Corporation. The organizing, financing, and managing of corporations; the position of the corporation before the law; methods of accounting; the relation of the government to the corporation; the question of trusts in its various phases. Durand.

146. Public Utilities. Economic and legal bases of classification, the relative advantages of public ownership and regulation. Central and municipal regulation compared. The basis of rates; relative rates; rates and service. Different theories of valuation. Durand.

ELECTRICAL ENGINEERING

Professor George D. Shepardson; Assistant Professor William T. Ryan.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
157-158.	Electric Power	6	Sr.	Physics 161

157-158. Electric Power. An elementary study of the electrical problems involved in the generation, distribution, measurement, and utilization of power, supplemented by laboratory work and numerous practical problems. Ryan.

EXPERIMENTAL ENGINEERING

Assistant Professors Charles F. Schoop, Franklin R. McMillan, Frank B. Rowley; Instructors E. Dow Gilman, Amos F. Moyer.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
101.	Materials Testing Laboratory	2	Jr., sr., grad.	Math. 151
102.	Hydraulic and Steam Laboratory	2	Jr., sr., grad.	Math. 152

101. MATERIALS TESTING LABORATORY. Investigation of strength and physical properties of various metals and engineering materials, including wood, cement, concrete, ropes, cables, belting, and chains. Supplemented by lectures on the various materials of construction and standard methods of testing. MCMILLAN, GILMAN, MOYER.

102. HYDRAULIC AND STEAM LABORATORY. Hydraulic measurements. Calibration of weirs, nozzles, orifices, and meters. Tests of water motors, rams; pulsometers; valve setting, indicator practice, calorimetry, study of lubricants, and introductory steam experiments. ROWLEY, GILMAN, MOYER.

GEOLOGY AND MINERALOGY

Professor WILLIAM H. EMMONS; Associate Professor FRANK F. GROUT; Assistant Professors A. WALFRED JOHNSTON, TERENCE T. QUIRKE; Instructor THOMAS M. BRODERICK.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	General Geology	3	Soph., jr., sr.	None
3.	Laboratory Work	1	Soph., jr., sr.	With Course 1
5.	Economic Geology	3	Jr., sr.	1
6.	Historical Geology	3	Soph., jr., sr.	1
8.	Laboratory Work	1	Soph., jr., sr.	With Course 6
21.	Elements of Mineralogy	3	Soph., jr., sr.	See statement
22.	Descriptive Mineralogy	3	Soph., jr., sr.	21
65.	Morphology of Minerals	3	Jr., sr.	22
105.	Elements of Rock Study	3	Jr., sr., grad.	See statement
106.	Petrology	3	Jr., sr., grad.	105
111.	Ore Deposits	4	Sr., grad.	6, 22, 105
112.	Problems in Ore Deposits	4	Sr., grad.	111
124.	Structural and Metamorphic Geology	3	Sr., grad.	6, 22, 105

1. GENERAL GEOLOGY. A synoptical treatment of materials of the earth and of geologic processes. Physiographic, dynamic and structural geology, with a brief introduction to historical geology. Lectures, laboratory work, field excursions, map study, and conferences. EMMONS, JOHNSTON, QUIRKE.

3. LABORATORY WORK. Supplements Course 1 with study of rocks and ores, topographic and geologic maps, and reference reading. Open only to students taking Course 1. JOHNSTON, QUIRKE, BRODERICK, and Assistants.

5. ECONOMIC GEOLOGY. The mineral resources of the United States. The origin, occurrence, distribution, and uses of the more important

minerals and mineral fuels of economic value. Lectures, map work, and field excursions. QUIRKE.

6. HISTORICAL GEOLOGY. The geological history of the North American continent; the more important types of fossils and their relations. EMMONS, QUIRKE.

8. HISTORICAL GEOLOGY LABORATORY WORK. The interpretation of geologic maps and sections; structural relations; study of fossils and rock specimens. Open only to students taking Course 6. JOHNSTON, QUIRKE.

21. ELEMENTS OF MINERALOGY. The crystal systems; morphological, physical, and chemical character of minerals; occurrence, genesis, and uses of minerals; classification and description of common minerals. Determinative work in laboratory, blowpipe analysis, sight identification. Open to students who have had or are taking Chemistry. BRODERICK.

22. DESCRIPTIVE MINERALOGY. A continuation of Course 21, special attention being given to metalliferous and rock-forming minerals. Laboratory determinations and sight identification. The use of the goniometer and microscope. Laboratory work, reference reading, and field excursions. BRODERICK.

65. MORPHOLOGY OF MINERALS. Crystallography, embracing projection and the geometric relations of crystal planes; crystal nomenclature; the relation of optical properties to morphology. A study of crystal models, crystal drawing, identification of minerals from crystal measurements and mathematical calculation. GROUT.

105. ELEMENTS OF ROCK STUDY. The occurrence and genesis of igneous, sedimentary, and metamorphic rocks; their mineral and chemical composition; their structure, texture, and alteration. The classification and methods of identification and description of rocks. Lectures, text, and laboratory work. Open to students who have had Course 1, and who have had or are taking Course 22. GROUT.

106. PETROLOGY. The identification and study of minerals and rocks by optical methods; the study of igneous rocks, crystalline schists, and metamorphic rocks. The origin and classification of rocks. Laboratory work, lectures, and reference reading. GROUT.

111. ORE DEPOSITS. The nature, distribution, and genesis of ore deposits of the United States; relations of ore deposits to geologic structure; the deformation and superficial alteration of ore deposits. EMMONS.

112. PROBLEMS IN ORE DEPOSITS. Field excursions, map work, lectures on field and laboratory methods. EMMONS.

124. STRUCTURAL AND METAMORPHIC GEOLOGY. The conditions, processes, and results of metamorphism, structural features resulting from deformation under varying conditions of load. JOHNSTON.

GERMAN LANGUAGE AND LITERATURE

Professor CARL SCHLENKER; Assistant Professor WALTER R. MYERS; Instructors LYNWOOD G. DOWNS, J. THEODORE GEISSENDOERFER, ARTHUR R. GRAVES, RICHARD WISCHKAEMPER.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1a,b.	Beginning	6	All	None
3a,b.	Intermediate	6	All	1a,b
5-6.	Prose and Poetry	6*	All	2 yrs. prep. German
11-12.	Rapid Reading	6*	Soph., jr., sr.	3a or 3b
21-22.	Scientific Intermediate	6*	All	1-2 or equivalent
23-24.	Advanced Scientific Reading	6*	All	3-4 or 5-6 or 4 yrs. prep. German

* Both semesters must be completed before credit is given for either semester.

1a,b. BEGINNING. Double course. Pronunciation, grammar, conversation, and composition; selected readings in easy prose and verse. MYERS, DOWNS, GRAVES.

3a,b. INTERMEDIATE. Double course. Selected texts in modern narrative and descriptive prose; selected lyrics and ballads; a drama of Lessing, Goethe, or Schiller. Assigned reading of texts outside of class. MYERS, DOWNS, GRAVES.

5-6. PROSE AND POETRY. Geography, history, and legend. Review of German grammar throughout the year. DOWNS, GEISSENDOERFER, GRAVES, WISCHKAEMPER.

11-12. RAPID READING. First semester: narrative prose; Hauff, Storm, Sudermann. Second semester: plays of Lessing, Goethe, Schiller, Hebbel. Assigned readings and reports. GRAVES.

21-22. SCIENTIFIC INTERMEDIATE. This course aims to give students a reading knowledge of German for use in scientific studies. Wait's *German Science Reader* (or equivalent). GEISSENDOERFER, GRAVES, WISCHKAEMPER.

23-24. ADVANCED SCIENTIFIC READING. Reading of monographs and periodicals. Not open to those who have credit for Course 7-8. WISCHKAEMPER.

MATHEMATICS

Professor GEORGE N. BAUER; Assistant Professors ANTHONY L. UNDERHILL, HERMON L. SLOBIN.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
5.	Alg. Cont. and Pl. Trig.	5	Fr., soph.	1 or prep. Higher Algebra
9a,b.	Pl. and Solid Analyt. Geom.	5	Fr., soph., jr., sr.	2a,b or 4
11a,b.	Differential Calculus	3	Soph., jr., sr.	7, 9a,b
51a,b.	Integral Calculus	3	Jr., sr.	11a or 11b

5. ALGEBRA, CONTINUED, THROUGH LOGARITHMS AND PLANE TRIGONOMETRY. Progressions, mathematical induction, determinants, theory of equations, trigonometry. UNDERHILL.

9a,b. PLANE AND SOLID ANALYTICAL GEOMETRY. Rectilinear and polar coordinates, loci and their equations, transformation of coördinates, the straight line, conic sections, higher plane curves, and an introduction to Solid Analytical Geometry. UNDERHILL.

11a,b. DIFFERENTIAL CALCULUS. Differentiation of algebraic and transcendental functions, development of functions, indeterminate forms, maxima and minima, treatment of tangents, sub-tangents, normals, sub-normals, asymptotes, direction and rate of curvature, evolutes, envelopes, and singular points. BAUER, UNDERHILL, SLOBIN.

51a,b. INTEGRAL CALCULUS. Integration of the various forms, integration as summation, rectification of curves, quadrature of plane and curved surfaces, cubature of volumes, equations in loci by means of the calculus, successive integration with application to moments of inertia, areas and volumes. BAUER, UNDERHILL.

MECHANICAL ENGINEERING

Professor JOHN J. FLATHER; Assistant Professors JOHN V. MARTENIS, S. CARL SHIPLEY*; Instructors FRANCIS A. HOBART, LEE A. WOLGEMUTH, EDWARD QUIGLEY, WILLIAM H. RICHARDS, ALLEN QUIMBY.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1-2.	Elementary Shop Practice	4	Fr., soph.	None
3a,b.	Pattern Making and Foundry Practice	3	Soph., jr.	1-2
4a,b.	Machine Shop Practice	3	Soph., jr.	1-2
15.	Mechanism and Kinematics	4	Jr.	Math. 11
116.	Machine Design	4	Sr.	Physics 101-102
124.	Internal Combustion Engines and Producers	3	Sr. elective	Chem. 38 or 135
129.	Steam Engines and Boilers	3	Sr.	Physics 101-102

REQUIREMENTS OF THE DEPARTMENT

Courses offered by the department are arranged in progressive order, and it is essential that subjects be taken in proper sequence. Courses may be elected only by those having sufficient preparation.

1-2. ELEMENTARY SHOP PRACTICE. A general course in shop work, including pattern making, foundry, forge, and machine work. SHIPLEY, HOBART, RICHARDS, QUIGLEY, QUIMBY.

3a,b. PATTERN MAKING AND FOUNDRY PRACTICE. An advanced course dealing with patterns for steam and gas engines, machine tool parts, and

* Absent on leave, 1917-18.

other special machinery; molding, core making, mixing; brass, bronze, aluminum and grey iron castings; machine molding and special processes. RICHARDS, QUIMBY.

4a,b. MACHINE SHOP PRACTICE. Machine operations, manufacturing methods, shop practice, lectures, and recitations. SHIPLEY, HOBART.

15. MECHANISM AND KINEMATICS. Transmission of motion without consideration of the strength of parts; gears, linkages, screws, epicyclic trains, graphical diagrams of paths, speeds, and accelerations of mechanisms; centroids; cams; roulettes, tooth profiles; kinematic pairs. MARTENIS.

116. MACHINE DESIGN. Calculation and design of such machine parts as fastenings, bearings, rotating pieces, pulleys and spur gears, spiral gears, and rope driving. Recitations, lectures, and drawing-room practice. FLATHER, MARTENIS.

124. INTERNAL COMBUSTION ENGINES AND GAS PRODUCERS. Principles of two and four cycle operation. Otto, semi-Diesel, and Diesel. Mechanism of stationary, automobile, and tractor engines. Carburation, ignition, governing, starting mechanism, cooling, lubrication, types of transmissions, and differentials. Gas producers, types and principles of operation, suction, pressure, blast furnace. By-product recovery. WOLGEMUTH.

129. STEAM ENGINES AND BOILERS. Steam boilers, settings, furnaces, stokers, smoke prevention, chimneys, evaporation. Boiler feed pumps and injectors. Mechanics of steam engine; work in cylinder; reciprocating parts; steam distribution; indicator cards, mechanism of steam engine; slide valve, Zeuner diagram, Corliss valves; governors; compounding. Steam turbines. FLATHER, WOLGEMUTH.

METALLURGY

Professors WILLIAM R. APPLEBY, PETER CHRISTIANSON, LEVI B. PEASE; Assistant Professor SAMUEL L. HOYT.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
2.	Assaying	4	Fr., soph.	Geol. 21; Chem. 5
3.	Gen. Metallurgy and Met. of Iron	3	Jr.	2, Chem. 6
4.	Met. of Wrought Iron and Steel	3	Jr.	3
105.	Met. of the Base Metals	4	Sr.	4
106.	Met. of the Precious Metals	4	Sr.	105
109.	Electrometallurgy	3	Sr.	106
153-154.	Metallography	10	Sr.	Chem. 12; Physics 1, 2
160.	Metallography	3	Sr.	Chem. 12; Physics 1, 2

2. ASSAYING. Determination of values of ores, metallurgical products and bullion. APPLEBY and Assistants.

3. GENERAL METALLURGY AND METALLURGY OF IRON. Including the subjects of combustion, fuels, refractory materials and furnaces. CHRISTIANSON.

4. METALLURGY OF WROUGHT IRON AND STEEL. Puddling and hearth processes for the production of wrought iron, cementation, crucible, Bessemer, and open hearth processes for the production of steel. General principles and construction of furnaces. CHRISTIANSON.

105. METALLURGY OF THE BASE METALS. Lead, copper, zinc, and mercury. Consideration of smelting methods and principles involved in refining methods. PEASE.

106. METALLURGY OF THE PRECIOUS METALS. Gold, silver, and platinum. Methods and principles of cyanidation, chlorination, amalgamation, and lixiviation, as applied to the treatment of the above. PEASE.

109. ELECTROMETALLURGY. Application of electricity to the production of heat for the smelting of ores and the refining of metals. Comparative tests of the use of fuel and electricity for heating purposes. CHRISTIANSON.

153-154. METALLOGRAPHY. Theory of metallic alloys. Metallographic technique. Properties of metals and alloys. Metallography of iron and steel and commercial alloys. Technical metallography. Three lectures, four laboratory hours per week; both semesters. HOYT.

160. METALLOGRAPHY FOR CHEMICAL STUDENTS. The preparation of metallic alloys; their microscopical and thermal analysis. Steel and other commercial alloys with particular reference to chemical metallurgy. Corrosion of steel and non-ferrous alloys. Metallography applied to analytical chemistry. HOYT.

MILITARY SCIENCE AND TACTICS

Major GEORGE W. MOSES, U. S. Cavalry, Professor of Military Science and Tactics, Head of the Department; Assistants, Captain THEODORE B. TAYLOR, U. S. Cavalry, Associate Professor of Military Science and Tactics; Captain JAMES B. WOOLNOUGH, U. S. Infantry, Associate Professor of Military Science and Tactics; First Lieutenant OWEN R. MEREDITH, U. S. Infantry, Assistant Professor of Military Science and Tactics; University Staff, BERT A. ROSE, Band Instructor.

REQUIRED WORK

All physically fit male students are required to take military training during the first two undergraduate years of their course unless they have secured such training at an approved institution endorsed by the Military

Department. When this course is entered upon it must be carried to completion as a prerequisite for graduation. No credits are allowed for this work.

ELECTIVE WORK

(a) All juniors and seniors who have completed two years of drill may register for the course required by General Orders No. 49 War Department for members of the Reserve Officers' Training Corps. Such students sign a written agreement to continue in this corps for the remainder of the college course, the completion of this work is a prerequisite to promotion. Any student who for satisfactory reasons is permitted to withdraw from this course must reimburse the War Department for all moneys received.

Juniors and seniors who take the course required by General Orders No. 49, which includes two camps of four weeks each, will receive an allowance of thirty cents per day for subsistence while pursuing the course and will have all expenses paid to and from the encampments. They also are eligible for appointment as temporary second lieutenants in the Infantry branch of the Regular Army for six months with a salary of one hundred dollars per month upon graduation and commission in the Reserve Corps. The Reserve Corps furnishes officers for Citizens Training Camps in time of peace and commission in the United States Volunteers in time of war, such officers having preference for commissions in the volunteers immediately below experienced officers in the federal service.

The course includes three hours a week of drill and three of study in the Military Department and also includes recommended courses offered by the respective colleges which have a direct bearing on the work of the Corps, such as Military History and International Law in the Liberal Arts College. The work carries three credits in each semester in the Military Department, and such additional credits as the respective curricula of the colleges may permit.

(b) Any student having completed the two years of required Military Training may continue the work for credit in the third and fourth years. Credit for such work is allowed in practically all of the colleges of the University, the maximum being three credits a year.

PATHOLOGY, BACTERIOLOGY, AND PUBLIC HEALTH

Associate Professor WINFORD P. LARSON; Instructors ANNE BENTON, ARTHUR T. HENRICI.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
6a,b.	Elementary Bacteriology	3	All	None
114.	Advanced Bacteriology	1½	All	6a,b

6a,b. ELEMENTARY BACTERIOLOGY. Lecture and laboratory course. The

principles and technique of general bacteriology. Studies in the morphologic and biologic characters of the common bacteria. Preparation of culture media. Disinfectants and disinfection. Bacteriology of water, etc. 80 hours; three credits. LARSON, HENRICI, and Assistants.

114. ADVANCED BACTERIOLOGY. An advanced course giving additional work in bacteriology and the opportunity of working out special problems. Limited to ten students. 48 hours; one and one-half credits. LARSON.

PHARMACOLOGY

Professor ARTHUR D. HIRSCHFELDER; Associate Professor EDGAR D. BROWN; Assistant Professor ROBERT A. HALL.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
102.	Gen. Pharmacology	2	Sr., grad.	Org. Chem.
104.	Experimental Pharmacology	1½	Sr., grad.	102
113a,b.	Chem. Basis of Pharm.	3	Sr., grad.	Org. Chem.

102. GENERAL PHARMACOLOGY. The principles underlying the structure, physico-chemical properties, physiologic, therapeutic and toxic actions of substances, natural or synthetic, used as medicines. Fourth year medical students. At least one semester of physiology is prerequisite. Two credits. HIRSCHFELDER, BROWN.

104. EXPERIMENTAL PHARMACOLOGY. Exercises illustrating the preparation and actions of medicines, their relation to chemical structure and their mode of administration. Fourth year medical students. At least one semester of physiology is prerequisite. One and one-half credits. HIRSCHFELDER, BROWN, HALL.

113a,b. THE PHYSIOLOGICAL AND CHEMICAL BASIS OF PHARMACOLOGY. The relation of drug action to chemical structure; the mode of action and therapeutic application of various synthetic drugs; the study of chemotherapy. An adequate training in chemistry is the one prerequisite. Three credits. HIRSCHFELDER.

For other advanced courses in Pharmacology, consult the Bulletin of the Medical School.

PHYSICAL EDUCATION

FOR MEN

Director LOUIS J. COOKE; Assistant Director WILLIAM K. FOSTER; Instructor JOHN C. WEST; Assistant BOTTOLF M. OHNSTAD.

GENERAL STATEMENT

The purpose of the department is to provide all men of the University opportunity for exercise to maintain and build up their general health.

It also provides special training to correct physical defects and functional derangements.

A physical examination is required at the beginning of the year of all new matriculants and of all others using the department privileges, and as often during their college course as their physical condition may indicate. Students taking the required work in physical education are examined also at the close of the year, and a study of these records shows a marked improvement in the standard of health of the average student during his college course.

The gymnasium, swimming pool, and baths are open to all students of the University, who are free to use the apparatus and to pursue a course in physical training under the supervision of the director and his assistants.

All students are required to pass a first- and a second-semester efficiency swimming test. Those who can not swim must report to the swimming instructor at the beginning of the first semester and arrange hours at which they can report for instruction until they are able to meet the swimming requirements.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Personal Hygiene	None	All	None
3-4.	Gymnastics	None	Fr.	None
5-6.	Intermediate Gymnastics	None	Fr.	See statement
7-8.	Advanced Leaders	2†	Soph., jr., sr.	1, 3-4, 5-6
9-10.	Corrective Gymnastics	None	All	None
10-12.	Wrestling	None	Soph., jr., sr.	3-4
13-14.	Advanced Gymnastics	None	Soph., jr., sr.	3-4
15-16.	Intermediate Swimming	None	All	None
17-18.	Advanced Swimming	None	All	15-16

† Both semesters must be completed before credit is given.

1. PERSONAL HYGIENE. Two hours a week; first six weeks of the first semester. Examination at close of course. Required on the part of all freshmen. COOKE.

A special lecture on sex hygiene is given during the first ten days of the autumn semester, with required attendance on the part of all freshmen.

3-4. GYMNASTICS. Two hours a week, on days not consecutive, from November 1 to end of second semester. Required qualifications in swimming, life-saving, bar-vaulting, jumping, sprinting, running, and on heavy apparatus. COOKE, FOSTER, WEST.

5-6. INTERMEDIATE GYMNASTICS. Three hours a week, on days not consecutive, from November 1 to April 1. Elective for freshmen showing exceptional ability in elementary apparatus work. FOSTER, WEST.

7-8. CLASS LEADERS (Advanced). Three hours a week. (No student may receive more than a total of six credits for elective work in both Physical Education and Military Drill.) FOSTER, WEST.

9-10. CORRECTIVE GYMNASTICS. Three hours a week, on days not consecutive. Special individual courses for students physically defective. OHNSTAD.

11-12. WRESTLING. Course in competitive wrestling. Most promising candidates chosen to represent Minnesota at the Western Intercollegiate Gymnastic and Wrestling Meet. No credit for gymnasium work is given for this course. (Optional.) OHNSTAD.

13-14. ADVANCED GYMNASTICS. Same as Course 11-12 except that it is in gymnastics instead of wrestling. Includes course in ground tumbling, horizontal bar, parallel bars, side horse, and flying rings. FOSTER, WEST.

15-16. SWIMMING, INTERMEDIATE. Life-saving, efficiency swimming, and fancy diving. Instruction is given in rescuing and restoring the apparently drowned and in other useful swimming accomplishments. FOSTER.

17-18. SWIMMING, ADVANCED. FOSTER.

PHYSICAL EDUCATION

FOR WOMEN

Assistant Professor J. ANNA NORRIS; Instructors *MAY S. KISSOCK, ALICE J. H. TOLG, VALERIA LADD.

This department aims to look after the health of its women students. It gives physical examination and advice to all newly entering students; conducts systematic yearly consultations with and examines, when necessary, all upper class students; gives courses in hygiene; organizes physical work to meet the various needs and physical tastes of students; coöperates closely with the Woman's Athletic Association in encouraging and organizing athletic sports; investigates cases of illness in dormitory and boarding houses.

The office is open at regular hours to all students who desire consultation regarding their physical condition.

A new gymnasium building, finished in 1916, affords adequate space and equipment for all activities.

For further information, see bulletin of the College of Science, Literature, and the Arts, and of the College of Education.

PHYSICS

Professors HENRY A. ERIKSON, ANTHONY ZELENY; Associate Professor LOUIS W. MCKEEHAN; Assistant Professor JOHN T. TATE; Instructors ERNEST O. DIETERICH, PAUL E. KLOPSTEG.

---

* Absent on leave 1917-18.

COURSES

No.	Title	Credits	Offered to	Prerequisite courses
1.	General Physics	3	Soph., jr., sr.	Math. 2 or 4
2.	General Physics	3	Soph., jr., sr.	1 or 7
3.	Gen. Laboratory Practice	1	Soph., jr., sr.	Registration in 1
4.	Gen. Laboratory Practice	1	Soph., jr., sr.	See statement
21.	Elements of Mechanics	3	Fr., soph.	High School Physics and reg. in Math. 1a, 2a or 3a
22.	Elements of Mechanics	3	Fr., soph.	21, Math. 1, 2 or 3, and reg. in Math. 2b, 3b, or 4b
42.	Heat	3	Soph., jr., sr.	2, 8, or 22; Math. 2 or 4
44.	Heat Measurements	1	Soph., jr., sr.	Registration in 42
52.	Light	3	Soph., jr., sr.	2, 8, or 22; Math. 2 or 4
54.	Light Measurements	1	Soph., jr., sr.	Registration in 52
155.	Spectrometry	3	Jr., sr., grad.	52 and 82
161.	Electricity and Magnetism	4	Jr., sr., grad.	2 and 4, 8 and 10 or 12; Math. 11
162.	Electrical Measurements	3	Jr., sr., grad.	161
166.	Electrical Measurements of Precision	3	Jr., sr., grad.	162

1. General Physics. Mechanics of solids and fluids, sound, and heat. Treatment experimental rather than mathematical; the fundamental principles. The first part of a general course 1-2. Should be taken in conjunction with Course 3, but may be taken separately. One lecture, two recitations per week. Zeleny, Dieterich, Klopsteg.

2. General Physics. Electricity, magnetism, and light. Treatment experimental; the fundamental principles, including those of radioactivity, ionization, X-radiation, and the electrical constitution of matter. The second part of a general course 1-2. Should be taken in conjunction with Course 4, but may be taken separately. One lecture, two recitations per week. Zeleny, Dieterich, Klopsteg.

3. General Laboratory Practice. Physical measurements in the mechanics of solids and fluids, sound, and heat, giving the student a knowledge of experimental methods, and an acquaintance with the fundamental facts of the subject. McKeehan, Dieterich.

4. General Laboratory Practice. Physical measurements in electricity, magnetism, and light. Open to all who have completed or are taking Course 2, and have attended Course 3. McKeehan, Dieterich.

21. Elements of Mechanics. The mechanics of solids treated from an historical and experimental standpoint. Two recitations and one two-hour session in the laboratory per week. Tate.

22. Elements of Mechanics. The mechanics of liquids and gases, and wave motion, treated from an experimental standpoint. Two recitations and one two-hour session in the laboratory per week. Tate.

42. Heat. A study of the fundamental principles of heat. One lecture, two recitations per week. Zeleny.

44. HEAT MEASUREMENTS. A laboratory course in heat supplementary to Course 42. ZELENY.

161. ELECTRICITY AND MAGNETISM. The phenomena accompanying the passage of electricity through solids, liquids, and gases. One lecture, two recitations, and one two-hour laboratory period a week. ZELENY.

162. ELECTRICAL MEASUREMENT. Devoted mainly to the study of capacity, inductance and magnetic induction. ZELENY, KLOPSTEG.

*ELECTIVE COURSES

52. LIGHT. A study of the fundamental principles of light. One lecture, two recitations per week. ERIKSON.

54. LIGHT MEASUREMENTS. A laboratory course in light supplementary to course 52. ERIKSON.

155. SPECTROMETRY. Measurements involving the use of prism spectroscopes, plane transmission and reflection gratings, concave grating, and the interferometers. ERIKSON.

166. ELECTRICAL MEASUREMENTS OF PRECISION. Making of standard cells, calibration of Wheatstone box bridge; adjustment of resistances, ammeters, and voltmeters; use of the potentiometer; problems involving capacity, inductance, and magnetic flux. ZELENY.

* Open to properly qualified students. For other courses, see the Bulletin of the College of Science, Literature, and the Arts.

PHYSIOLOGY

Professor ELIAS P. LYON; Associate Professors RICHARD OLDING BEARD, FREDERICK H. SCOTT; Assistant Professors JOHN F. MCCLENDON, M. RUSSELL WILCOX, FRANCIS B. KINGSBURY, CHAUNCEY J. V. PETTIBONE.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
102.	Physiologic Chemistry	5	Jr., sr.	Chem. 13 or equiv.
103.	Physiology	4	Sr., grad.	Chem. 13 and Zool.
104.	Physiology of Nervous System	4	Sr., grad.	Chem. 13 and Zool.
111.	Physical Chemistry of Cells	3	Sr., grad.	Zool. and 2 yrs. of Chem.
112.	Electrophysiology	3	Sr., grad.	As 111
151-152.	Physiologic Chemistry	3	Jr., sr., grad.	Chem. 13-14 or equiv.
153-154.	Adv. Physiologic Chem.	3	Sr., grad.	102
161.	Urinalysis	1½	Sr., grad.	102
163.	Metabolism	1½	Sr., grad.	102
164.	Quantitative Methods	3	Sr., grad.	102

For a full list of courses in this department see the Bulletin of the Medical School.

102. PHYSIOLOGIC CHEMISTRY. The components of the animal body; foods, digestion, the excreta and metabolism. Third year medical students and others. Five credits. PETTIBONE, KINGSBURY, and Assistant.

103. PHYSIOLOGY OF MUSCLE, NERVE, BLOOD, CIRCULATION AND DIGESTION. Fourth year medical students and others. Four credits. SCOTT, LYON, BEARD, MCCLENDON, and Assistants.

104. PHYSIOLOGY OF THE NERVOUS SYSTEM AND SPECIAL SENSES; RESPIRATION, METABOLISM, NUTRITION, AND EXCRETION. Fourth year medical students and others. Four credits. LYON, BEARD, SCOTT, MCCLENDON, and Assistants.

111. PHYSICAL CHEMISTRY OF CELLS. Osmotic pressure, surface tension and electric conductivity of blood and urine; colloids; permeability of cells and tissues and changes in permeability produced by electrolytes. Three credits. MCCLENDON.

112. ELECTRO-PHYSIOLOGY. The bio-electric currents and the theory of stimulation and narcosis. Hydrogen ion concentration and its relation to enzyme activity and irritability. Three credits. MCCLENDON.

151-152. PHYSIOLOGIC CHEMISTRY. The components of the body, foods, digestion and metabolism. Open to qualified students in all divisions of the University. May be taken by medical students in place of Course 102. Three credits in each semester. KINGSBURY and Assistants.

153-154. ADVANCED PHYSIOLOGIC CHEMISTRY. Course arranged by instructors with qualified students for special work. Open to fourth, fifth, or sixth year medical students and others; may be taken in either semester or both. Three credits, either semester. PETTIBONE, KINGSBURY.

161. URINALYSIS. Advanced methods. Open to fourth, fifth, or sixth year medical and other qualified students. First quarter. One and one-half credits. PETTIBONE.

163. METABOLISM. Special phases of metabolism. Lectures may be taken alone; number of students unlimited; laboratory course limited to ten students. Open to fourth, fifth, or sixth year medical students and others. Second quarter. One and one-half credits. PETTIBONE.

164. QUANTITATIVE METHODS. The estimation of certain important substances in the urine, blood, and other body fluids. Open to fourth, fifth, or sixth year medical students. Three credits. KINGSBURY.

POLITICAL SCIENCE

Professor WILLIAM A. SCHAPER; Professors CEPHAS D. ALLIN, JEREMIAH S. YOUNG; Instructor WILLIAM ANDERSON; Assistant BEN A. ARNESON.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1a,b.	American Government	3	Soph., jr., sr.	None
5.	European Municipal Administration	3	Soph., jr., sr.	1
6.	American Municipal Administration	3	Soph., jr., sr.	1
7a,b.	State and Local Government	3	Soph., jr., sr.	1
26.	Commercial Law	2	Sr.	1 or Econ. 1

1a,b. AMERICAN GOVERNMENT. Organization and actual workings of the national government; nature and origin of the American governmental system. SCHAPER, ALLIN, YOUNG, ANDERSON, ARNESON.

5. EUROPEAN MUNICIPAL ADMINISTRATION. A study of French, German, Austrian, and English cities; the forms of government, parties and elections; achievements in finance, police, sanitation, city planning and other public services undertaken. SCHAPER.

6. AMERICAN MUNICIPAL ADMINISTRATION. A study of the organization and chief functions of American cities; their growth, relation to the state, forms of charters, inefficiency and corruption, reform measures; and the administration of finance, police, health, and other activities. SCHAPER.

7a,b. STATE AND LOCAL GOVERNMENT. A comparison of typical American state governments, with special attention given to Minnesota; relation of the state to the United States and to the local units of government; recent democratic experiments; social and economic legislation. YOUNG, ANDERSON, ARNESON.

26. COMMERCIAL LAW. The principles of law governing ordinary business transactions. This course will deal with the general law of contracts including sales, bankruptcy, and agency. ARNESON.

RHETORIC

Professor JOSEPH M. THOMAS; Assistant Professors DANIEL FORD, SIDNEY F. PATTISON, ANNA H. PHELAN, CHARLES E. SKINNER, HELEN A. WHITNEY; Instructors JAMES T. HILLHOUSE, ERNEST P. KUHL, MARTIN B. RUUD, ARTHUR J. TIEJE.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1-2.	Composition and Rhetoric	6	Fr.	None
1b-2a.	Composition and Rhetoric	6	Fr.	None
11-12.	Exposition, Description, and Narration	6	Soph., jr., sr.	1-2
15-16.	Exposition and Argument	6	Soph., jr., sr.	1-2
103-104.	Studies in Structure and Style	6	Jr., sr., grad.	1-2, 11-12 or 15-16

1-2. COMPOSITION AND RHETORIC. Practical training in the art of writing; the principles of structure and analysis of specimens of good prose. THOMAS, FORD, PATTISON, SKINNER, HILLHOUSE, KUHL, RUUD, TIEJE, PHELAN, WHITNEY.

1b-2a. COMPOSITION AND RHETORIC. Same as Course 1-2.

11-12. EXPOSITION, DESCRIPTION, AND NARRATION. In the first semester the analysis of specimens of exposition; short themes and fortnightly essays, with emphasis on careful planning and amplification. In the second semester, the same general plan applied to description and narration. Not open to those who have credit for Course 15-16. PATTISON, WHITNEY, PHELAN, SKINNER, HILLHOUSE, RUUD.

15-16. EXPOSITION AND ARGUMENT. In the first semester, exposition; the second semester, argument. The study of a text and the analysis of specimens, accompanied by weekly essays and shorter themes. Not open to those who have credit for Course 11-12. TIEJE.

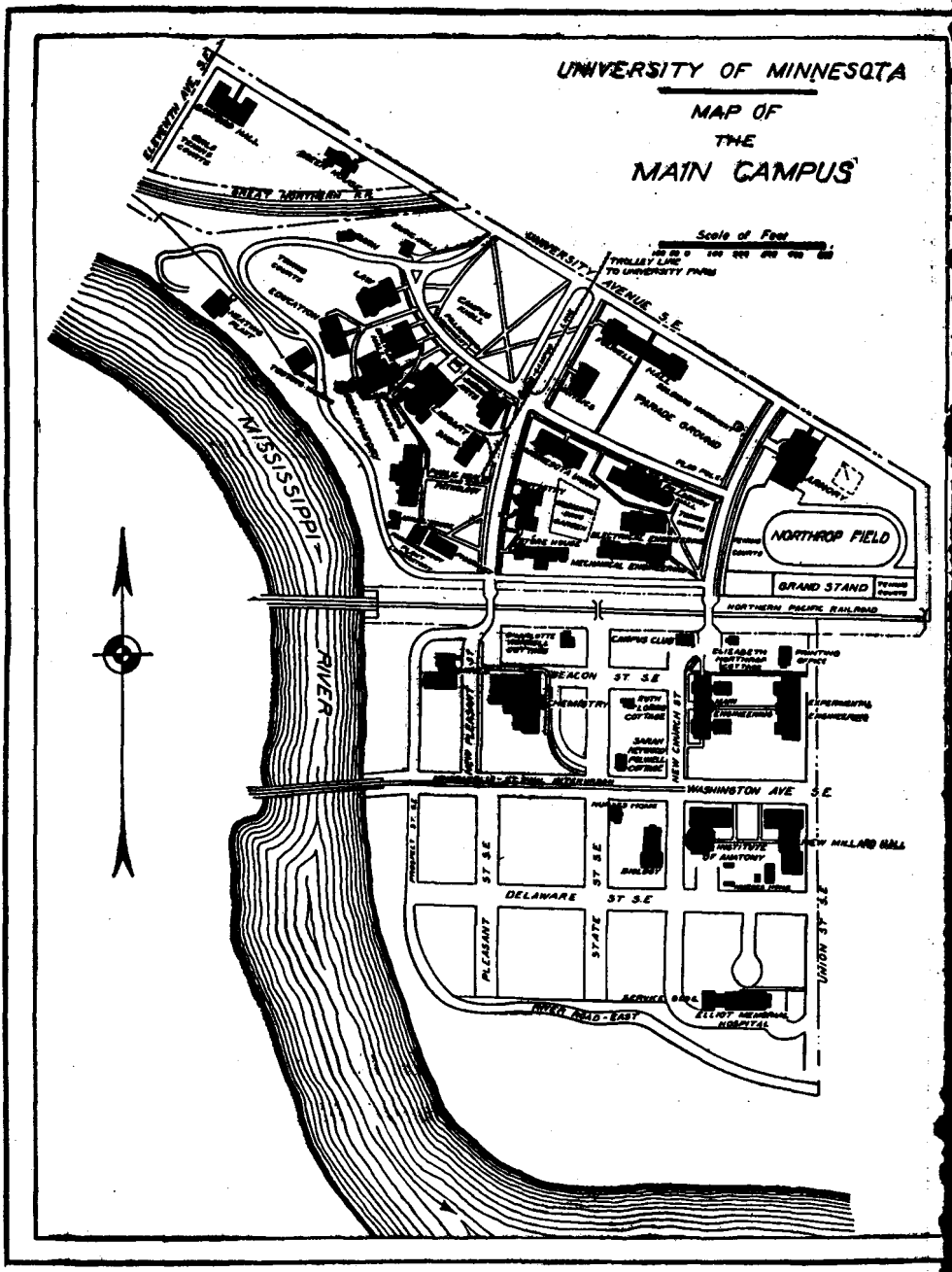
103-104. STUDIES IN STYLE AND STRUCTURE. Theory of style and structure; rhetorical analysis of standard English prose; themes based on personal observation, current reading, and investigation; preparation of essays with particular classes of readers in view. FORD.

The Bulletin *of the* University *of* Minnesota

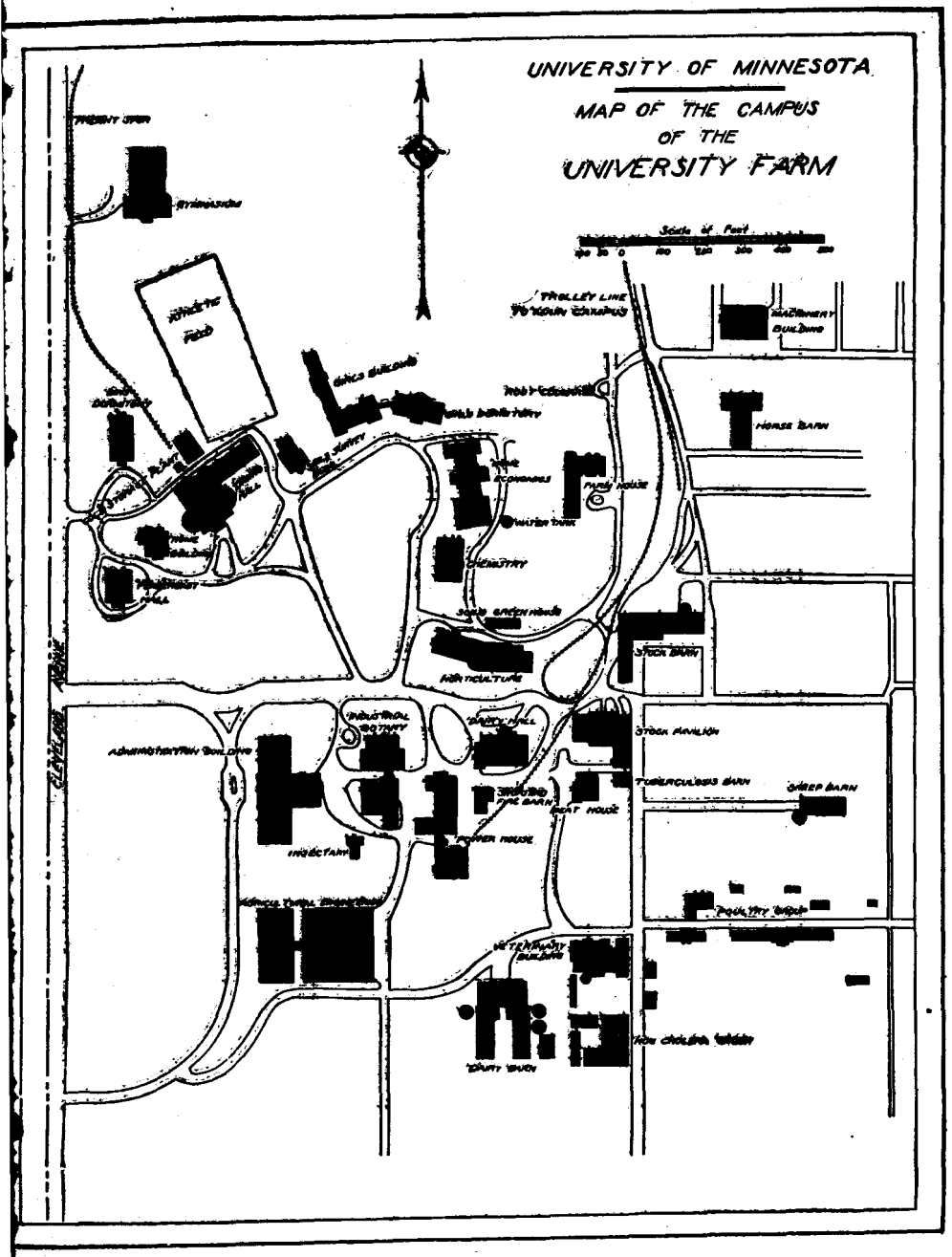
The College of Education
Announcement for the Year
1917-1918

Catalog Series No. 13
Vol. XX No. 44 September 24 1917

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



Area of Main Campus, 108.5 acres



Area of University Farm, 422.56 acres

1917

JULY

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

AUGUST

..	..	..	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
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

..	..	..	..	..	..	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	..	..	..	..	..

1918

JANUARY

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

FEBRUARY

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

MARCH

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

APRIL

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

MAY

..	..	..	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	..	..	..	..	..	..

JULY

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

AUGUST

..	..	..	..	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	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

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	..	..	..	..
..	..	..	..	..	..	..

UNIVERSITY CALENDAR

1917-1918

1917			
September	26	Wednesday	Registration closes for all students
September 26 – October 3		Week	Fees payable for all students
October	1	Monday	First semester evening extension classes begin
October	2-9	Week	Examinations for removal of conditions (except for Colleges of Agriculture and Forestry), and entrance examinations
October	10	Wednesday	First semester begins
October	15	Monday	Agricultural College, farm experience examinations
October	18	Thursday	School of Agriculture, first term begins
October	29	Monday	Senate meeting, 4:00 p.m.
November	5	Monday	Dairy School opens
November	28	Wednesday	Thanksgiving recess begins 9:00 p.m.
December	1	Saturday	Dairy School closes
December	3	Monday	Thanksgiving recess ends 8:00 a.m.
December	3-8	Week	Second semester condition examinations, Colleges of Agriculture and Forestry
December	3-8	Week	Short course for ice-cream makers
December	5	Wednesday	Medical School second quarter begins
December	20	Thursday	Senate meeting, 4:00 p.m.
December	21	Friday	School of Agriculture, first term closes
December	21	Friday	Christmas vacation begins 9:00 p.m.
1918			
December 31 – January 5		Week	Farmers' and Home Makers' Week Short Course
January	2	Wednesday	Christmas vacation ends 8:00 a.m.
January	2	Wednesday	School of Embalming begins, eight weeks' session
January	8	Tuesday	School of Agriculture, second term begins
January	25	Friday	First semester evening extension classes close
February	4	Monday	Second semester registration closes
February	4	Monday	Second semester evening extension classes begin
February	4-9	Week	Merchants' Short Course
February	11	Monday	Final examinations begin
February	11	Monday	Payment of fees for second semester closes

February	12	Tuesday	Lincoln's Birthday; a holiday
February	18	Monday	Second semester begins
February	21	Thursday	Senate meeting, 4:00 p.m.
February	22	Friday	Washington's Birthday; a holiday
March	27	Wednesday	School of Agriculture closes
March	28	Thursday	Easter recess begins 9:00 p.m.
April	1	Monday	Easter recess ends 8:00 a.m.
April	1-6	Week	Boys' and Girls' Week
April	1-6	Week	Condition examinations in certain colleges
April	15	Monday	Medical School fourth quarter begins
April	30	Tuesday	Traction Engineering Short Course begins
May	16	Thursday	Senate meeting, 4:00 p.m.
May	24	Friday	Second semester evening extension classes close
May	30	Thursday	Memorial Day; a holiday
May	31	Friday	Traction Engineering Short Course closes
June	8	Saturday	Final examinations begin 2:00 p.m.
June	15	Saturday	Second semester closes
June	16	Sunday	Baccalaureate service
June	17	Monday	Senior Class Day exercises
June	19	Wednesday	Alumni Day
June	20	Thursday	Forty-sixth Annual Commencement
June	21	Friday	Summer vacation begins
June	24	Monday	Summer Session begins

The University year for 1918-19 will begin Tuesday, September 17. Classes will begin September 25.

COLLEGE OF EDUCATION

FACULTY

MARION LEROY BURTON, Ph.D., D.D., LL.D., President 1005 S. E. 5th St.
CYRUS NORTHROP, LL.D., President Emeritus 510 10th Ave. S. E.
LOTUS D. COFFMAN, Ph.D., Dean and Professor of Education 1115 E. River Road
EDWARD E. NICHOLSON, M.A., Dean of Student Affairs 914 S. E. 7th St.
GEORGE N. BAUER, Ph.D., Professor of Mathematics 1201 E. River Road
WILLIAM O. BEAL, Ph.D., Assistant Astronomer 1082 16th Ave. S. E.
WILBUR H. BENDER, M.Di., Ph.B., B.S. in Agr.Ed., Associate Professor of Agricultural Education 2121 Como Ave. W., St. Paul
JOSEPHINE T. BERRY, M.A., Professor of Nutrition 2176 Scudder Ave. S. E
GISLE BOTHNE, M.A., Professor of Scandinavian Languages 619 9th Ave. S. E.
LOUIS J. COOKE, M.D., Director of Physical Education for Men 909 S. E. 6th St.
HARDIN CRAIG, Ph.D., Professor of English 2725 Humboldt Ave. S.
HENRY A. ERIKSON, Ph.D., Professor of Physics 424 S. E. Harvard St.
JOHN HENRY GRAY, Ph.D., Professor of Economics 412 S. E. Walnut St.
MELVIN E. HAGGERTY, Ph.D., Professor of Educational Psychology 70 Seymour Ave. S. E.
JOHN CORRIN HUTCHINSON, B.A., Professor of Greek Emeritus 3806 Blaisdell Ave.
CLARENCE M. JACKSON, M.S., M.D., Professor of Anatomy 436 S. E. Harvard St.
DAVID L. KIEHLE, LL.D., Professor of Education Emeritus 226 58th St. E., Portland, Oregon
WILLIAM H. KIRCHNER, B.S., Professor of Drawing and Descriptive Geometry 722 10th Ave. S. E.
FREDERICK KLAEBER, Ph.D., Professor of Comparative Philology 619 9th Ave. S. E.
AUGUST C. KREY, Ph.D., Assistant Professor of History 939 14th Ave. S. E.
WINFORD P. LARSON, M.D., Associate Professor of Bacteriology 614 9th Ave. S. E.
DEXTER D. MAYNE, Professor of Agricultural Pedagogics 1403 Cleveland Ave., St. Paul
WILFORD S. MILLER, Ph.D., Assistant Professor of Education and Principal of the University High School 1205 S. E. 7th St.
J. ANNA NORRIS, M.D., Director of Health and Physical Education for Women 509 S. E. 6th St.

EVERETT WARD OLMSTED, Ph.D., Professor of Romance Languages
2727 Lake of Isles Blvd.
JOSEPH B. PIKE, M.A., Professor of Latin 1025 S. E. 6th St.
CHESSLEY JUSTIN POSEY, M.S., Assistant Professor of Geography
1627 Melbourne Ave. S. E.
ALBERT W. RANKIN, B.A., Professor of Education 916 S. E. 5th St.
CARL O. ROSENDAHL, Ph.D., Professor of Botany
2191 Commonwealth Ave., St. Paul
CHARLES A. SAVAGE, Ph.D., Professor of Greek 618 10th Ave. S. E.
WILLIAM A. SCHAPER, Ph.D., Professor of Political Science
625 S. E. Fulton St.
CARL SCHLENKER, B.A., Professor of German 514 11th Ave. S. E.
CARLYLE SCOTT, Professor of Music 3322 Lyndale Ave. S.
CHARLES P. SIGERFOOS, Ph.D., Professor of Zoology
1023 University Ave. S. E.
ANDREW A. STOMBERG, M.S., Professor of Scandinavian Languages
531 S. E. Walnut St.
ASHLEY V. STORM, M.A., Professor of Agricultural Education
2239 Como Ave. W., St. Paul
FLETCHER H. SWIFT, Ph.D., Professor of Education 819 Superior St.
ARTHUR J. TODD, Ph.D., Professor of Sociology 713 8th Ave. S. E.
JOSEPH M. THOMAS, Ph.D., Professor of Rhetoric
818 University Ave. S. E.
MARVIN J. VAN WAGENEN, Assistant Professor of Education
MARION WELLER, B.A., Assistant Professor of Textiles and Clothing
2176 Scudder Ave., St. Paul
NORMAN WILDE, Ph.D., Professor of Philosophy 901 S. E. 6th St.

INSTRUCTORS

JEAN H. ALEXANDER, M.A., Instructor in Education
FRANCIS B. BARTON, Docteur de l'Université de Paris, Instructor in Teachers' Course in Romance Languages 507 S. E. Oak St.
CHARLES L. HARLAN, M.A., Instructor in Education 710 11th Ave. S. E.
REWEY BELLE INGLIS, B.A., Instructor in Methods of Teaching High School English 2436 Bryant Ave. S.
PAUL E. KLOPSTEG, M.A., Instructor in Teachers' Course in Physics
1026 15th Ave. S. E.
GEORGE A. MCGARVEY, B.A., Instructor in Manual Training
512 S. E. Delaware St.
WILLIAM D. REEVE, B.S., Instructor in Methods of Teaching High School Mathematics 820 University Ave. S. E.
SARA T. RIVET, B.A., Instructor in Methods of Teaching High School Botany
STERLING TEMPLE, Ph.D., Instructor in the Teachers' Course in Chemistry
1758 Blair St., St. Paul
MILDRED WEIGLEY, Instructor in Foods and Cookery
2176 Scudder Ave., St. Paul

UNIVERSITY HIGH SCHOOL

Sophia Hubman, M.A., Instructor in German
Rewey Belle Inglis, B.A., Instructor in English
Frances M. Morehouse, B.A., Instructor in History
George A. McGarvey, B.A., Instructor in Manual Training
Samuel R. Powers, B.A., Instructor in Science
William D. Reeve, B.S., Instructor in Mathematics
Elsie M. Smithies, B.A., Instructor in Latin

LECTURERS

Thaddeus P. Giddings, Lecturer in Public School Music
Court House, Minneapolis
Georgina Lommen, Lecturer in Methods of High School Teacher Training Department 1502 St. Anthony Ave., St. Paul

ASSISTANTS AND SCHOLARS

Oscar Julius Johnson, B.A., Assistant

GENERAL INFORMATION

The College of Education was authorized by special enactment of the Legislature of Minnesota in 1905 and was established by the Regents of the University in the following year. It has the following purposes:

1. To offer opportunity for the study of education as an important enterprise of society and as of peculiar interest to all persons whether they are preparing for teaching or not.

2. To offer inexperienced university students who intend to become teachers the technical training for their vocation.

3. To offer experienced teachers or those actively engaged in service opportunity for advanced professional study under direction.

4. To offer to university students, and to all teachers of suitable attainment, appropriate training designed to prepare them for successful careers as public school administrators, normal school teachers, or college teachers of education.

5. To offer opportunity for original investigation, research, and experiments in education and for the preparation of constructive contributions to educational theory and practice.

In fulfilling these purposes the College of Education offers the professional courses for the training of superintendents, principals, supervisors of special subjects, rural school supervisors, teachers of the high school subjects, manual training teachers, school librarians, teachers of high-school teacher-training departments, teachers of agriculture, teachers of home economics, teachers of physical education, supervisors of playground and recreation activities, school nurses, school doctors, and school dentists. The preparation of teachers of home economics and agriculture is given at the College of Agriculture. In every instance the educational courses designed to equip one for work in any one of these special fields is offered by the College of Education, while the subject matter courses are offered by departments in other colleges.

University High School

The University High School and the College of Education are located in the Education Building. The University High School is maintained, first, to conserve the interests of its student body, and, second, to provide superior opportunities for observation and directed teaching for prospective teachers. To fulfill the latter obligation, teachers of recognized skill and proficiency have been engaged as critic teachers. In cooperation with the high school principal, these critics supervise all the practice of the student teachers. For further information consult the Bulletin of the University High School.

ADMISSION

Students looking forward to teaching should consult with the Dean of the College of Education or the Chairman of the Program Committee early in their course.

Not infrequently seniors discover that a slight difference in arrangement of studies in their courses made during their freshman or sophomore years would have made them much more eligible for teaching positions.

Students are held responsible for arranging their courses so as to meet all requirements. To do this intelligently they should secure from the Registrar's office or the office of the Dean of the College of Education the following bulletins and pamphlets:

Bulletin of General Information
Bulletin and program of the College of Education
Bulletin and program of any other college in which subject matter courses are to be pursued
Bulletin of the University High School
Information for New Students
See also page 15 of this bulletin.

Regular Students

To be admitted to regular standing in the College of Education, students must be able to satisfy either of the following requirements, (a) or (b).

(a) Completion of at least the freshman and sophomore years of the College of Science, Literature, and the Arts, or of some other approved College at the University of Minnesota or elsewhere, during which time an introductory course in general psychology shall have been pursued. No formal application is necessary for transfer from the College of Science, Literature, and the Arts to the College of Education, nor is any loss of credits involved. Students able to meet the requirements set forth above simply make known their desire at the Registrar's office at the time of registration and they will thereupon be furnished with College of Education registration cards.

(b) Graduation from an approved normal school of Minnesota or of some other state. See below under Advanced Standing.

Unclassed Students

Normal school graduates receiving forty-two credits, teachers preparing for examination for the First Grade Professional Certificate, but who are unable to meet the regular requirements for admission, teachers in service unable to carry full work, and certain other classes of students are admitted to the College of Education as unclassed students. Each case must, however, be dealt with individually as the result of formal application to the Dean.

Unclassed students in the College of Education will find it possible to pursue all subjects required for a First Grade Professional Certificate.

Student Advisers

Only members of the faculty of the College of Education may act as student advisers.

ADVANCED STANDING

By Examination

The tendency of the College of Education is distinctly toward discouraging any effort to secure advanced standing in professional subjects by examination. With the establishment of correspondence courses in the General Extension Division, there are no longer the reasons which formerly existed for granting such examinations. (See also statement, Practice Teaching, page 21-22.)

Graduates of Minnesota Normal Schools

The College of Education grants to graduates of the Advanced Graduate Course of Minnesota State Normal Schools sixty credits of advanced standing (approximately two years' credit); to graduates of the Advanced Latin or Advanced English courses, forty-two credits.

Normal School graduates desiring admission to the College of Education must present a recommendation from the President of the normal school from which they were graduated, together with a record of the courses pursued and grades received.

Students admitted to the College of Education from normal schools will not be permitted to elect the following courses for credit: Education 1; Philosophy 1-2, or 5.

For a statement of records to be submitted, see Bulletin of General Information, pages 27-28.

CLASS ROUTINE AND SCHOLASTIC REQUIREMENTS

The following regulations refer chiefly to undergraduates; graduate students should consult the bulletin of the Graduate School.

Classes are held mornings and afternoons of every week day except Saturday afternoon. (For teachers' afternoon and Saturday classes see page 18.)

No student may elect work during any semester in more than five departments. Students must elect at least fourteen hours a week. Students may ordinarily elect not more than seventeen credit hours. A student who has, during the preceding semester or two semesters, earned an average of one and one-half honor points for each credit hour taken and who has had no condition or failure the preceding semester, may elect eighteen hours, upon the approval by the Administrative Board of a petition for permission to do the same. For explanation of Credit Hours and Honor Points, see page 16.

Students whose absences exceed four weeks in the aggregate during a semester are not permitted to take the semester examinations without permission of the Administrative Board. Any student reported below

grade in sixty per cent of his work, or in three subjects, at the middle or close of the first semester or middle of the second semester is dropped from the rolls and not allowed to re-enter the University until the opening of the following year.

Examinations are held at the close of each semester. A student's grade is based upon his class work and examination. Four passing grades are given, namely A, B, C, D. Work not done satisfactorily is marked I (incomplete), E (condition), or F (failure). An incomplete must be removed within one month after the opening of the following semester; otherwise it becomes a condition.

A failure must be removed by pursuing the work again in class the next time the course is offered.

CERTIFICATES

Required in Minnesota

Every teacher in the Minnesota Public Schools must have a valid certificate before he can be lawfully employed. Two classes of certificates are of interest to University students:

1. A First Grade Professional Certificate renders its holder eligible for the following positions: (1) Superintendent of Schools (if candidate has had previously two years' experience in supervising grades); (2) Principal of a Graded or High School; (3) Instructor in any high-school subject, except those subjects which demand special certificates.

2. A Special Certificate authorizes the holder to teach the special subjects indicated on the certificate. The University prepares students for special certificates in: (1) Music; (2) Drawing; (3) Home Economics; (4) Manual Training; (5) Agriculture; (6) Commercial Subjects; (7) Public School Music; (8) Physical Education.

3. High School Training and Teacher-Librarians. In addition to the courses preparing for special certificates, the College of Education offers courses to prepare teachers for high-school rural training departments and high-school teacher-librarians. The State Department issues no special certificates for these two classes of teachers, but gives an official endorsement to students who complete these courses in the College of Education. The College of Education grants persons completing these courses a special diploma.

The University Teachers' Certificate

1. Two year certificate. The University Teachers' Certificate is valid for two years as a First Grade Professional Certificate. Holders are eligible for all positions open to holders of the First Grade Professional Certificate named above. The courses leading to this certificate are described on page 21.

2. Life Certificates. After two years of successful teaching experience, the University Teachers' Certificate may become a Life Certificate, upon endorsement by the State Department of Education and the President of the University. This two-years' experience must be gained within

Minnesota. Graduates who teach in another state may, upon returning to Minnesota, apply to the State Department of Education for an extension of their University Teachers' Certificate for two years at the completion of which application may be made for a permanent life certificate. The fee for this extension is $1. Holders of the University Teachers' Certificate who wish to have their certificate made a permanent life certificate should apply directly to the State Department of Education, St. Paul, for a permanent endorsement of the certificate. The fee for this endorsement is $5.

Regulations Governing the Issuance of Certificates

1. All inexperienced students desiring the University Teachers' Certificate (described on page 21) are required to comply with the University requirements for this certificate. This certificate shall specify the major and minor subjects the student is qualified to teach.

2. Mature and experienced undergraduates may petition the Administrative Board to be excused from certain of the prescribed courses for the regular University Teachers' Certificate, but their petition must be approved by the Department of Education and the petition must be accompanied by a statement showing that the student has been a successful teacher in certain high school subjects. These students will be required to complete satisfactorily prior to graduation at least fifteen hours of work in education. The education courses which they shall be privileged to carry will be determined entirely upon the recommendation of the Dean of the College of Education or the Department of Education.

3. Graduates of normal schools or of other institutions registered in the College of Education who do not desire to become high school teachers, but who desire a more liberal training for elementary school work, may be relieved from complying with the regular requirements for a University Teachers' Certificate, but they will not be relieved from carrying at least fifteen hours of work in education. Such persons at graduation will be granted a special teachers' certificate describing their courses and indicating the types of positions for which they are qualified.

4. Students desiring to qualify as public school administrators will be granted a certificate upon completion of a course leading to such a certificate, but no student shall be eligible to such a certificate unless he has completed at least twenty-four hours of work in education, at least twelve of which must have been taken at the University of Minnesota.

5. Teachers and supervisors of public school music, of physical education, of manual training, of home economics, of agriculture, and of such special subjects as may later be included in the program of the College of Education will be granted a special teacher's or supervisor's certificate upon completing a prescribed course leading to such a certificate.

6. Students desiring to qualify as heads of teacher training departments in high schools will be granted a certificate upon the completion of a course leading to such a certificate.

7. Students desiring to qualify as teachers of defective or supernormal children will be granted a certificate upon completion of a course leading to such a certificate.

8. Students regularly enrolled for graduate work with Education as a major will, upon the completion of the requirements for an advanced degree, be recommended for a University Teachers' Certificate.

9. Students regularly enrolled for graduate work with education as a minor, who desire a University Teachers' Certificate, will be required to complete the course prescribed for such a certificate, unless they have already met the requirements or their equivalent for the certificate in their undergraduate careers.

THE DEGREE OF BACHELOR OF ARTS (IN EDUCATION)

The degree of Bachelor of Arts (in Education) may be conferred by the College of Education upon any student who fulfills all the requirements stated below.

Summary of Requirements

1. Amount and grade of work. During his entire course the student must earn: (a) one hundred and twenty credit hours in addition to the required exercises in drill, gymnasium, and physical education; (b) one hundred and twenty honor points; (c) one and one-half honor points per credit hour in his major subject.

2. Courses required and allowed. (a) The student must have completed (normally during sophomore year) a general introductory course in psychology (e.g. Philosophy 1-2, or 5, or an equivalent of the same); (b) he must have satisfied all the requirements for a teachers' certificate (see page 21) except as hereinafter provided:

(1) Students *already holding a first grade professional certificate will be excused from complying with the university requirements for the certificate,* but they will be required to carry an equivalent number of courses in education.

3. Distribution of work—Majors and Minors. A student must take a sufficient number of courses so distributed among at least three distinct departments concerned with the work of the secondary school as to secure one major and two minors. Either Education or Psychology may be counted as a major or a minor in this group.

4. Residence. At least thirty credits must be earned by residence in this college. If the term of residence is only one year, that year must be the senior year; and in any case, at least half of the work of the senior year must be done in residence. Attendance at summer sessions counts as residence.

Explanation of Requirements

The amount of work pursued by a student is estimated in credit hours; the quality or grade of his work, in honor points.

A *Credit Hour* is one hour per week of recitation or lecture work extending throughout one semester, or three hours per week of laboratory work through one semester. It is assumed that each credit hour will demand on the average three hours a week of the student's time for recitation or lecture, one hour in class and two hours of preparation; for laboratory courses, three hours in the laboratory.

Honor Points are computed as follows: each credit hour with the grade of A entitles the recipient to three honor points; each credit hour with the grade of B entitles the recipient to two honor points; each credit hour with the grade of C to one honor point; each credit hour with the grade of D to no honor points. Illustration: A student completing a one-semester three-credit course and receiving the grade A would be entitled to nine honor points; if receiving the Grade of B to six honor points; if receiving the grade of C to three honor points; if receiving the grade D to no honor points.

Majors and Minors. Twelve credits is the minimum requirement for a minor and eighteen credits for a major, in the College of Education. Usually a minor will demand from fifteen to eighteen credits with a corresponding increase for the major, depending upon the combination which the student has selected with a view to future teaching. Only in special cases will the minimum mentioned above be accepted. The definite determination of the credits required is left in each case to the department concerned, for a statement of which consult the departmental statements appearing further on in this bulletin.

GRADUATION WITH DISTINCTION

The degree of Bachelor of Arts in Education with Distinction is granted to graduates of this College who fulfill the following conditions:

A. Special excellence in major subject.

B. Application for the degree with distinction should be made at the time of entering the College, but may, however, be postponed until the opening of the senior year.

C. At the time of application the student shall, after conference with the Dean of the College of Education, or some other member of the Faculty appointed for that purpose, select a subject for his thesis, which must be formally approved and recorded.

D. The presentation of a satisfactory thesis upon some subject within the major field of study not later than May 1, senior year.

E. At the time of application the student must have an average of one and one-half honor points per credit hour in all previous work.

F. At the time of graduation the student must have met all conditions applying to the Bachelor's Degree in Education; must show a record of one and one-half honor points per credit hour in *four fifths of all work pursued throughout his entire course;* and

G. Must be recommended to the Faculty for the degree with distinction, which recommendation must be approved by the vote of the Faculty of the College.

GRADUATE WORK IN EDUCATION

Graduate Study. Graduate courses in Education leading to the degree of Master of Arts or Doctor of Philosophy may be pursued in the Graduate School. Students who desire to undertake graduate work with Education as a major must have had at least a year's work in Psychology, and, in addition to this, a total of not less than twelve credits in Education. Students who desire to undertake graduate work with Education as a minor must have at least a year's work in Psychology, and, in addition to this, a total of not less than six credits in Education. Graduates, holding a Bachelor's degree, who have less than twelve credits in undergraduate courses in Education, will be obliged to increase the number of credits required for a major or a minor in Education by the difference between twelve and the number of undergraduate credits in Education which they present. Such students will not, however, be barred from counting all the time spent at the University toward satisfying the residence requirement of graduate work, provided the work which they pursue is approved by the Dean of the Graduate School.

During summer sessions graduate work may be pursued. The Master's degree may ordinarily be completed in four summer sessions. For full statement of regulations, consult Graduate School bulletin.

TEACHING ASSISTANTS IN MINNEAPOLIS PUBLIC SCHOOLS

The College of Education in coöperation with the Minneapolis schools has adopted a plan which provides for employing in the Minneapolis high schools a certain number of University graduates to be known as "teaching assistants." The adoption of this plan is in essence the establishment in the Minneapolis public schools of a certain number of teaching fellowships for graduate students. These teaching assistants will receive a compensation for their work in the schools proportionate to the amount of time devoted to teaching; $300 for the first year; $400 for the second year.

For each assistant a definite course, combining graduate professional study and teaching experience will be outlined. Altho the plan provides an abundance of teaching experience, the greater emphasis will be thrown upon advanced professional study.

Work in Minneapolis Schools. Teaching assistants shall be on duty at the schools from 8:30 until 12:15. Their work will be divided between teaching and assisting. During their first year they shall instruct not more than two classes per day, that is, one third of a regular teacher's teaching periods. If they continue a second year, the portion of their time devoted to class instruction may be increased to three periods a day. Their work as teaching assistants shall be limited to the hours during which they are on duty in the schools and no additional work other than preparation for teaching their regular courses shall be required of them outside of the above set schedule of hours.

Applications for positions as teaching assistants should be made directly to the principal of the University High School. The number of

such positions can not be absolutely determined in advance of the opening of the schools.

COÖPERATION WITH STATE DEPARTMENT OF EDUCATION

Arrangements have been made whereby a few students of superior ability who are interested in problems relating to the administration of state systems of education may carry on a limited part of their work in the office of the State Superintendent of Education. This office now has at its command a very valuable library, a great mass of original material, and the services of a number of competent men and women who are devoting themselves to the administration and supervision of:

(a) The description of state's moneys for the support of public education.

(b) The inspection of rural, elementary, and secondary schools.

(c) Construction of buildings.

(d) The training of teachers.

It is understood that in case any students are recommended for this work, the recommendation must be made by the Department of Education of the University of Minnesota, and that such students, in case they are to receive credit for graduate work in the University of Minnesota, will be expected to work under the supervision of the State Department of Education and the Department of Education in the University of Minnesota and that in each instance, the student will be required to do a specific and intensive piece of work.

SPECIAL OPPORTUNITIES FOR TEACHERS IN SERVICE

Afternoon and Saturday morning classes, correspondence lessons, extension classes, and the summer session are the chief channels through which the College of Education seeks to discharge its obligation to teachers in service.

Afternoon and Saturday Classes

A special announcement of late afternoon and Saturday morning classes arranged especially for teachers, together with a statement of the requirements for admission and method of registration will be issued by the College of Education early in October.

Teacher Training through Extension Courses

The General Extension Division offers excellent opportunities for teachers and others to pursue courses carrying credit for the Bachelor of Arts degree or for the professional state teachers' certificate, either by correspondence lessons or by joining an extension class. For further information address the General Extension Division, University of Minnesota.

Summer Session

The summer session conducted by the University offers unusual oppor-

tunities for professional training to undergraduates, graduates, superintendents and principals, teachers in service, and candidates for first grade and second grade State Professional Certificates. The summer session of 1918 will begin Monday, June 24.

EMPLOYMENT BUREAUS

Appointment Bureau. The University of Minnesota maintains an Appointment Bureau which endeavors to place graduates of the University of Minnesota in positions best suited to their training and experience. Students looking forward to teaching should register during the first semester of their senior year. No fee, however, will be charged to those who register before February 15. Complete instructions and registration blanks should be secured at the office of the Appointments Bureau. During the year 1917-18, the general office of this Bureau will be located in the College of Education Building, Room 110. Special offices, however, will be maintained at the College of Agriculture under the direction of Professor A. V. Storm for those desiring to teach agriculture or domestic science.

State Teachers' Employment Bureau. The State Teachers' Employment Bureau, located in the State Capitol, St. Paul, under the direction of Mr. E. T. Critchett, offers its services to all teachers and prospective teachers. The fee for registration is $3.

Neither the University of Minnesota nor the State Teachers' Employment Bureau exacts any commission.

COURSE OF STUDY

DEPARTMENT

Every course listed in this Bulletin counts in the College of Education.

GUIDANCE IN THE SELECTION OF COURSES

Superintendents and Graded School Principals

It is desirable that prospective superintendents and principals of graded schools, before entering upon their duties, shall have had courses in School Administration and School Supervision in some recognized normal school or college. The following courses will count toward a supervisor's certificate: 109, 121, 123, 134, 136, 141, and 142. Course 121 is a general introduction to all other courses in School Administration and is especially recommended to those beginning a study of this field.

Graduate Students

All courses bearing numbers of 100 and above are open to graduate students. Before attempting to make out their programs, graduate students in Education should consult the Dean of the College of Education and the Dean of the Graduate School. Attention is called to the fact that Course 125 is ordinarily required of all candidates for advanced degrees. Courses bearing numbers 200 and above are open to graduate students only.

All graduate students majoring in Education are required to meet with the department staff every alternate Monday evening from 7:15 to 9:00 for conference regarding subjects of original investigation. This work carries no credit. See also page 17 of this bulletin.

Candidates for State Professional Certificates

Unclassed students, candidates for the State Professional Certificate, may pursue courses in residence or by correspondence or in extension classes. For guidance in the selection of courses relating to this certificate, consult statement, State Professional Teachers' Certificate, page 21.

Undergraduates

Students should consult carefully the departmental descriptions of courses required for admission to teachers' course. The teachers' course in each subject must be taken in advance of or contemporaneously with practice teaching. For some subjects more than a minor is required for admission to teachers' courses in the case of students who wish to offer the subject only as a minor.

See the following topics in this bulletin: (1) University Teachers' Certificate, page 21; (2) major and minors, page 16; (3) special training courses, pages 22-24; (4) admission, page 10; (5) prerequisites for teachers' courses, pages 21-22.

THE UNIVERSITY TEACHERS' CERTIFICATE

A two-year, junior-senior course, leading to the degree of Bachelor of Arts (in education) entitles the recipient in every case to a University Teachers' Certificate.

All students without teaching experience, desiring a University Teachers' Certificate will be required to comply with the requirements listed below. Such students will also be required to complete a two years' course leading to the degree of Bachelor of Arts (in Education).

Candidates for this degree may major in any department offering work in the College of Education.

Recipients of the degree of Bachelor of Arts (in Education) and of the University Teachers' Certificate may, by a proper selection of studies during their regular course, become eligible for recommendation or endorsement for one of the special certificates described on pages 13-14.

Prescribed Course of Study for University Teachers' Certificate

The College of Education has adopted the prescribed course of study outlined below, for the University Teachers' Certificate, and for the degree of Bachelor of Arts (in Education).

No.	Title	Credits	To be Taken Semester	Year
1.	Brief History of Education	3	1 or 2	Jr.
	or			
101-102.	History of Education	6	1 and 2	Jr.
3.	Social Aspects of Education	3	1 or 2	Jr.
11.	Technique of Teaching	3	1 or 2	Sr.
15.	Practice Teaching (See statement below)	3	1 or 2	Sr.
	Teachers' Courses (i.e. courses in special methods covering at least two high school subjects and totaling at least three credits*	3	1 or 2	Jr.
			or 1	Sr.

A general introductory course in Psychology is a prerequisite for all courses in Education, except those now offered in the Department of Agricultural Education and in the Department of Home Economics Education. Credits gained by it, however, are not counted as professional credits toward the teachers' certificate.

* In some cases the amount of work necessary to meet this requirement will total six credits. In other cases a single teachers' course totaling only three credits is arranged in such a way as to cover two subjects, thereby satisfying this requirement. An example of this is the teachers' course in English and Rhetoric.

Graduates of normal schools who, upon entering the College of Education, receive credit for any of the courses specified above will be allowed to elect in the place of the same other strictly professional subjects.

PRACTICE TEACHING—PREREQUISITES

Opportunity for Practice Teaching is provided in part by the University High School and in part by the Minneapolis City Schools.

Education 1 or 101-102, 3, 11, and the teachers' course in the department in which the student wishes to do practice teaching, together with

all subjects required by the department concerned as prerequisite to the teachers' course (see departmental statement) are prerequisite to the course in Practice Teaching. In cases where the teachers' course extends throughout two semesters, students will in exceptional cases be permitted to do their practice teaching during the second semester of their teachers' course.

ADMISSION TO PRACTICE TEACHING

Application and Credentials

No student will be permitted to do practice teaching who has not been definitely recommended by the department in which the subject lies as being well prepared from the standpoint of subject matter.

All assignments to Practice Teaching are made by the Principal of the University High School. Before registering for this work students must consult with him and submit: (1) the departmental recommendation referred to above and (2) a statement from the Registrar showing the courses they are offering as prerequisites including, (a) the courses in Education, (b) the courses in the department concerned. This statement must show when these courses were taken and the grade received and it must be followed by a formal statement that the student has satisfied all the prerequisites for practice teaching. Special blanks for this purpose may be secured at the office of the High School Principal.

Students at the College of Agriculture desiring to qualify as teachers will be required to comply with the usual requirements for practice teaching. Arrangements for this work will be made by Professor Storm and Miss Berry.

Credits allowed in Agriculture and Home Economics. A maximum of eighteen credits is elective from courses in Agriculture and Home Economics, but it should be noted that prospective teachers of these subjects must secure from the State Department of Education in advance of their contract to teach, a special certificate in the subject concerned.

SPECIAL TRAINING COURSES

DEPARTMENT OF AGRICULTURAL EDUCATION

The special professional courses offered by the College of Education for the preparation of teachers, superintendents, and supervisors of agriculture are given in the Department of Agricultural Education on the campus of the College of Agriculture. (See departmental statement, page 34.)

COMMERCIAL TRAINING

The demand for University graduates as commercial teachers has been greater than the University has been able to meet. A new requirement of the State Department that teachers of commercial subjects, must be

college graduates will intensify this demand. The University has as yet made no arrangements to offer the technical subjects required for this work, such as stenography, typewriting, penmanship, bookkeeping, etc. Nevertheless, by a proper selection of courses in English, rhetoric, foreign language, history, economics, psychology, and education, students who have secured a knowledge of the technical subjects elsewhere can get a broad and sound foundation for this work during their university course.

DEPARTMENT OF HOME ECONOMICS EDUCATION

The special professional courses offered by the College of Education in Home Economics for the training of teachers of Home Economics are given by the Department of Home Economics Education on the campus of the College of Agriculture. (See department statement, page 35.)

MANUAL TRAINING

Students looking forward to teaching manual training may, under the present arrangements, offer manual training as a minor in the College of Education. Under manual training in the departmental statement will be found a prescribed course of study to be required of all students whom the College of Education will recommend for certificates as teachers of manual training. (See department statement, pages 37-38.)

HIGH SCHOOL TEACHER-TRAINING DEPARTMENTS

The College of Education offers a definite course of study for the preparation of teachers for high-school teacher training departments. This course is open only to teachers who have had two years of rural teaching experience and who in addition to this are graduates from the advanced course of a Minnesota State Normal School or who possess equivalent professional preparation.

NOTE: To this second requirement, exceptions may be made in the case of teachers already engaged in high-school training departments and in certain other individual cases where circumstances justify the same.

Ordinarily two years will be required to complete this course. However, teachers already engaged in high-school training departments and holding First Grade Professional Certificates and who are unable to absent themselves from their duties for more than a year will be permitted to deviate from the prescribed course of study and to elect such subjects as will be of most immediate use to them in their work.

Students who complete the course offered by the College of Education for teachers of training departments will be eligible for the endorsement of the State Department of Education as heads of training departments in high schools. The course as outlined (see pages 39-40) provides Education as a major study, with Economics and English as minors. The selection of these two subjects as minors has been based upon the nearness of their relation to the work of the rural school teacher. The Educa-

tion courses are all required, but other minors may be selected upon approval. The attention of teachers desiring to become teachers in high-school training departments is called to the following rules recently passed by the High School Board which provides that after 1918 all candidates for this work shall be both normal school and college graduates.

TEACHERS OF DEFECTIVES

Four-year course in Education for Teachers of Exceptional Children, leading to degree of B.A. in Education.

The State of Minnesota has provided state aid to local school systems which arrange for the instruction of subnormal children in special classes. The College of Education of the University of Minnesota has undertaken to prepare teachers for such classes and, to this end, has arranged a program for their training. Persons who have had two years successful experience teaching normal children and who complete the equivalent of the following program will receive a special university teacher's certificate indicating their qualifications for the work of teaching subnormal children in the public schools. This certificate will be recognized by the Minnesota State Department of Education as the equivalent of the certificate issued by the Department to "Directing Teachers for Classes of Subnormal Children."

OUTLINE OF COURSE

Department	Number of Course	Title of Course	Credits
Rhetoric	1-2	Elementary	6
Animal Biology or Chemistry	1-2	Elementary	6
Modern Language			6 or 12
Electives			6 or 12
Total			30

SOPHOMORE YEAR

Department	Number of Course	Title of Course	Credits
Pyschology	1-2	Elementary	6
Sociology	1a or 1b	Introductory	3
Sociology	6	Modern Social Movements	3
Physiology	3a or 3b	Elementary	3
Mech. Engineering	8	Industrial Education including Sloyd and Woodwork	3
Physical Education	31 or 32	Organization of Games and Folk Dancing	0
Animal Biology or Chemistry	1-2	Elementary	6
Electives			6
Total			30

JUNIOR YEAR

Department	Number of Course	Title of Course	Credits
Psychology	101a or b	Experimental	3
Sociology	9	Treatment of Dependents and Defectives	3
Sociology	10	Child Welfare	3
Sociology	106	Treatment of Delinquents	3
Education	1a or 1b	History of Education or Course in American School System	3
Education	11a or 11b	Technique of Teaching	3
Education	3a or 3b	Social Aspects	3
Education	136	Mental Tests	3
Education	105	Educational Psychology	3
Education	140	Course of Study for Subnormal Children	3
Total			30

SENIOR YEAR

Department	Number of Course	Title of Course	Credits
Education	109	Educational Diagnosis	2
Education	134	Mental Diagnosis of School Children	2
Education	137, 138	Psycho-Educational Clinic	3
Education		Practice Teaching of Subnormal Children	3
Education	123	Theory of Supervision	3
Education	106	Educational Psychology	3
Education		Study of Speech Defects	3
Education		Lectures on Organization and Administration of Classes for Subnormal Children	
Human Physiology	137a or b	Foods and Practical Dietetics	2
Electives			9
Total			32

KINDERGARTEN AND ELEMENTARY TEACHERS

The College of Education offers opportunity for advanced study to teachers who have had adequate normal school training and who wish to take further preparation for work as principals, supervisors, or teachers of elementary schools. A special certificate will be granted to normal school graduates who spend two years in the College of Education taking advanced work for the purpose of becoming better teachers of elementary schools. The following agreements between the presidents of the State Normal Schools of Minnesota and the Executive Faculty of the College of Education, reached at an informal conference, April 3, 1915, make it possible for students in the College of Education, who discover during their course that their taste and ability lie in the elementary field, to transfer from the College of Education to one of the normal schools at the opening of their senior year and thus prepare themselves as elementary teachers or as kindergartners without loss of time.

Agreements between Normal Schools and College of Education

1. That less than one year of residence at a State Normal School for the purpose of preparing for kindergarten or elementary school work would not be adequate.

2. That the normal schools would be willing to confer their regular diploma upon university students coming to them from the College of Education, who had had three years of college work, upon the satisfactory completion of one year in the normal schools.

3. That these provisions be limited to students previously registered in the College of Education.

4. That they should not apply to students who had entered the College of Education upon the basis of normal school credits.

PUBLIC SCHOOL MUSIC

See courses 27-28 under statement of Department of Music.

DEPARTMENTAL STATEMENTS

EDUCATION

Professors LOTUS D. COFFMAN, MELVIN E. HAGGERTY, ALBERT W. RANKIN, FLETCHER H. SWIFT; Assistant Professors WILFORD S. MILLER, MARVIN J. VAN WAGENEN; Instructors JEAN H. ALEXANDER, CHARLES L. HARLAN, REWEY BELLE INGLIS, GEORGE A. MCGARVEY, WILLIAM D. REEVE; Assistant OSCAR JULIUS JOHNSON; Special Lecturers THADDEUS P. GIDDINGS, GEORGINA LOMMEN.

REQUIREMENTS OF THE DEPARTMENT

For a Minor, eighteen credits, including Philosophy 1-2 or equivalent.

For a Major, twenty-four credits, including Philosophy 1-2 or equivalent. Six credits in Philosophy are prerequisite for all courses in Education.

COURSES

No.	Credits	Title	Offered to	Prereq. courses
1a	3	Brief Course in Hist. of Educ.	Jr., sr.	Phil. 1-2
		8 TThS	205Ed	Swift, Alexander
		9 TThS	205Ed	Swift, Alexander
		9 MWF	205Ed	Swift, Alexander
1b	3	Brief Course in Hist. of Educ.	Jr., sr.	Phil. 1-2
		9 TThS	204Ed	Alexander
5b	3	The American School.....	Jr., sr.	Phil. 1-2
		10:45 TThS	Col. of Agr.	Swift
3a	3	Social Aspects of Educ...	Jr., sr.	Phil. 1-2
		4 MWF	204Ed	
3b	3	Social Aspects of Educ....	Jr., sr.	Phil. 1-2
		8 MWF	204Ed	Rankin
3bt	3	Social Aspects of Educ....	Teachers	Phil. 1-2
		8-9:50 S		
		1 hr. Ar	111Ed	Rankin
11a	3	Technique of Teaching....	Jr., sr.	Phil. 1-2
		8 MWF	205Ed	Harlan
		9 MWF	204Ed	Miller
11b	3	Technique of Teaching....	Jr., sr.	Phil. 1-2
		9 MWF	204Ed	Harlan
15a	3	Practice Teaching	Sr., grad.	See statement
		Ar Ar	Ar	Miller
15b	3	Practice Teaching	Sr., grad.	See statement
		Ar Ar	Ar	Miller
101	3	Hist. Found. of Mod. Educ.	Jr., sr., grad.	Phil. 1-2 and 6 cr. in Dept. of History
		2-3:30 TTh	205Ed	Swift
102	3	History of Educ. since Reformation	Jr., sr., grad.	Phil. 1-2 and 6 cr. in Dept. of History
		2-3:30 TTh	205Ed	Swift
103	3	Educational Classics	Jr., sr., grad.	1 or 101-102
		10 TThS	205Ed	Swift, Alexander

No.	Credits	Title	Offered to	Prereq. courses
104	3	Educational Classics	Jr., sr., grad.	1 or 101-102
		10 TThS	205Ed	Swift, Alexander
105	3	Educational Psychology ...	Sr., grad.	Phil. 1-2
		11 MWF	204Ed	Haggerty
106	3	Educational Psychology ...	Sr., grad.	Phil. 1-2
		11 MWF	205Ed	Haggerty
109	2	Educational Diagnosis	Sr., grad.	1 or 101-102 and 3
		10-11:40 S	204Ed	Haggerty
119	3	School Curricula	Sr., grad.	1 or 101-102 and 3
		4 MWF	205Ed	Rankin
121a	3	School Organ. & Admin...	Sr., grad.	1 or 101-102 and 3
		3 MWF	205Ed	Rankin
121b	3	School Organ. & Admin...	Sr., grad.	1 or 101-102 and 3
		3 MWF	205Ed	Rankin
123	3	Theory of Supervision....	Sr., grad.	1 or 101-102 and 3
		11 MWF	205Ed	Coffman
124	3	Educational Administration	Sr., grad.	121
		3 MWF	111Ed	Coffman, Van Wagenen
125	2	Methods in Educ. Research	Sr., grad.	1 or 101-102 and 3
		3 MW	111Ed	Coffman
131	3	German Schools	Sr., grad.	1 or 101-102 and 3
		4 MWF	111Ed	Alexander
132	3	French Schools	Sr., grad.	1 or 101-102 and 3
		4 MWF	111Ed	Alexander
134	2	Mental Diagnosis	Sr., grad.	Phil. 1-2
		10-11:40 S	MH	Haggerty, Van Wagenen
135	2	Mental Tests	Jr., sr., grad.	Phil. 1-2
		2-4 WF	MH	Haggerty, Johnson
136	2	Experimental Education ..	Jr., sr., grad.	Phil. 1-2
		2-4 WF	MH	Haggerty, Johnson
137-138	1 to 6	Psycho-Educational Clinic..	Sr., grad.	Phil. 1-2; Ed. 109, 134, or 135
		12:30-2:30 MWF	126-128MH	Haggerty
141	3	School Sanitation	Sr., grad.	1 or 101-102 and 3
		8 MWF	204Ed	Rankin
142	3	Industrial Education	Sr., grad.	1 or 101-102 and 3
		4 MWF	205Ed	Rankin
146	3	Hist. and Prin. of Religious Education	Jr., sr., grad.	Phil. 1-2
		9 TThS	205Ed	Swift
*152	1	Elem. Meth. in Reading..	Jr., sr., grad.	1 or 101-102
		5 Th	111Ed	Lommen
*153	1	Elem. Meth. in English...	Jr., sr., grad.	1 or 101-102
		5 Th	111Ed	Harlan
*154	1	Elem. Meth. in Indus. Arts	Jr., sr., grad.	1 or 101-102
		Ar Ar	Col. of Agr.	Lommen
*155	1	Elem. Meth. in History...	Jr., sr., grad.	1 or 101-102
		5 T	111Ed	Lommen
*156	1	Elem. Meth. in Geography.	Jr., sr., grad.	1 or 101-102
		5 T	111Ed	Lommen
*157	1	Elem. Meth. in Arithmetic	Jr., sr., grad.	1 or 101-102
		Ar Ar	Ar	Harlan

* Credit only in the College of Education.

No.	Credits	Title	Offered to	Prereq. courses
201-202	4	Seminar in Selected Problems in Educ. History..	Grad.	101-102 and 6 cr. in Dept. Hist.
		4-5:30 T	214Ed	Swift
203-204	4	Seminar in Educ. Psychol.	Grad.	105
		4-5:30 M	203Ed	Haggerty
205-206	4	Seminar in Educ. Admin..	Grad.	124, 125
		4-5:30 W	203Ed	Coffman

HISTORY OF EDUCATION

1a or 1b. A BRIEF COURSE IN THE HISTORY OF EDUCATION. Current school problems and educational theories in the light of their history. Emphasis upon secondary education and those aspects of education of most immediate concern to high-school teachers. SWIFT, ALEXANDER.

101. FOUNDATIONS OF MODERN EDUCATION. An interpretative historical study of those elements in modern education derived from the Hebrews, Greeks, Romans, Middle Ages, and Renaissance. Emphasis will be laid upon secondary and higher education and the origin and results of the monopoly of the cultural conception of education and cultural studies. SWIFT.

102. HISTORY OF EDUCATION FROM THE REFORMATION TO THE PRESENT TIME. Modern educational institutions, theories, and problems in the light of their history. Special emphasis upon elementary education. SWIFT.

103. EDUCATIONAL CLASSICS. An intensive study of selected writings of educational leaders, ancient, medieval, and renaissance. SWIFT, ALEXANDER.

104. EDUCATIONAL CLASSICS. An intensive study of selected writings of educational leaders, from Locke to the present time. SWIFT, ALEXANDER.

201-202. SEMINAR IN SELECTED PROBLEMS IN EDUCATIONAL HISTORY. Research work for graduate students. SWIFT.

PRINCIPLES OF EDUCATION

11a or 11b. TECHNIQUE OF TEACHING. Types of classroom exercises; preparation of teaching plans; hygiene of instruction; classroom management; the professional ethics of teaching; observation of high-school work. HARLAN, MILLER.

EDUCATIONAL PSYCHOLOGY

105. EDUCATIONAL PSYCHOLOGY. Advanced work in genetic psychology, the origin and nature of the human organism, the origin, development and control of instincts, and their relations to group activities, and the relation of instincts to the formation of habits; introductory to the psychology of learning. HAGGERTY.

106. EDUCATIONAL PSYCHOLOGY. The psychology of learning. Methods of measuring the rate of learning; study of typical learning experiments and an examination of the conditions of the most economic learning, study of individual differences, and the psychology of the school subjects. HAGGERTY.

109. EDUCATIONAL DIAGNOSIS. A study of the typical educational problems involving the use of educational scales and standard tests. The course will deal with the nature of the tests, the methods of their use, analysis of the results obtained, and programs of remedial educational procedure based on the results of the test. HAGGERTY.

134. MENTAL DIAGNOSIS OF SCHOOL CHILDREN. A study of mental variation in children, its nature, degree, causes, and effects. Introductory to the course will be a series of lectures on the anatomy, physiology, and pathology of childhood. Methods of treating superior and subnormal children in the schools will be discussed. HAGGERTY.

135. MENTAL TESTS. A study of individual differences by means of mental tests. Laboratory work in giving and taking tests introductory to the use of group tests for the measurement of age-level, etc. HAGGERTY, JOHNSON.

§136. EXPERIMENTAL EDUCATION. The application of experimental methods to educational research. Problems in mental measurement, educational and mental diagnosis, and the psychology of learning will be set as individual problems for properly prepared students. HAGGERTY, JOHNSON.

137-138. PSYCHO-EDUCATIONAL CLINIC. The Psycho-educational clinic is conducted in close coöperation with the Medical School clinics in pediatrics and nervous and mental diseases. Students taking this course will be given work in the mental examination and diagnosis of individual cases, and practical experience in the use of standardized tests, studies of family history and investigation of school records. Each student will be expected to make a detailed study of a number of individual cases and to assist in carrying out prescribed treatment in such cases. HAGGERTY.

203-204. SEMINAR IN EDUCATIONAL PSYCHOLOGY. A research course for graduate students. Topic for year 1917-18, "Educational and Mental Diagnosis of School Children." Required of all students writing theses in educational psychology and related topics. HAGGERTY.

SCHOOL ADMINISTRATION

3a or 3b. SOCIAL ASPECTS OF EDUCATION. The school as a community factor; the present peculiar relation of the school to social problems; the function of the school in these relations. RANKIN.

3bt. SOCIAL ASPECTS OF EDUCATION. Same as above for teachers. RANKIN.

119. School Curricula. A study of the ideas implicit in a democratic society and an attempt to apply those ideas in the selection of the material of school curricula. This will involve some consideration of the constructive aims and methods of education. Rankin.

121a. School Organization and Administration. An introductory course in school administration for students of teaching experience and for those looking forward to work as principals and superintendents. Rankin.

121b. Same as 121a. Rankin.

123. Theory of Supervision. The problems involved in the training of teachers in service; studies of qualities of merit in teachers; factors in service; factors in selecting teachers; the distribution of subject matter by grades; time allotment of studies. Coffman.

124. Educational Administration. The interpretation of present tendencies in the administration of state and city school systems. Coffman.

125. Methods in Educational Research. A study of statistical and other methods as applied to educational investigation. This course is ordinarily required of all candidates for advanced degrees. Coffman.

205-206. Seminar in Educational Administration. Coffman.

SCHOOL SANITATION AND HYGIENE

141. School Sanitation and Public Health. A course in school hygiene in its broader aspects. Designed for all teachers and supervisors who are responsible for the health of school children. Treats of medical supervision and other problems arising from school environment. Rankin.

INDUSTRIAL EDUCATION

142. Industrial Education. Existing types of industrial and vocational schools and systems of training. Comparison of conditions in America and foreign countries. Organization of course of study. Rankin.

FOREIGN SCHOOLS

131. German Schools. Study of the existing school systems of Germany and with emphasis upon present conditions and problems. Alexander.

132. French Schools. A study of the existing school systems of France with emphasis upon present conditions and problems. Alexander.

RELIGIOUS EDUCATION

146. History and Principles of Religious Education. Part I: The influence of religion and religious education as social and spiritual forces among certain selected types. Part II: Principles of education as applied to religious instruction and training. This course may be pursued as a graduate course under certain conditions. Swift.

PRACTICE TEACHING

15a,b. Practice Teaching. Teaching under supervision in the University High School and in the Minneapolis City Schools, in the regular secondary school subjects. The course calls for one period daily at the school where the work is assigned. Miller.

METHODS OF TEACHING

1. General Method. See above Course 11 (Technique of Teaching).

2. Teachers' Courses or Courses in Special Methods of Teaching High School Subjects.

A description of the methods courses offered in the Rural Training Department is given immediately after the following tabular statement.

A recent ruling of the State Department of Education requires courses in special methods of at least two different high-school subjects totaling at least three credits, for all applicants for the State Professional Teachers' Certificate. In some cases the amount of work necessary to meet this requirement will total six credits. In other cases a single teachers' course totaling only three credits is arranged in such a way as to cover two subjects, thereby satisfying this requirement; an example of this is the teachers' course in English and Rhetoric.

METHODS COURSES

No.	Credits	Title	Offered to	Prereq. courses
31-32	3*	Nature Study	Jr., sr.	12 cr. in An. Biol.
		2, 3, 4 T	213AB	Sigerfoos
121-122	6	Studies and Methods in Plant Industry and Gen. Biol. ..	Jr., sr., grad.	An av. of 1 honor point for each cred. hour in 1 intro. and 1 intermed. course
		Ar Ar	Ar	Rivet
20	2	Teachers' Course in Chemistry	Jr., sr.	3-4 or 7-8 or 21-22
		8 TTh	Ar	Temple
80a,b	3	Teachers' Course in English.	Jr., sr.	See statement
		3-4:30 TTh	206Ed	Inglis
55	3	Teachers' Course in Geog. ..	Jr., sr., grad.	Any one of 36, 39, 116, 118
		8 TThS	105P	Posey
59-60	2*	Teachers' Course in German	Jr., sr.	29-30 and 31-32 or 53-54
		4 F	209F	Schlenker

No.	Credits	Title	Offered to	Prereq.courses
56-57	3	Teachers' Course in History and Political Science.....	Jr., sr.	See statement
		4 MW	111L	Krey
101	3	Advanced Caesar	Jr., sr.	58
		9 TThS	109F	Pike
MT11a,b	3	Manual Training	Sr.	None
		3 MWF	114Ed	McGarvey
54	2	Mathematics	Jr., sr.	11
		3 TTh	113Ed	Reeve
27-28	6	Public School Music.....	Jr., sr.	None
		4-5:30 WF	117Ed	Giddings
90	2	Physics	Sr.	2 & 4, 8 & 10, or 2 yrs. of Physics
		Ar Ar	Ar	Klopsteg
15-16	6	Principles of Phys. Educ. ..	Sr.	1-2, 3-4, 21-22, 31-32, 33-34
		Lect. 10 MWF	201WGm	Ladd, Schill, Tolg
		Lab. 2 MWF	3, 151, 153WGm	Ladd, Schill, Tolg
56-57	3	Teachers' Course in Political Science and History.....	Jr., sr.	See statement
		4 MW	Lib.	.....
80a,b	3	Teachers' Course in Rhetoric (English)	Jr., sr.	See statement
		3-4:30 TTh	206Ed	Inglis
161-162	2	Teachers' Course in Romance Languages	Jr., sr., grad.	See statement
		2 Th	201F	Barton, et al.
110	2	Teachers' Course in Norweg.	Sr., grad.	3-4
		4, 5 Th	206F	Bothne
116	2	Teachers' Course in Swedish	Sr., grad.	7-8
		Ar Ar	206F	Stomberg

* Both semesters must be completed before credit is given for the first semester.

High School Training Department Methods

*152	1	Elem. Methods in Reading..	Jr., sr., grad.	1 or 101-102
		5 Th	111Ed	Lommen
*153	1	Elem. Methods in English...	Jr., sr., grad.	1 or 101-102
		5 Th	205Ed	Harlan
*154	1	Elem. Methods Indust. Arts.	Jr., sr., grad.	1 or 101-102
		Ar Ar	Col. of Agr.	Lommen
*155	1	Elem. Methods in Hist.	Jr., sr., grad.	1 or 101-102
		5 T	111Ed	Lommen
*156	1	Elem. Methods in Geog.	Jr., sr., grad.	1 or 101-102
		5 T	111Ed	Lommen
*157	1	Elem. Methods in Arith. ...	Jr., sr., grad.	1 or 101-102
		Ar Ar	Ar	Harlan

* Receives credit only in the College of Education.

HIGH SCHOOL TRAINING DEPARTMENT METHODS

152. Elementary Methods in Reading. The place of reading in the rural school curriculum. Different types of lessons, equipment, materials, adaptation to needs of rural community. Lommen.

153. ELEMENTARY METHODS IN ENGLISH. The place of English in the rural school curriculum. Different types of lessons, equipment, materials, adaptation to needs of rural community. HARLAN.

154. ELEMENTARY METHODS IN INDUSTRIAL ARTS. The place of industrial arts in the rural school curriculum. Different types of lessons, equipment, materials, adaptation to needs of rural community. LOMMEN.

155. ELEMENTARY METHODS IN HISTORY. The place of history in the rural school curriculum. Different types of lessons, equipment, materials, adaptation to needs of rural community. LOMMEN.

156. ELEMENTARY METHODS IN GEOGRAPHY. The place of geography in the rural school curriculum. Different types of lessons, equipment, materials, adaptation to needs of rural communities. LOMMEN.

157. ELEMENTARY METHODS IN ARITHMETIC. The place of arithmetic in the rural school curriculum. Different types of lessons, equipment, materials, adaptation to needs of rural communities. HARLAN.

AGRICULTURAL EDUCATION

Professors ASHLEY V. STORM, DEXTER D. MAYNE; Associate Professor WILBUR H. BENDER; Extension Specialists THEODORE A. ERICKSON, GEORGE F. HOWARD.

General statement.—For specialization in this department, see special requirements in Course of Study.

COURSES

Introductory Courses

No.	Credits	Title		Offered to	Prereq. courses
11a,b	3	Principles of Indus. Educ....		Soph., jr., sr.	None
		8:50-10:35	TThS	317Ad	.....
21	3	Industrial Education		Soph., jr., sr.	None
		8:00-8:45	TThS	317Ad	Mayne

Advanced Courses

131a,b	3	Methods in Teaching High School Agriculture		Sr.	11
		8:55-9:40	TThS	317Ad	Bender
141a,b	3	Teaching		Sr.	131, Agron. 5, 104; see statement
		8:55-9:40	MWF	317Ad	Bender, Storm
		9:50-10:35	MWF	317Ad	Bender, Storm
151a,b	3	Organization & Management		Sr.	68
		10:45-11:30	MWF	317Ad	Storm

INTRODUCTORY COURSES

11a,b. PRINCIPLES OF INDUSTRIAL EDUCATION. The fundamental principles upon which education is based. Emphasis is placed on those phases which are most closely related to industrial education.

21. INDUSTRIAL EDUCATION. A short history of industrial education; the present status in Europe and United States; manual training and home arts in an educational system; the place of agriculture in the public schools; trade and vocational schools. MAYNE.

ADVANCED COURSES

131a,b. METHODS IN TEACHING HIGH-SCHOOL AGRICULTURE. Fundamental elements of method in teaching as related to teaching agriculture in high school. Organized subject matter of daily work; selection and manipulation of devices. Classroom and laboratory method. Specific plans for teaching secondary agriculture. BENDER.

141a,b. TEACHING.* Observation of regular classes; interpretation of class practices; preparation of lesson plans and actual teaching of classes under careful supervision in recitation and laboratory; criticism and discussion of plans, methods, and results of student's teaching. Students are admitted to this course only when recommended by the faculty of the division in which they are specializing and when accepted by the Division of Agricultural Education. BENDER, STORM.

151a,b. ORGANIZATION AND MANAGEMENT. Organization and management of work in secondary schools, particularly of Minnesota, with special reference to agricultural work, courses of study, programs, equipment, laboratory and class management, extension work, plots, and coördination of work. STORM, LUSK.

HOME ECONOMICS EDUCATION

Professor JOSEPHINE T. BERRY; Assistant Professors MILDRED WEIGLEY, MARION WELLER.

COURSES

No.	Credits	Title	Offered to	Prereq. courses
HE42	3	Home Economics Education....	Jr.	He22, Psychol. 5b
		8:55-9:40 MWF	213He	Berry
HE44	3	Organ. & Methods of Teaching for Textiles and Clothing...	Jr.	He13, Psychol. 5b
		8:55-9:40 MWF	213He	Berry, Weller
HE45	1	Home Economics Education...	Sr.	He42
		8:55-9:40 S	213He	Berry
HE46	1	Home Economics Education...	Sr.	He45
		8:55-9:40 S	213He	.....

* Students who are prepared may be required to do their teaching in manual training.

No.	Credits	Title	Offered to	Prereq. courses
HE47	3	Observation and Teaching.....	Sr.	He42
		8:00-8:45 TThS	213He	Weigley
HE48	3	Observation and Teaching.....	Sr.	He42
		8:00-8:45 TThS	309He	Weller

HE42. HOME ECONOMICS EDUCATION. Curricula, textbooks, equipment, methods of teaching, and class management, as applied to the teaching of Home Economics. BERRY.

HE44. ORGANIZATION AND METHODS OF TEACHING FOR TEXTILES AND CLOTHING. A combination with Course HE42, dealing with adaptations to the teaching of Textiles and Clothing. BERRY, WELLER.

HE45. HOME ECONOMICS EDUCATION. A continuation of HE42. BERRY.

HE46. HOME ECONOMICS EDUCATION. A continuation of HE45. BERRY.

HE47. OBSERVATION AND TEACHING. Observation of teaching in regular classes; criticism and discussion of class practice, lesson plans, methods, results, and examinations; preparation of lesson plans, and directed teaching of foods and cookery and home management. WEIGLEY.

HE48. OBSERVATION AND TEACHING. A course similar to Course HE47 but dealing with the teaching of textiles and clothing. WELLER.

TEACHERS OF PHYSICAL EDUCATION

Seniors desiring special teachers' certificates in physical education will be expected to complete the courses listed below.

No.	Title	Credits
1-2	Elementary Physical Training.....	0
3-4	Intermediate Physical Training.....	3
5-6	Advanced Physical Training (must be taken in senior year)	3
13	Personal Hygiene	3
15-16	Theory of Physical Education.....	6
21-22	Elementary Dancing	0
31-32	Organized Games	0
33-34	Major Sports	0
	Practice Teaching	3
3a	Social Education	3
11a	Technique of Teaching.....	3
1 or 101-102	History of Education.....	3
141	School Sanitation and Public Health.....	3

MANUAL TRAINING

For a Minor, eighteen credits required in the courses outlined below or their equivalent.

For a Teacher's Certificate, completion of eighteen credits in the courses listed below, and the educational work outlined under courses of study for University Teacher's Certificate.

Students desiring to procure a special certificate for the teaching of manual training shall consult with the Instructor in Manual Training before registering.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
1	1½	Mechanical Drawing		Soph., jr.	None
		Ar	Ar	Ar	French
3a,b*	3	Mechanical Drawing		Soph., jr.	None
		Ar	Ar	Ar	Whitson
3†	2	Descriptive Geometry		Jr.	None
		10-11	MTThS	101Mech.E.	Kirchner
		1-2	M		
		Lect. 9	Th or W		
		10-12	TWThS	101Mech.E.	Kirchner
		Lect. 9	Th		
		8-10	MWF	101Mech.E.	Kirchner
		3-5	F		
		Lect. 9	F		
		8-10	WF	101Mech.E.	Kirchner
		1-3	WF		
		Lect. 9	T	101Mech.E.	Kirchner
43‡	3	Working Draw. & Specifica..		Jr., sr.	Mech. Draw.
		9-11	MWF	ME	Cederburg
1	2	Advanced Drawing		Jr., sr.	Mech. Draw.
		4-6	WF	114Ed	McGarvey
5*	3	Carpentry		Jr., sr.	None
		Ar	Ar	Agr. Eng.	White
7*	3	Farm Structures		Jr., sr.	5
		Ar	Ar	Agr. Eng.	Mowry
7	2	Wood Turning and Pattern Making		Sr.	1-5
		8-11	TThS	102Mech.E.	Richards
		9-12	MF	102Mech.E.	Richards
8	2	Foundry Work		Sr.	1-5, 7
		8-11	ThS	104Mech.E.	.....
		9-12	MF	104Mech.E.	.....
9	2	Forge		Sr.	1-5
		8-11	ThS	102Mech.E.	Hobart
		9-12	MF	102Mech.E.	Hobart

* Agricultural Engineering.
† Engineering.
‡ Architecture.

No.	Credits	Title		Offered to	Prereq.courses
10	2	Machine Shop		Sr.	1-5
		8-11	ThS	104Mech.E.	Shipley
		9-12	MF	104Mech.E.	Shipley
6	2	Advanced Woodwork		Jr., sr.	Agr. Eng. 5
		4-6	MWF	114Ed	McGarvey
11MTa,b	3	Teaching and Supervision of Manual Training		Sr.	1-6
		3	MWF	114Ed	McGarvey

NOTES: 1. In all Manual Training courses each credit hour calls for at least three hours of shop work.

2. In all drawing courses students provide their own instruments and materials. A laboratory fee of three dollars per course will be charged for shop courses.

MECHANICAL DRAWING. Note: For a description of this course see College of Engineering Bulletin. FRENCH.

AGRICULTURAL ENGINEERING 3a,b. Note: For a description of this course see College of Engineering Bulletin. WHITSON.

DESCRIPTIVE GEOMETRY. Note: Course offered in the Engineering College, No. 9. KIRCHNER.

ARCHITECTURE 43. WORKING DRAWINGS AND SPECIFICATIONS. Note: See College of Engineering Bulletin for description of this course. CEDERBURG.

ADVANCED DRAWING. Orthographic and isometric projection, lettering, drawing from machine models, cabinet drawing, topographical drawing, shop details, and elements of architectural drawing. MCGARVEY.

AGRICULTURAL ENGINEERING 5. CARPENTRY. Note: For description of this course see Bulletin of the College of Agriculture. WHITE.

AGRICULTURAL ENGINEERING 7. FARM STRUCTURE. Note: For description of this course see Bulletin of College of Agriculture. MOWRY.

7. WOOD TURNING AND PATTERN MAKING. RICHARDS.

8. FOUNDRY WORK.

9. FORGE. HOBART.

10. MACHINE SHOP. SHIPLEY.

For description of above courses see bulletin of College of Engineering.

6. ADVANCED WOOD WORK. Work adapted to upper grammar grades and high school, with the emphasis placed upon the preparation of models suitable for these grades. Student demonstrations of simple projects. Shop fee, $3. MCGARVEY.

MT11a,b. THE TEACHING AND SUPERVISION OF MANUAL TRAINING. Teachers' Course. A study of the history and aims of Industrial Education and the methods of presenting Manual Training and Drawing to grade and high school pupils. The outlining of courses and the selecting of equipment adaptable to different types of school systems. McGARVEY.

HIGH-SCHOOL RURAL TRAINING

Director LOTUS D. COFFMAN; Lecturers CHARLES L. HARLAN, GEORGINA LOMMEN.

REQUIREMENTS OF THE DEPARTMENT

1. *For Admission.* (1) Two years of rural teaching experience; (2) Advanced diploma from a State Normal School. For exceptions, see statement, page 24.

2. *For Recommendation for State Endorsement.* For explanation, see page 24 of this bulletin.

Students who complete the following course will be eligible for recommendation for the endorsement of the State Department of Education as teachers of high-school rural training departments.

In the following course, Education is selected as a major. The two minors recommended are English and Economics. The Education courses, in *italics* are all required, but previous training, experience, and needs of the student may modify his choice of minors and of other electives. Normal school graduates are credited with the History of Education and Introductory Psychology, consequently these courses are not included in the following outline. (See also page 24.)

PRESCRIBED COURSE FOR HIGH SCHOOL RURAL TRAINING TEACHERS
JUNIOR YEAR

First Semester	Credit	*Second Semester*	Credit
Education:		Education:	
3a. *Social Aspects of Educ.*	3	152. *Elem. Meth. in Read.*	1
Economics:		154. *Elem. Meth. in Ind. Arts.*	1
3b. General Economics	3	156. *Elem. Meth. in Geog.*	1
English:		English:	
1. General Survey	3	2. General Survey	3
		Home Economics*†	3

SENIOR YEAR

First Semester

	Credit
Education:	
11a. Technique of Teaching....	3
123. School Supervision	3
153. *Elem. Meth. in English*...	1
155. *Elem. Meth. in History*...	1
157. *Elem. Meth. in Arith.*	1
Sociology:	
119. The Family	3
Agriculture*	3

Second Semester

	Credit
Education:	
142. Industrial Education	3
15. Practice Teaching	3
Philosophy:	
18. Child Development	3
Sociology:	
120. Social Progress	3
6. Social Reform Movements.	3
English:	
54. American Literature	3

* Courses to be selected according to individual interests after conferences with head of department.

† A course in Home Economics especially designed for teachers of high school training departments will be arranged in case the number of registrations and the community of needs of students warrants this.

Descriptions of all courses above not definitely referred to in footnotes will be found in the proper Departmental Statement.

ANIMAL BIOLOGY

Professors HENRY F. NACHTRIEB, JOHN B. JOHNSTON, THOMAS S. ROBERTS, CHARLES P. SIGERFOOS, HAL DOWNEY; Assistant Professors ELMER J. LUND, OSCAR W. OESTLUND; Instructors GEORGE DELWIN ALLEN, CHARLES E. JOHNSON.

REQUIREMENTS OF THE DEPARTMENT

For a Minor, twelve credits.

For a Major, twenty-four credits.

For B.A. with Honors, freshman year, Course 1-2; sophomore year, the student may elect from Courses 7-8, 15-16, 19-20, 23-24; during the junior year the student must elect from Courses 31-144, and must include some line of work begun in the sophomore year which he expects to pursue during the senior year under 161-162.

For a Teacher's Certificate an average of one and one-half honor points and six other credits in Animal Biology and six credits in Botany.

JOURNAL CLUB

The professors, instructors, and advanced students of the department meet once a week to review and discuss current zoological literature and to listen to reports from those carrying on investigations.

COURSES

No.	Credits	Title	Offered to	Prereq. courses
1-2	6†	General Zoology††	All	None
		Sec. 1. Lab. 8, 9 WF 101AB		¶
		Lect. 10 WF 313AB		¶
		Sec. 2. Lab. 10, 11 WF 101AB		¶
		Lect. 9 WF 313AB		¶
		Sec. 3. Lab. 1, 2 M 101AB		¶
		Lab. 2, 3 W 101AB		¶
		Lect. 1 WF 313AB		¶
		Sec. 4. Lab. 8, 9 ThS 101AB		¶
		Lect. 10 ThS 313AB		¶
		Sec. 5. Lab. 10, 11 ThS 101AB		¶
		Lect. 9 ThS 313AB		¶
		Extra Lab. Classes		
		Sec. 6. Lab. 8, 9 MT 101AB		¶
		Sec. 7. Lab. 10, 11 MT 101AB		¶
7-8	6†	Histology-Embryology ...	Soph., jr., sr.	1-2
		10, 11 MWF 201, 211		Downey
12	3	Histological Technique...	Soph., jr., sr.	1-2 and 7-8
		See Anatomy Schedule		
15-16	6†	Gen. Physiology	Jr., sr.	12 credits in An. Biol. or Zool. 1-2 & Chem. 13-14 or 35-36
		2, 3 MWF 20AB		Lund
19-20	6†	Comp. Gross Anat. of Vert.	Soph., jr., sr.	1-2
		2, 3 MWF 105-109, 211AB		Johnson
23-24	6†	Entomology	Soph., jr., sr.	1-2
		10, 11 MWF 208-210AB		Oestlund
		8, 9 TThS 208-210AB		Oestlund
28	3	Ornithology	Soph., jr., sr.	1-2
		2, 3, 4 TTh 211, 314AB		Roberts
30	3	Neurology	Soph., jr., sr.	1-2
		Ar Ar 215IA		Johnston

No.	Credits	Title			Offered to	Prereq. courses
31-32	3†	Nature Study			Jr., sr.	12 credits in An. Biol.
		2, 3, 4	T	213AB		Sigerfoos
51	3‡	Protozoology			Jr., sr.	9 credits incl. 1-2
		8, 9	TThS	213AB		Sigerfoos
56	3‡	Morphology of Invertebr.			Jr., sr.	9 credits incl. 1-2
		8, 9	TThS	213AB		Sigerfoos
101-102	6	Advanced Entomology ..			Jr., sr., grad.	1-2, 23-24
		2, 3	MWF	208-210AB		Oestlund, Chapman
107-108	6	Gen. Ecology of Insects.			Jr., sr., grad.	1-2, 23-24
		2, 3, 4	TTh	208-210AB		Oestlund, Chapman
117-118	6	Mammology			Jr., sr., grad.	1-2, 7-8 or 19-20
		4, 5	MWF	107-109, 211AB		Johnson
119-120	6	Vertebrate Histology			Sr., grad.	1-2, 7-8, Anat. 111b
		3, 4	TThS	201, 211AB		Downey
123-124	6†	Blood of Vertebrates.....			Sr., grad.	1-2, 7-8, Anat. 111b, 131-132, reading knowledge of French and German.
		3, 4	TThS	201, 211AB		Downey
131-132	6†	Embryology			Jr., sr., grad.	1-2, 7-8
		10, 11	MWF	202, 211AB		Nachtrieb
143-144	6	Genetics and Eugenics...			Sr., grad.	1-2
		2, 3, 4	TTh	202, 211AB		Nachtrieb
161-162	6 or 12	Problems			Sr., grad.	1-2 and other courses prescribed by the department
		Hours, days, and rooms arranged				

†† So far as possible students should register for both lecture and laboratory work in the same section.

† Both semesters must be completed before credit is given for the first semester.

‡ Courses 51 and 56 may be combined for a year course.

31-32. NATURE STUDY. Discussions, reference, field and laboratory work, through the year, once a week and, in addition, field trips Saturday afternoons during the autumn and spring months. Especially for the fitting of teachers in secondary schools. SIGERFOOS.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin.

ASTRONOMY

Professor FRANCIS P. LEAVENWORTH; Assistant Astronomer WILLIAM O. BEAL.

REQUIREMENTS OF THE DEPARTMENT

For B.A. with Honors, the general requirements, Courses 51-52, 101-102 (as a twelve credit course), and six credits in Physics.

Starred Courses. The College of Education has as yet adopted no system of starred courses. Nevertheless, candidates for the degree of Bachelor of Arts with Honors will in some cases be obliged, in order to meet the departmental requirements, to be guided by this system and should therefore consult the departmental statements in the Science, Literature, and the Arts bulletin.

ASTRONOMICAL OBSERVATORY

The Astronomical Observatory contains a ten and one-half inch refracting telescope furnished with a third lens for converting it into a

photographic telescope; a five-inch star camera; a filar micrometer; a spectroscope by Brashear; a meridian circle and zenith telescope; a Repsold photographic measuring machine; a chronograph, and astronomical clocks.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
11a	3	Descriptive Astronomy ..		Soph., jr., sr.	None
		9	MWF	124F	Leavenworth
		11	TThS	124F	Beal
11b	3	Descriptive Astronomy ..		Soph., jr., sr.	None
		11	MWF	124F	Leavenworth
		11	TThS	124F	Beal
13-14	6	Descr. Astr. & Obs. Pract.		Soph., jr., sr.	None
		9	TThS	124F	Beal
51-52	6	General Astronomy		Jr., sr.	1 yr. mathematics
		10	MWF	124F	Beal
		2	MWF	124F	Leavenworth
62a	3	Elements of Pract. Astr...		Jr., sr.	1 yr. mathematics and Ast. 11, or 13, or 51
		Ar	Ar	124F	Beal
62b	3	Elements of Pract. Astr..		Jr., sr.	1 yr. mathematics and Ast. 11, or 13, or 51
		Ar	Ar	124F	Beal
101-102	6 or 12	Practical Astronomy		Jr., sr., grad.	Math. 7 and 11 and Ast. 11, or 13, or 51
		10	TThS		
		or	MTWThFS	124F	Leavenworth
140	2 or 3	Method of Least Squares		Sr., grad.	Math. 51
		Ar	Ar	O	Leavenworth
201-202	3	Adv. Pract. Astr.		Grad.	Astr. 102
		Ar	Ar	Ar	Leavenworth
205-206	3	Astrophotography		Grad.	Astr. 102
		Ar	Ar	Ar	Leavenworth
209-210	3	Calculation of Orbits....		Grad.	Math. 51
		Ar	Ar	Ar	Beal
211-212	3	Celestial Mechanics		Grad.	Math. 51
		Ar	Ar	Ar	Beal

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 24-25.

BACTERIOLOGY

Associate Professor WINFORD P. LARSON; Instructors ARTHUR T. HENRICI, ANNE BENTON; Assistants IKEDA and DIEHL.

COURSES

No.	Credits	Title	Offered to	Prereq. courses
§6a	3	Elementary Bacteriology	All	None
		M 2, 3, 4; W 2, 3	Lab.PHP	Larson, et al.
§6b	3	Elementary Bacteriology	All	None
		M 3, 4; W 3, 4; F 3	Lab.PHP	Larson, et al.
§114	1½	Advanced Bacteriology	All	6a or 6b
		TTh 2, 3, 4 (or 2:30-5:30)	Lab.PHP	Larson, et al.

All of the above courses receive credit in the College of Education.

BOTANY

Professors CARL OTTO ROSENDAHL, JOSEPHINE E. TILDEN; Assistant Professors HERBERT F. BERGMAN, FREDERIC K. BUTTERS, NED L. HUFF; Instructor WILLIAM S. COOPER; Teaching Fellows ARTHUR M. JOHNSON, VINNIE A. PEASE.

REQUIREMENTS OF THE DEPARTMENT

For B.A. with Honors, the general requirements; thirty-six credits in Botany, of which twenty-four shall be selected from advanced Courses 105-106 to 119-120 inclusive. Those electing the Honors Course are urged to secure twelve credits during the sophomore year.

For a Teacher's Certificate, an average of at least one honor point for each credit hour in one introductory and one intermediate course, and in Course 121-122. One year of Zoology is also advised.

Students entering the department without preparation must take Course 1 followed by 2. Students coming from an approved high school course will take Course 1 or 2 according to preparation.

COURSES

Introductory Courses

No.	Credits	Title		Offered to		Prereq. courses
1a	3	Gen. Botany,	Lab. & Class	All		None
		8, 9	MWF	207P	¶	
		10, 11	MWF	207P	¶	
		1, 2	MWF	207P	¶	
		2, 3, 4	MF	207P	¶	
		3, 4	MWF	207P	¶	
		8, 9	TThS	207P	¶	
		10, 11	TThS	207P	¶	
		1, 2, 3	TTh	207P	¶	
		2, 3, 4	TTh	207P	¶	
1b	3	Gen. Botany,	Lab. & Class	All		None
		8, 9	MWF	214P	¶	
		2, 3, 4	MF	214P	¶	
2a	3	Gen. Botany,	Lab. & Class	All		1 or approved High School Botany
		8, 9	MWF	214P	¶	
		2, 3, 4	MF	214P	¶	
2b	3	Gen. Botany,	Lab. & Class	All		1 or approved High School Botany
		8, 9	MWF	207P	¶	
		10, 11	MWF	207P	¶	
		2, 3	MWF	207P	¶	
		8, 9	TThS	207P	¶	
		10, 11	TThS	207P	¶	
		2, 3, 4	TTh	207P	¶	
		2, 3, 4	MF	207P	¶	

Intermediate Courses

5a	3	Plant Morphology		Soph., jr., sr.		6 cred.; see bulletin statement
		10, 11	MWF	214P	Butters, Huff	

No.	Credits	Title	Offered to	Prereq. courses
5b	3	Plant Morphology	Soph., jr., sr.	6 cred.; see bulletin statement
6a	3	Plant Morphology	214P Butters, Huff	
		10, 11 MWF	.....	3 or 5
6b	3	Plant Morphology	.....	3 or 5
		10, 11 MWF	214P Butters, Huff	
7-8	6	Taxonomy	Soph., jr., sr.	6 cred.; see bulletin statement
		10, 11 MWF	20P Rosendahl	
9-10	6	Physiology and Ecology....	Soph., jr., sr.	6 credits
		1, 2, 3 MF	3G Cooper	
11	6	Industrial Botany	Soph., jr., sr.	6 credits
		10, 11 TThS	212P Tilden	
12	3	Industrial Botany	Soph., jr., sr.	6 credits
		10, 11 TThS	212P Tilden	
		Advanced Courses		
105-106	6	Algae	Jr., sr., grad.	9 credits
		1, 2, 3 TTh	212P Tilden	
107-108	6	Mosses and Ferns.....	Jr., sr. grad.	9 cr.
		Ar Ar	Ar Butters	
110	3	Gymnosperms	Jr., sr., grad.	9 cred.; incl. 2 or 3, or 5-6
		Ar Ar	Ar Butters	
111-112	6	Advanced Taxonomy	Jr., sr., grad.	7-8
		Ar Ar	20P Rosendahl	
113-114	6	Advanced Ecology	Jr., sr., grad.	9-10
		Ar Ar	200P Cooper	
117-118	6	Cytology	Jr., sr., grad.	9 credits
		Ar Ar	8P Rosendahl	
119-120	6	Advanced Industrial Bot..	Jr., sr., grad.	11-12
		Ar TTh	212P Tilden	
121-122		Studies and Methods.....	Jr., sr., grad.	9 cr. in Plant Industry and Gen. Biol.
		Ar Ar	Ar Rivet	

121-122. STUDIES AND METHODS IN PLANT INDUSTRY AND GENERAL BIOLOGY. (Teachers' Course.) The subject matter includes what is ordinarily called "Botany," "Agriculture," and "Horticulture." The work presented and discussed as it is taught in the Plant Industry classes in the Minneapolis High Schools. There is a close correlation between the laboratory work, "Practice Teaching" and the seminar work. RIVET.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 26-27.

CHEMISTRY

THE SCHOOL OF CHEMISTRY

Professors GEORGE B. FRANKFORTER, CHARLES F. SIDENER; Associate Professors EVERHART P. HARDING, WILLIAM H. HUNTER; Assistant Professors IRA H. DERBY, EDWARD E. NICHOLSON; Instructors ROSS A. BAKER, FRANK W. BLISS, LILLIAN COHEN, LAWRENCE M. HENDERSON,

FRANK H. MACDOUGALL, EDWARD B. PECK, CARL L. SCHUMANN, WOLDEMAR STERNBERG, ISAAC W. GEIGER, H. LEE WARD; Assistants ARTHUR R. CADE, WALTER M. LAUER, ALLEN F. NEWMAN, ANNA PETERSON, S. JOSEPH REICHERT.

REQUIREMENTS OF THE DEPARTMENT

In Chemistry the purpose of the honors course is served by the Five-Year Course in Arts and Chemistry.

For a Teacher's Certificate, an average of at least one and one-half honor points for each credit hour in Courses 1-2 or 3-4 and 7-8 or 11-12; and 20.

COURSES

Division of General and Inorganic Chemistry

No.	Credits	Title		Offered to		Prereq. courses
1-2	6†	General Chemistry		Those entering without chemistry		None
		8, 9	TThS	110	Cohen	
		10, 11	MWF	110	Cohen	
21-22	10	Inorganic and Qual. Chem.		Those entering without chemistry		None
	Lect.	1	M	100	¶	
	Lab.	8, 9	TThS	110	¶	
	Rec.	10	TThS	111	¶	
3-4	6†	Adv. Gen. Chemistry and Qual. Analysis		Fr., soph., jr.		Entrance cr. in Chem.
	Lect.	1	M	100	¶	
	Lab.	2, 3	MW	110	¶	
	Rec.	2 or 3	F	111	¶	
	Lab.	10, 11	S	115	¶	
7-8	6†	Qualitative Anal.		Soph., jr., sr.		1-2
		8, 9	MWF	210	Nicholson	
		10, 11	MWF	210	Bliss	
10	1	Glass Blowing		Jr., sr.		Open only to those who are taking practice teaching in Chemistry
		Ar	Ar	49	Baker	
17	2	Inorganic Colloquium ...		Sr.		11-12
		8	MF	111	Baker	
20	2	Teachers' Course		Jr., sr.		3-4 or 7-8 or 21-22
		8	TTh	Ar	Temple	
167-168	4†	Adv. Inorganic Chem. ...		Sr.		2 yrs. college chem.
		Ar	Ar	Ar	Baker	
169-170	4†	Chem. of Rare Elements.		Jr., sr.		11-12
		Ar	Ar	Ar	Nicholson	

Division of Analytical Chemistry

11-12	8†	Quantitative Analysis		Soph., jr., sr.		3-4 or 7-8, or 21-22 and 1 yr. math. or Physics 1‡
		1-5	F	310	Sidener	
		2-5	MW	310	Sidener	
107-108	6†	Adv. Quan. Analysis		Jr., sr.		11-12
		Ar	Ar	317	Sidener	

Division of Organic Chemistry

No.	Credits	Title		Offered to	Prereq. courses
13-14	6†	Medical Organic Chem...		Soph.	3-4 or 7-8 or 21-22
		Lect. 11	MWF	100	Hunter
		Lab. 2-5	W or F	10	Hunter
		Rec.	Ar	Ar	¶
18	2	Organic Colloquium		Sr.	35-36
		8	WF	115	Frankforter
35-36	8†	Organic Chemistry		Soph., jr., sr.	3-4 or 7-8 or 21-22 and 1 yr. Biol. Sci.
		Lect. 11	TTh	100	Frankforter
		Lab. 2, 3, 4	MW	10	Schumann
		Rec. 1	W	315	Schumann
115	2	Adv. Organic Chem.		Sr.	35-36
		9	MWF	325	Hunter
116	2	Theoretical Org. Chem. ..		Sr.	35-36
		9	MWF	325	Hunter

Division of Physical Chemistry

121-122	4†	Physical Chemistry		Jr., sr.	‡35-36, Physics 2 & 4
		11	WF	115	MacDougall
123-124	2†	Physico-chemical Lab. ...		Jr., sr.	Must be taken in conjunction with 121-122
		2-5	F	117	MacDougall
125-126	6†	Adv. Physical Chem.		Sr.	121-122
		Ar	Ar	Ar	Derby
127	2	Radiochemistry Lectures..		Jr., sr.	3-4 or 7-8 or 21-22 & ‡Physics 2 and 4
		Ar	Ar	Ar	Henderson
128	2	Radiochemistry Lab.		Jr., sr.	127
		Ar	Ar	Ar	Henderson

Division of Technological Chemistry

27-28	4†	Chem. in Every-day Life.		Jr., sr.	3-4 or 7-8 or 21-22
		2-5:30	TTh	Ar	Geiger

Division of Industrial Chemistry

15	2	Photochemistry		Jr., sr.	3-4 or 7-8 or 21-22
		Lect. 8	M	27	Peck
		Lab. 2, 3, 4	Th	27	Peck
16	2	Color Photography		Jr., sr.	15
		Lect. 8	M	27	Peck
		Lab. 2, 3, 4	Th	27	Peck

† Both semesters must be completed before credit is given for the first semester.

‡ This physics may be taken at the same time.

20. TEACHERS' COURSE. For those who expect to teach Chemistry.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 28-29.

COMPARATIVE PHILOLOGY

Professor FREDERICK KLAEBER.

COURSES

No	Credits	Title	Offered to	Prereq. courses
101	2	Science of Language.... 2 TTh	Jr., sr., grad. 205F	See bulletin statement Klaeber
102	2	Sci. of Language (Adv.). 2 TTh See bulletin statement	Jr., sr., grad. 205F	Same as for 101 Klaeber
105	1	Universal Language .... 10 S	Jr., sr., grad. 221F	Same as for 101 Klaeber
109-110	4†	History of the German Language ..... 2 WF See bulletin statement	Jr., sr., grad. 205F	German 53, 54 Klaeber

† Both semesters must be completed before credit is given for either semester. Identical with German 109-110.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 30-31.

DRAWING AND DESCRIPTIVE GEOMETRY

Professor WILLIAM H. KIRCHNER; Instructor LAWRENCE J. MORTENSON.

COURSES

No.	Credits	Title	Offered to	Prereq. courses
21-22	4	Technical Drawing ..... 8, 9 MWF	All 13MechE	None Kirchner, Mortenson, et al.

21-22. TECHNICAL DRAWING. Theoretical and practical graphics, the reading and making of working plans. Projection, sketching, lettering, conventions, renderings, and translations. KIRCHNER, MORTENSON.

ECONOMICS

Professors JOHN H. GRAY, E. DANA DURAND; Assistant Professors ROY G. BLAKEY, WILLIAM W. CUMBERLAND, J. FRANKLIN EBERSOLE, THOMAS WARNER MITCHELL; Instructors LLOYD M. CROSGRAVE, ALBERT C. HODGE, ALBERT C. JAMES, J. WARREN STEHMAN; Assistant JOSEPH A. CUMMINGS; in the General Extension Division, Associate Professor CLARE L. ROTZEL; Assistant Professors CHARLES H. PRESTON; Instructor RAYMOND V. PHELAN.

SUGGESTIONS AS TO COURSES IN THE DEPARTMENT

In order to aid students who have some idea as to their intended profession or calling to make a wise choice of courses, the accompanying tabular statement has been prepared.

These recommendations are merely suggestive and more courses are sometimes recommended than suffice to make up a technical major in

order that students may choose those courses which interest them the most.

Course 3-4 is not included in these recommendations, as it should, in any case, precede the advanced courses, and is required of all taking a major in Economics.

Students desiring merely a general acquaintance with Economics as part of a liberal education and as a preparation for citizenship are recommended to take the general courses and such others, amounting at least to a minor, as their interest may indicate.

ECONOMICS

In preparation for	Courses most essential	Additional courses desirable
Law	76, 145, 146, 191	43, 104, 143, 174
Public Service	2, 145, 146, 191	35-6, 101, 164
Consular and Diplomatic Service	2, 13, 72, 76, 101	34, 43, 143
Journalism	2, 43, 145, 146, 173, 191	101, 104, 143, 161, 164
Engineering or Railway Service	47, 145, 146, 173	34, 35-6, 142, 161, 174
Chemistry or Manufactures	2, 15, 76, 145, 161	34, 35-6, 101, 131
Mining	2, 72, 143, 145, 161	13, 142
Banking and Finance	43, 46, 101, 143, 145	35-6, 41, 139, 142, 144, 255-56
General Business	2, 13, 43, 76, 143	34, 35-6, 142, 145
Forestry or Agriculture	13, 15, 18, 22	35-6, 43, 143, 173, 251-2
Teaching Business Subjects	2, 13, 43, 104	34, 35-6, 41
Medicine	2, 43, 164	34, 35-6, 142
Social Service Work	2, 101, 161	104, 164, 261-62
The Ministry	2, 161	104
Public Accountancy	34, 35-6, 132	43, 46, 49, 101, 131, 142, 145, 146, 253-54
Insurance	34, 35-6, 46, 47	142, 145, 146

COURSES

No.	Credits	Title		Offered to	Prereq. courses
2b	3	Industries and Commerce of the United States		Soph., jr., sr.	None
		Sec. 1 9	MWF	9F	Ar
		Sec. 2 10	MWF	109MA	Ar
		Sec. 3 11	MWF	5F	Ar
3-4	6†	General Economics		Soph., jr., sr.	None
		Sec. 1 9	TThS	209MA	Stehman, Blakey
		Sec. 2 11	TThS	102MA	Hodge, Crosgrave
		Sec. 3 3	MWF	202MA	James, Stehman
3b	3‡	General Economics		Soph., jr., sr.	None
		Sec. 1 11	TThS	114F	Hodge
		Sec. 2 3	MWF	102MA	James
4	3	General Economics		Soph., jr., sr.	3
		9	TThS	209MA	Blakey
		Ar	Ar	Ar	Blakey
7-8	6††	Principles of Economics		Soph., jr., sr.	None
		11	MWF	202MA	James, Stehman
7b	3††	Principles of Economics		Soph., jr., sr.	None
		11	MWF	102MA	James

‡ Credit is given only after Course 4 is completed.
†† Open only to students in the vocational curriculum.

No.	Credits	Title			Offered to	Prereq. courses
9	3	Industrial History			Soph., jr., sr.	None
			11	MWF	102MA	Ar
13	3	Econ. Geog. of Foreign Countries			Soph., jr., sr.	None
			2	MWF	202MA	Ar
34b	3	Business Management			Soph., jr., sr.	3 or 7
			10	TThS	202MA	Mitchell
35-36	6†	Accounting Principles			Soph., jr., sr.	None
Sec. 2 Lect. & Quiz.			10	WF	301MA	Hodge
Sec. 1 Lect. & Quiz.			11	TS	301MA	Mitchell
Sec. 1 Lab.			11, 12	Th	301MA	Mitchell
Sec. 2 Lab.			1, 2	T	301MA	Hodge
Sec. 3 Lab.			1, 2	Th	301MA	Hodge
Sec. 3 Lect. & Quiz.			2	MF	301MA	Hodge
37	3	Marketing of Products....			Soph., jr., sr.	3 credits
			9	TThS	202MA	James
38	3	Advertising			Soph., jr., sr.	3 credits
			11	TThS	125F	James
41	3	Financial History			Soph., jr., sr.	3 or 7
			10	TThS	209MA	Blakey
43a	3	Banking			Soph., jr., sr.	3 or 7
		Sec. 1	9	MWF	209MA	Stehman
		Sec. 2	10	MWF	202MA	Stehman
43b	3	Banking			Soph., jr., sr.	3 or 7
		Sec. 1	10	MWF	209MA	Stehman
		Sec. 2	2	MWF	109MA	Stehman
49	3	Insurance			Soph., jr., sr.	3-4
			11	TThS	109MA	James
76	3	Commercial Policies			Jr., sr.	6 cr. inc. 3 or 7
			10	TThS	209MA	Blakey
88	3	Retail Marketing			Jr., sr.	6 cr. inc. 37
			9	TThS	202MA	James
101	3	Statistics			Jr., sr., grad.	6 cr. inc. 3 or 7
			11	TThS	303MA	Durand
103	3	Distribution of Wealth.....			Jr., sr., grad.	3-4 or 7-8
			10	MWF	213MA	Ar
104	3	History of Econ. Ideas....			Jr., sr., grad.	3-4 or 7-8
			10	MWF	213MA	Ar
131	3	Cost Accounting.....			Jr., sr., grad.	3 or 7, and 35-36
			9	TThS	301MA	Mitchell
132	3	Accounting Problems			Jr., sr., grad.	3 or 7, and 35-36
			9	TThS	301MA	Mitchell
142	3	Invest. and Speculations...			Jr., sr., grad.	6 cr. inc. 3 or 7
			9	MWF	109MA	Hodge
143	3	Money and Prices.....			Jr., sr., grad.	3 or 7, and 41 or 43
			10	TThS	109MA	Stehman
145	3	The Modern Business Corporation			Jr., sr., grad.	6 cr. inc. 3 or 7
			9	MWF	102MA	Hodge
146	3	Public Utilities			Jr., sr., grad.	145
			9	MWF	102MA	Durand
161	3	Labor Problems			Jr., sr., grad.	6 cr. inc. 3 or 7
			11	MWF	209MA	Crosgrave

* Not open to students who have taken 46 or 47.

† Both semesters must be completed before credit is given.

No.	Credits	Title	Offered to	Prereq.courses
162	3	Labor Legislation	Jr., sr., grad.	6 cr. inc. 3 or 7
		11 MWF	209MA	Crosgrave
165	3	Socialism	Jr., sr., grad.	6 cr. inc. 3 or 7
		11 TThS	213MA	Crosgrave
173	3	Railway Problems	Jr., sr., grad.	6 cr. inc. 3 or 7
		9 TThS	213MA	Ar
174	3	Railway Rate Regulation...	Jr., sr., grad.	173
		9 TThS	213MA	Ar
191	3	Public Finance	Jr., sr., grad.	6 cr. inc. 3 or 7
		11 TThS	209MA	Blakey
192	3	State and Local Taxation..	Jr., sr., grad.	191
		11 TThS	209MA	Blakey
253-254	6	Seminar in Accounting and Business Management ...	Sr., grad.	12 cr. inc. 35-36, and 131
		Ar Ar	Ar	Mitchell
259-260	6	Seminar in Corporation and Trust Problems	Sr., grad.	12 credits
		Ar Ar	Ar	Durand

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 31-37.

ENGLISH

Professors RICHARD BURTON,[1] CARLETON BROWN, HARDIN CRAIG, FREDERICK KLAEBER, ELMER E. STOLL; Associate Professor OSCAR W. FIRKINS; Assistant Professors JOSEPH W. BEACH, GEORGE N. NORTHROP.[2]

REQUIREMENTS OF THE DEPARTMENT

For B.A. with Honors, the general requirements, twenty-four credits in English, a reading knowledge of French, German, Italian, Greek, or Latin, and a final year's work in seminar for which a sequence shall have been specially arranged.

For a Teacher's Certificate

a. English as the major subject of teaching:

English 1-2, 3, 5 or 7, and 28; Rhetoric 1-2, either 11-12 or 15-16, and 41-42.

b. English as the minor subject of teaching:

English 1-2, and 3; Rhetoric 1-2, and either 11-12 or 15-16.

In order to be recommended, a student must secure an average of at least one and one-half honor points for each credit hour of all the work taken in the departments of English and Rhetoric.

[1] Absent on leave during second semester.

[2] Absent on leave.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
1-2	6	General Survey Eng. Lit....		Soph., jr., sr.	Rhet. 1-2
		11	MWF	204F ¶	
		11	MWF	109F ¶	
		11	MWF	212F ¶	
		11	MWF	205F ¶	
		11	MWF	110F ¶	
		3	MWF	301F ¶	
		3	MWF	204F ¶	
		3	MWF	110F ¶	
		3	MWF	205F ¶	
		3	MWF	114F ¶	
3	3	Old English		Soph., jr., sr.	1-2‡
		9	TThS	205F	Klaeber
		10	TThS	110F	Firkins
5a	3	Chaucer		Soph., jr., sr.	1-2‡
		9	TThS	204F	Brown
5b	3	Chaucer		Soph., jr., sr.	1-2†
		10	TThS	110F	Firkins
7	3	Shakespeare		Soph., jr., sr.	1-2‡
		10	TThS	301F	Stoll
26	3	Advanced Old English....		Soph., jr., sr.	3
		9	TThS	205F	Klaeber
28	1	Hist. of English Language.		Jr., sr.	3
		3	T	206F	Klaeber
51	3	Spenser		Jr., sr.	1-2
		2	MWF	110F	Firkins
54	3	American Literature		Jr., sr.	1-2
		9	MWF	204F	Craig
58	3	Nineteenth Century Prose.		Jr., sr.	1-2
		10	MWF	204F	Beach
67	3	English Novel		Jr., sr.	1-2
		10	MWF	301F	Burton
80a	3††	Teachers' Course		Jr., sr.	See statement
		3-4:30	TTh	206Ed	Inglis
80b	3††	Teachers' Course		Jr., sr.	See statement
		3-4:30	TTh	206Ed	Inglis
107	3	Eighteenth Century Prose.		Jr., sr., grad.	1-2 and 6 credits in courses below 10
		9	MWF	204F	Craig
113-114	6	Drama		Sr., grad.	1-2, 7, and 3 credits in courses below 10
		3	MWF	206F	Firkins
118a	2	Bible as Literature.....		Jr., sr., grad.	1-2 and 6 credits in courses below 10
		11	TTh	107F	Burton
119-120	6	Prin. of Literary Criticism		Jr., sr., grad.	1-2 and 6 credits in courses below 10
		11	TThS	204F	Firkins
123-124	4	Seminar in Novelists.....		Sr., grad.	1-2 and 6 credits in courses below 10
		3, 4	T	221F	Beach
129	3	Modern Drama		Sr., grad.	1-2, 7, and 3 credits in courses below 10
		11	MWF	301F	Burton

‡ This course may be taken at the same time with English 1.
†† Carries credit only in Department of Education.

No.	Credits	Title	Offered to	Prereq. courses
136	3	Advanced Shakespeare ...	Jr., sr., grad.	1-2, 7, and 3 credits in courses below 10
		10 TThS	304F	Stoll
140	2	Advanced Chaucer	Jr., sr., grad.	1-2, 5a or 5b, and 3 cred. in courses below 10
		9 TTh	204F	Brown
143	3	Recent English Poetry....	Jr., sr., grad.	1-2 and 6 credits in courses below 10
		4 MWF	204F	Beach
146	3	Metrical Romances	Jr., sr., grad.	1-2 and 6 credits in courses below 10
		11 MWF		Brown
201	2	Anglo-Saxon	Grad.	.....
		Ar Ar	221F	Klaeber
204	2	Beowulf	Grad.	.....
		Ar Ar	221F	Ar
209-210	4	Middle English Lyric.....	Grad.	.....
		Ar Ar	Ar	Brown
211-212	4	Drama in England before Shakespeare	Grad.	.....
		Ar Ar	Ar	Craig
215	2	Drama as a form and phase of modern thought.....	Grad.	.....
		Ar Ar	Ar	Burton
217	2	Seminar in Elizabethan Drama	Grad.	.....
		Ar Ar	Ar	Stoll
220	2	Seminar in Restoration Drama	Grad.	.....
		Ar Ar	Ar	Stoll

*80a,b. TEACHERS' COURSE. Methods of teaching English in high schools. Course of study, textbooks, and equipment; visits to high schools; theme-correcting. Open to juniors, seniors, graduates qualifying for a major recommendation in English. Credit only in Education. INGLIS.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 40-43.

GEOLOGY AND MINERALOGY

Professors WILLIAM H. EMMONS, CLINTON R. STAUFFER; Associate Professor FRANK F. GROUT; Assistant Professors A. WALFRED JOHNSTON, CHESSLEY J. POSEY, TERENCE T. QUIRKE; Instructor THOMAS M. BRODERICK; in the General Extension Division, Assistant Professor EDWARD M. LEHNERTS.

REQUIREMENTS OF THE DEPARTMENT

For a Minor, twelve credits.

For a Major, twenty-four credits. It is strongly recommended that a field course be included when this is practicable.

For B.A. with Honors, Courses 11, 29, 105, 111, 124, and a field course; and twelve credits selected from the following courses:

57, 58, 108, 109 in Paleontology
106, 131, 132, 140 in Petrology
112, 124, 137, 140, 144 in Economic Geology
106, 112, 124 in Structural Geology
36, 39, 116, 118 in Geography

For a Teacher's Certificate, requirements the same as for a major, with an average of at least one and one-half honor points for each credit hour.

COURSES

No.	Credits	Title	Offered to	Prereq. courses
1	3†	General Geology	Soph., jr., sr.	None
		8 MWF	105P	Johnston
		10 TThS	110P	Emmons
		11 MWF	110P	Johnston
		3 MWF	110P	Johnston
3	1	General Geology Lab. ...	Soph., jr., sr.	Supports 1
		Ar.	112P	Johnston
4	3	Geology of Minnesota....	Soph., jr., sr.	Course 1
		11 MWF	110P	Johnston
5	3	Economic Geology	Jr., sr.	1 and 6
		9 MWF	104P	Quirke
6	3†	Historical Geology	Soph., jr., sr.	Course 1
		8 MWF	105P	Johnston
		10 TThS	110P	Emmons
		11 TThS	105P	Quirke
		3 MWF	105P	Quirke
8	1	Historical Geology Lab. ..	Soph., jr., sr.	Supports 4 and 6
		Ar.	112P	Johnston
10	3	Elements of Paleontology.	Soph., jr., sr.	Course 1
		10 MWF	104P	Stauffer
11	3	Paleontology	Jr., sr.	Course 6
		Lect. 9 M	104P	Stauffer
		Lab. 2-4 WF	104P	Stauffer
12	3	Paleontology	Jr., sr.	Course 11
		Lect. 9 M	104P	Stauffer
		Lab. 2-4 WF	104P	Stauffer
14	3	Applied Geol. for Civ. Eng.	Soph., jr., sr.	Course 1
		8 TThS	110P	Quirke
15a or 15b	1	Minerals and Rocks.....	Jr., sr.	1
		Ar.	100P	Grout
21	3	Elements of Mineralogy.	Soph., jr., sr.	See bulletin statement
		Lect. 11 TThS	110P	Broderick
		Lab. 8 TThS	100P	Broderick
		Lab. 10 TThS	100P	Broderick
		Lab. 2-5 W	100P	Broderick
22	3	Descriptive Mineralogy...	Soph., jr., sr.	21
		Lect. 11 TThS	110P	Broderick
		Lab. 10 TThS	100P	Broderick
27a or 27b	1	Outlines of Mineralogy..	Jr., sr.	None
		Ar.	100P	Grout
29	3	General Physiography ...	Soph., jr., sr.	None
		10 TThS	105P	Posey
30	3	Principles of Geography.	Soph., jr., sr.	None; 29 desirable
		10 MWF	105P	Posey

† Geology 1 and 6 constitute a year's course; both semesters must be completed before credit is given for the first semester.

No.	Credits	Title	Offered to	Prereq. courses
34	3	Meteorology	Soph., jr., sr.	None
		8 TThS	105P Posey	
35	1	Laboratory work	Soph., jr., sr.	See bulletin statement
		Ar.	104P Posey	
36	3	Geog. of North America.	Jr., sr., grad.	1 or 29 and 3 creds. from 5, 6, 30, 34, 39
		10 TThS	105P Posey	
37	3	Physical & Com. Geog...	Fr.	None
		9 MWF	204P Posey	
39	3	Geographic Influences ...	Jr., sr., grad.	3 cred. from 1, 29, 30, and History 5 or its equivalent
		10 MWF	105P Posey	
55	3	Teachers' Course in Geog.	Jr., sr., grad.	Any one of 36, 39, 116, or 118
		8 TThS	105P Posey	
57	3	Paleontology	Jr., sr.	6
		9-11 TThS	104P Stauffer	
58	3	Paleontology	Jr., sr.	57
		9-11 TThS	104P Stauffer	
61	3	Physical Mineralogy	Jr., sr.	22
		Ar.	Ar.P Grout	
65	3	Morphology of Minerals.	Jr., sr.	22
		Ar.	Ar.P Grout	
105	3	Elements of Rock Study.	Jr., sr., grad.	See bulletin statement
		2-4 TTh	200P Grout	
106	3	Petrology	Jr., sr., grad.	105
		2-4 TTh	200P Grout	
108	3	Paleontologic Practice ...	Jr., sr., grad.	58
		2-4 MWF	107P Stauffer	
109	3	Advanced Paleontology ..	Jr., sr., grad.	58
		8-10 MWF	107P Stauffer	
110	3	Advanced Paleontology ..	Jr., sr., grad.	109
		8-10 MWF	107P Stauffer	
111	4	Ore Deposits	Sr., grad.	6, 22, 105
		8 TWThF	110P Emmons	
112	4	Problems in Ore Deposits	Sr., grad.	111
		2-6 W	104P Emmons	
116	3	Geog. of Latin America..	Jr., sr., grad.	6 cred. from 1, 6, 29, 30, 34, 36, 39
		9 MWF	105P Posey	
118	3	Geog. of Eurasia.....	Jr., sr., grad.	Same as for 116
		9 MWF	105P Posey	
124	3	Structural & Metam. Geol.	Sr., grad.	6, 22, 105
		10 TThS	112P Johnston	
131-132	6	Advanced Petrology.....	Jr., sr., grad.	106
		Ar.	200P Grout	
137	3	Testing Econ. Minerals..	Jr., sr., grad.	6, 22, 105
		Lect. 11 MW	200P Grout	
		Lab. 2-4 W	200P Grout	
140	3	Applied Petrology	Jr., sr., grad.	See bulletin statement
		Ar.	200P Grout	
144	3	Construction of Geol. Maps	Jr., sr., grad.	1, 6
		Ar.	112P Quirke	
151	3	Advanced General Geol..	Jr., sr., grad.	6
		11 MWF	104P Stauffer	

No.	Credits	Title	Offered to	Prereq. courses
152	3	Advanced General Geol..	Jr., sr., grad.	151
		11 MWF .	104P Stauffer	
160	6	Field Geology	Jr., sr., grad.	See bulletin statement
188	6	Field Work in Geography	Jr., sr., grad.	See bulletin statement

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 47-50.

55. TEACHERS' COURSE IN GEOGRAPHY. A critical study of materials and methods of teaching secondary school geography. The relation of human activities to environment will be emphasized. For teachers of high school geography. Prerequisites: Geology 1 or 29, and 36 or 116 or 118. POSEY.

GERMAN

Professor CARL SCHLENKER; Assistant Professors OSCAR C. BURKHARD, JAMES DAVIES, ALFRED E. KOENIG, SAMUEL KROESCH, WALTER R. MYERS; Instructors ARTHUR R. GRAVES, HAROLD W. SOULE, EDWIN H. ZEYDEL; Teaching Fellow .....

REQUIREMENTS OF THE DEPARTMENT

For B.A. with Honors, the general requirements, and fifteen credits during the junior year in courses numbered between 51 and 100, of which Courses 53-54 and 55-56 are required; eight credits during the senior year, including at least one course numbered between 101 and 200, and one course numbered above 200; and the special thesis, to be completed under the direction of the instructor in charge of the latter course.

Teacher's Certificate in German. For a minor recommendation, a minimum of fourteen credits; required courses are German 29-30, 31-32 and 59-60. For a major recommendation, a minimum of twenty-eight credits; required courses are German 29-30, 31-32, 53-54, 55-56 and 59-60. German 57-58 is strongly recommended. German 1 and 3 shall not be counted toward either a minor or a major recommendation. To obtain either a minor or a major recommendation the student must obtain an average of one and one-half honor points for each credit hour for all German courses taken.

For courses in Germanic Philology see the statement of the Department of Comparative Philology.

COURSES

a. Only students who are taking or who have taken Course 5-6 or Course 16 may elect the supplementary courses 25-26 and 27-28, either one or both. But students electing Course 11-12 or Course 14 may elect Course 25-26. No credit will be granted for Course 25-26 or Course 27-28 if students elect them when taking or when they have taken courses numbered above 50.

b. Only students who are taking or who have taken Courses 7-8 or Course 9-10 or Course 11-12 or Course 14 or Course 21-22 or Course 23-24 may elect the supplementary courses 29-30 and 31-32, either one or both together. Students electing Course 11-12 or Course 14 or Course 21-22 should take courses 29-30 and 31-32 only after consultation with the instructor in charge.

c. Credit for only one of the following courses will be granted: Courses 5-6, 16, 21-22.

d. Credit for only one of the following courses will be granted: Courses 7-8, 9-10, 11-12, 14, 21-22, 23-24.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
1a	6	Beginning		All	None
		8	MTWThFS	207F	¶
		9	MTWThFS	207F	¶
		10	MTWThFS	207F	¶
		11	MTWThFS	207F	¶
1b	6	Beginning		All	None
		9	MTWThFS	101F	¶
3a	6	Intermediate		All	1a or 1b
		11	MTWThFS	209F	¶
3b	6	Intermediate		All	1a or 1b
		8	MTWThFS	207F	¶
		9	MTWThFS	207F	Kroesch
		10	MTWThFS	207F	Myers
		11	MTWThFS	207F	Koenig
5-6	6†	Prose and Poetry.....		Fr., soph.	2 yrs. prep. German
		8	TThS	209½F	¶
		9	MWF	212F	¶
		10	MWF	209F	¶
		10	TThS	213F	¶
		11	TThS	110F	¶
		2	MWF	213F	¶
6a	3	Prose and Poetry.....		Fr., soph.	5a or 5b
		2	MWF	209F	Graves
7-8	6	Drama		All	5-6 or 4 yrs. prep. German
		9	TThS	212F	Burkhard
		10	MWF	212F	Schlenker
		11	TThS	212F	Davies
11-12	6†	Rapid Reading		Soph., jr., sr.	3a or 3b
		9	TThS	213F	Koenig
		10	MWF	213F	Graves
		11	MWF	213F	Kroesch
14	6	Rapid Reading		Soph., jr., sr.	3a or 3b
		11	MTWThFS	209F	Zeydel
16	6	Prose and Poetry.....		All	2 yrs. prep. German
		11	MTWThFS	113F	¶
21-22	6†	Scientific Intermediate		Soph., jr.	3a or 3b
		11	TThS	213F	Graves
23-24	6†	Scientific Advanced		Soph., jr.	5-6 or 16 or 21-22
		10	MWF	206F	Soule

No.	Credits	Title		Offered to	Prereq. courses
25-26	2†	Elementary Composition ..		Fr., soph., jr.	See note a
		9	S	209½F	Zeydel
		10	S	209½F	Koenig
27-28	2†	Elementary Conversation..		Fr., soph., jr.	See note a
		8	WF	209½F	Zeydel
		9	TTh	209½F	Graves
		10	TTh	209½F	Soule
29-30	2†	Advanced Conversation ...		Soph., jr., sr.	See note b
		9	WF	209½F	Zeydel
		10	TTh	209F	Davies
31-32	2†	Intermediate Composition..		Soph., jr., sr.	See note b
		9	M	209½F	Graves
		10	S	209F	Davies
51	2	Faust, Part I		Soph., jr., sr.	7-8 or 9-10 or 11-12 or 14 or 23-24
		11	WF	209½F	Schlenker
53	3	Survey through Classic Period		Soph., jr., sr.	7-8 or 9-10 or 11-12 or 14 or 23-24
		9	MWF	209F	Burkhard
		9	TThS	209F	Myers
54	3	Survey since Classic Period		Soph., jr., sr.	53
		9	MWF	209F	Burkhard
		9	TThS	209F	Myers
55-56	2†	Advanced Composition ...		Jr., sr.	31-32
		3	M	207F	Kroesch
		3	M	209F	Myers
57-58	4	Oral Diction		Jr., sr.	See statement
		10	MW	209½F	Koenig
59-60	2†	Teachers' Course		Jr., sr.	29-30 and 31-32 or 53-54
		4	F	209F	Schlenker
61	2	Romantic School		Jr., sr.	7-8 or 9-10 or 11-12 or 14 or 23-24
		11	TTh	209½F	Schlenker
62	2	Drama since 1880		Jr., sr.	2 credits in starred courses
		11	TTh	209½F	Schlenker
107-108	4†	Middle High German		Jr., sr., grad.	4 credits in starred courses
		4	WF	209½F	Kroesch
109-110	4†	Hist. of German Language		Jr., sr., grad.	4 credits in starred courses
		2	WF	205F	Klaeber
119-120	4†	Drama of Schiller.....		Sr., grad.	4 credits in starred courses
		2, 3	Th	209½F	Myers
127-128	4	Eighteenth and Nineteenth Century Lyric		Sr., grad.	4 credits in starred courses
		2, 3	F	207F	Davies
137-138	4†	Aspects of Nineteenth Century Literature		Sr., grad.	4 credits in starred courses
		2, 3	W	209½F	Burkhard

† Both semesters must be completed before credit is given for either semester.

No.	Credits	Title	Offered to	Prereq. courses
143-144	4†	Heine und das Junge Deutschland	Sr., grad.	4 credits in starred courses
		4 TTh	207F Graves	
225-226	4†	Literary Problems	Honors and grad.	
		2, 3 T	209½F Schlenker	

† Both semesters must be completed before credit is given for either semester.

59-60. TEACHERS' COURSE. Lectures, readings, and reports; observation of classes. SCHLENKER.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 47-50.

GREEK

Professor CHARLES ALBERT SAVAGE.

REQUIREMENTS OF THE DEPARTMENT

For a Minor, twelve credits.

For a Major, twenty-four credits (exclusive of Courses 59 to 64 inclusive).

COURSES

No.	Credits	Title	Offered to	Prereq. courses
1-2	10†	First Year Greek	Fr., soph., jr., sr.	None
		9 TWThFS	114F Savage	
3-4	6†	Anabasis-Iliad	Fr., soph., jr., sr.	1-2
		10 MWF	114F Savage	
51	3	Philosophy	Jr., sr.	3-4
		10 TThS	114F Savage	
52	3	Oratory	Jr., sr.	3-4
		10 TThS	114F Savage	
101	3	Lyric Poetry	Sr., grad.	51-52
		11 MWF	113F Savage	
102	3	Tragedy	Sr., grad.	7 or 101
		11 MWF	113F Savage	
		Courses open to all. No knowledge of Greek required.		
61	2	Drama	Jr., sr.	None
		2 TTh	114F Savage	
62	2	Literature and Life	Jr., sr.	None
		2 TTh	114F Savage	
63	1	Mythology	Jr., sr.	None
		3 Th	114F Savage	

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 50-51.

† Both semesters must be completed before credit is given for the first semester.

HISTORY

Professors GUY STANTON FORD, WILLIAM STEARNS DAVIS, WALLACE NOTESTEIN, ALBERT BEEBE WHITE; Associate Professors SOLON JUSTUS BUCK, AUGUST CHARLES KREY; Lecturer LESTER BURRELL SHIPPEE; Instructor WAYNE EDSON STEVENS; Teaching Assistant WILSON PORTER SHORTRIDGE; Assistants ALICE H. FELT, FRANCES IRWIN, CECIL W. SHIRK.

REQUIREMENTS OF THE DEPARTMENT

For B. A. with Honors, see general statement.

For a Teacher's Certificate, eighteen credits in History, including at least three credits in intensive courses. In addition the student must take History 56-7.

The Departments of History, Economics, Political Science, Sociology and Anthropology constitute a social science group. The subjects are closely interrelated, and are of especial importance to students who intend to engage in law, business, public service at home or abroad, journalism, and the work of charities and corrections, or to give instruction in one of the social sciences. Students who are interested in any one of the departments of the social science group ought to be familiar with at least the elements of the subjects offered in the other departments. A student who takes his major in any one of them ought to have more than the elements of the others.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
1-2	6	Med. and Modern Europe.		All	None
	(Lecture)	1	W	30Ph	Ford, Krey
		8	TS	111L	¶
		9	MF	111L	¶
		9	TS	111L	¶
		10	MF	111L	¶
		11	MF	15F	¶
		11	TS	111L	¶
		3	MF	111L	¶
2a-1b	6	Med. and Modern Europe.		All	None
		10	TThS	301F	¶
3-4	6	English, 1066 to present...		All	None
	(Lecture)	1	M	301F	White
	(Lecture)	1	M	308F	Notestein
		9	WF	112L	¶
		9	TTh	112L	¶
		10	WF	112L	¶
		10	TTh	112L	¶
		11	WF	112L	¶
		11	TTh	112L	¶
		2	WF	112L	¶
		3	WF	112L	¶
5-6	6	American History		Soph., jr., sr.	6 credits
	(Lecture)	10	M	5F	Shippee
		10	WF	5F	¶
		10	ThS	5F	¶
		11	WF	3F	¶

No.	Credits	Title	Offered to	Prereq. courses
7-8	6	English History, 1783-1917.	Soph., jr., sr.	6 credits
		2 MWF	218bL	Notestein
9	3	National Movements	Soph., jr., sr.	6 credits
		See statement		
10	3	Europe in 19th Century..	Soph., jr., sr.	6 credits
		11 MWF	111L	Ford
13	3	Medieval Civilization	Soph., jr., sr.	6 credits
		See statement		
14	3	Renaissance and Reform'n.	Soph., jr., sr.	6 credits
		11 MWF	3F	Krey
15	3	Military History	See note†	See bulletin statement
		10 TThS	3F	Davis
21	3	Outlines of Greek History.	Jr., sr.	9 credits
		3 MWF	3F	Davis
22	3	Outlines of Roman History	Jr., sr.	9 credits
		3 MWF	3F	Davis
56-57	3	Teachers' Course	Jr., sr.	See statement
		4 MW	111L	Krey
61	3	National Expansion and Jacksonian Democracy, 1816-1840	Jr., sr.	9 credits (inc. 5-6)
		3 MWF	5F	Stevens
62	3	Recent American History..	Jr., sr.	9 credits (inc. 5-6)
		3 MWF	5F	Shippee
101	3	French Revolution	Jr., sr., grad	9 credits
		11 MWF	111L	Ford
104	3	The Near East.....	Jr., sr., grad	9 credits
		10 TThS	111L	Davis
121-122	6	History of Greece.....	Jr., sr., grad.	See statement
		See statement		
123-124	6	History of Rome.....	Jr., sr., grad.	See statement
		See statement		
125	3	History of Old Orient....	Jr., sr., grad.	9 credits
		See statement		
133-134	6	Ancient Civilization	Jr., sr., grad.	See statement
		11 TThS	3F	Davis
136	3	Outlines of Prussian Hist..	Jr., sr., grad.	9 credits
		See statement		
137	3	English Constitutional Hist.	Jr., sr., grad.	9 credits
		4-5:30 TTh	218bL	White
141	3	West in American History.	Jr., sr., grad.	9 credits (inc. 5-6)
		3 MWF	218bL	Buck
144	3	History of Minnesota.....	Jr., sr., grad.	9 credits (inc. 5-6)
		3 MWF	218bL	Buck
155	3	American Economic and Social History 1860-76...	Sr., grad.	12 credits (inc. 5-6)
		2-3:30 TTh	112L	Shippee
162	3	Beginnings of Parliament.	Jr., sr., grad.	See bulletin statement
		4-5:30 TTh	218bL	White
163	3	English Judicial System...	Jr., sr., grad.	See statement
		See statement		
171-172	6	German History	Sr., grad.	See statement
		See statement		
181	3	English Backgrounds of American History	Sr., grad.	12 cr. (inc. 3-4)
		See statement		

No.	Credits	Title	Offered to	Prereq. courses
182	3	English Colonization in America	Sr., grad.	12 cr. (inc. 5-6 or 181)
183	3	Stuart Period ..... 4-5:30 WF	Sr., grad.	See statement Notestein
191	3	Age of the Crusades..... 1:30-3 TTh	Sr., grad. 218bL	See statement Krey

56-57. THE TEACHING OF HISTORY AND GOVERNMENT. Open only to students who have eighteen credits in History, including a starred course. Deals chiefly with the practical problems of teaching history and government in the secondary schools. Students planning to teach government must have 9 credits in Political Science. KREY, et al.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 51-54.

HUMAN ANATOMY

THE MEDICAL SCHOOL

Professors CLARENCE M. JACKSON, JOHN B. JOHNSTON, THOMAS G. LEE, RICHARD E. SCAMMON; Associate Professor CHARLES A. ERDMANN; Instructors JAY A. MYERS, ANDREW T. RASMUSSEN.

REQUIREMENTS OF THE DEPARTMENT

For a Minor, twelve credits.

For a Major, twenty-four credits.

Prerequisites in Animal Biology may be counted as a part of the work for a minor or major.

COURSES

No.	Credits	Title	Offered to	Prereq. courses
3-4	10	Gross Human Anatomy.....	Soph., jr., sr.	An. Biol. 1-2
		Lab. 8, 9, 10, 11 TThS	304-308IA	Jackson, et al.
		Lect. 1 MW	304IA	Jackson
101	5	Human Histology	Jr., sr., grad.	An. Biol. 7-8
		Lab. 8, 9, 10 MWF	106-108IA	Scammon, et al.
		Lect. 11 WF	102IA	Scammon
102	3	Human Embryology	Jr., sr., grad.	An. Biol. 7-8
		Lect. 11 MW	102IA	Scammon
		Quiz. 3 Th	106-108IA	Lee, et al.
		Lab. 3, 4, 5 M or W or F	106-108IA	Lee, et al.
103	3	Human Neurology	Sr., grad.	Anat. 101 and 102, or An. Biol. 7-8 or 19-20
		Lab. 8, 9, 10 ThS	108-214-215IA	Johnston, Rasmussen, et al.
111a,b	3	Anatomical Technique ..... 1, 2, 3 TS	Soph., jr., sr. 113IA	Histology or Embryol. Lee
114	3	Topographic Anatomy	Sr., grad	3-4
		Lab. 1, 2, 3 TTh	313IA	Jackson
115	3	Fetal Anatomy	Sr., grad.	3-4 and 102 or An. Biol. 137
		Lab. Ar. TTh	20IA	Scammon

General Zoology (Animal Biology 1) is an additional prerequisite for all courses in Human Anatomy.

NOTE: Since the number of students in anatomy Courses Nos. 3-4, 101, and 102 is limited, students will not be permitted to register for these courses without written permission from the head of the department.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 55-56.

HUMAN PHYSIOLOGY

Professor ELIAS P. LYON; Associate Professors RICHARD OLDING BEARD, FREDERICK H. SCOTT, JOHN E. MCCLENDON; Assistant Professors M. RUSSELL WILCOX, FRANCIS B. KINGSBURY, CHAUNCEY J. V. PETTIBONE; Assistants CHARLES C. GAULT, ALBERT M. SNELL.

REQUIREMENTS OF THE DEPARTMENT

For a Minor, twelve credits, which may include Animal Biology 1-2.

For a Major, Animal Biology 1-2 and eighteen credits, including Physiology 102, 103, and 104. In these eighteen credits may be included Anatomy 101 and Animal Biology 15-16.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
1-2	2 or 4	Physiology and Hygiene..		All	None
		9-12	S		
3a,b	3†	Elem. Human Physiology		Soph., jr., sr.	1 yr. Chem., half yr. Biol.
		1:30-4	T		
		1:30-5	Th	214MH	Beard, or Lyon, et al.
4	3†	Elementary Physiology ...		Soph., jr., sr.	Elem. Chem. & Biol. or Anat.
		9-10	T		
		9-12	Th		
		9-10	S	214, 301MH	Beard or Lyon, et al.
6	3†	Elem. Physiol. Chemistry.		Soph., jr., sr.	Elem. Chem. & Biol. or Anat.
		10-12	T		
		10-12	S	214, 310MH	Pettibone, et al.
102	5	Physiologic Chemistry ...		Jr., sr., grad.	Organic Chem.
		8-11	MW		
		8-12	F	214, 310MH	Pettibone, et al.
103	4	Physiol. Muscle, etc.....		Jr., sr., grad.	An. Biol. 1-2 and 7-8 or Anat. 101
		1-3	M		
		1-4:30	W		
		1-3:30	F	214, 301MH	Scott, et al.
104	4	Physiol. Nerv. Sys., etc..		Jr., sr., grad.	An. Biol. 1-2 and 7-8 or Anat. 101
		1-3	M		
		1-4	W		
		1-4	F	214, 301MH	Lyon, et al.
151-152	6	Physiologic Chemistry ...		Jr., sr., grad.	Organic Chem.
		1-4	TTh	305, 310MH	Kingsbury, et al.

† Students may not receive credit for any two of Courses 3 and 4.

1-2. HUMAN PHYSIOLOGY. A course in the essentials of human physiology and hygiene, planned to afford teachers an adequate knowledge of the human subject whom they are engaged in teaching. Offered to public school teachers and others. BEARD and Assistants.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 56-57.

LATIN

Professors JOSEPH B. PIKE, JOHN E. GRANRUD.

REQUIREMENTS OF THE DEPARTMENT

For a Teacher's Minor Recommendation, Courses 5, 6, 57, 58, and 101; *for a Major Recommendation,* these same courses with the addition of Course 102, with an average of at least one and one-half honor points per credit hour.

For B.A. with Honors, the general requirements, and a fair reading knowledge of German or French or Greek. Six credits in Latin a semester during the junior and senior years are to be selected from Courses 57 to 204. (Students who do not desire a recommendation for teaching Latin may, by selecting courses that are given in alternate years, secure enough work for the honors course without being obliged to take Course 101 or 102.) Instead of taking all the work indicated above in Latin, the student may substitute six credits in Greek (third-year Greek or above), or six credits in Greek or Roman History, or six credits in ancient Philosophy.

COURSES

No.	Credits	Title	Offered to	Prereq. courses
1	6	Beginning Latin	All	None
		9 MTWThFS	107F ¶	
2	6	Selections from Caesar†..	All	1
		9 MTWThFS	107F ¶	
3	3	Select. from Latin Authors	All	1-2 or 2 or 3 yrs. prep. Latin
		10 MWF	109F ¶	
4	3	Select. from Latin Authors‡	All	1-2 or 2 or 3 yrs. prep. Latin
		10 MWF	109F ¶	
5	3	Livy	All	3-4 or 4 yrs. prep. Latin
		10 TThS	109F ¶	
6	3	Plautus and Terence††...	All	3-4 or 4 yrs. prep. Latin
		10 TThS	109F ¶	
57	3	Horace	Soph., jr., sr.	6
		9 MWF	109F Pike	
58	3	Pliny	Soph., jr., sr.	57
		9 MWF	109F Pike	
101	3	Advanced Caesar	Jr., sr.	58
		9 TThS	109F Pike	
102	3	Advanced Virgil	Jr., sr.	101
		9 TThS	109F Pike	
105	3	Roman Elegy	Jr., sr., grad.	58
		10 MWF	107F Granrud	
107	3	Letters of Cicero.....	Jr., sr., grad.	58
		See statement	107F Granrud	

† Students entering at midyear with one year of Latin may take Course 2.

‡ Students entering at midyear with two or three years of Latin may take Course 4.

†† Students entering at midyear with four years of Latin may take Course 6.

No.	Credits	Title	Offered to	Prereq. courses
108	3	Tacitus	Jr., sr., grad.	58
		11 MWF	107F	Granrud
110	3	Roman Satire	Jr., sr., grad.	58
		See statement	107F	Granrud
9	1	Roman Architecture	Jr., sr.	None
		11 S	107F	Granrud
10	1	Roman Art	Jr., sr.	None
		11 S	107F	Granrud
201-202	3	Lucretius	Grad. and honor	Consult department
		3, 5 T	...	Pike
203-204	3	Seneca	Grad. and honor	Consult department
		See statement	109F	Pike
205-206	6	Roman Comedy	Grad. and honor	Consult department
		3, 4, 5 Th	107F	Granrud

101. ADVANCED COURSE IN CAESAR. Teachers' Course. Selections from books five to seven of the Gallic War; the principles of indirect discourse; intermediate Latin composition; class drill and discussion of various problems connected with secondary school work in Latin. PIKE.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 58-59.

MATHEMATICS

Professors GEORGE N. BAUER, FRANCIS P. LEAVENWORTH; Associate Professors WILLIAM H. BUSSEY, ROYAL R. SHUMWAY; Assistant Professors HERMON L. SLOBIN, ANTHONY L. UNDERHILL, WILLIAM D. REEVE; Instructors RALPH M. BARTON, RAYMOND W. BRINK, EDWARD A. T. KIRCHER.

REQUIREMENTS OF THE DEPARTMENT

For B.A. with Honors, the general requirements. In junior and senior years any courses above 50 may be presented, except Course 54. Astronomy 101-102, Physics 121-122, and with the consent of the Department of Mathematics, other courses in Astronomy and Physics open only to juniors and seniors may be presented.

For a Teacher's Certificate, an average of at least one and one-half honor points per credit hour through Course 51; Course 54; and an average of at least one honor point per credit hour in all other courses taken in the department. Course 6 must be included if not offered for admission.

COURSES

Year courses for freshmen and sophomores. Course 1-2 is a year course open to students who presented for entrance one unit of Elementary Algebra. Course 3a-4b and Course 5-9b are two alternative year-courses open to those who presented for entrance one unit of Elementary Algebra and one-half unit of Higher Algebra. Students who intend to specialize in Mathematics are advised to take Course 5-9b. Course 9a-11b

is a year course for sophomores who had Course 1-2 or Course 3a-4b in the freshman year. Course 11a-51b is a year-course for sophomores who had Course 5-9b in the freshman year.

COURSES

No.	Credits	Title		Offered to		Prereq. courses
1-2	5	Algebra I, II, and Pl. Trig...		Fr., soph.		Elem. Algebra
		8	TWThFS	125F	¶	
		9	TWThFS	125F	¶	
		11	TWThFS	104F	¶	
		2	MTWThF	104F	¶	
1b	5	Algebra I		Fr., soph.		Elem. Algebra
		8	TWThFS	105F	¶	
3a	3	Algebra II		Fr., soph.		Prep. Higher Algebra
		10	MWF	104F	¶	
		10	TThS	104F	¶	
		2	MWF	101F	¶	
		3	MWF	104F	¶	
3b	3	Algebra II		Fr., soph.		Prep. Higher Algebra
		8	MWF	104F	¶	
4a	3	Trigonometry		Fr., soph.		3
		8	TThS	104F	¶	
4b	3	Trigonometry		Fr., soph.		3
		10	MWF	104F	¶	
		10	TThS	104F	¶	
		2	MWF	101F	¶	
		3	MWF	104F	¶	
5	5	Algebra II and Pl. Trig.		Fr., soph.		Prep. Higher Algebra
		9	TWThFS	104F	¶	
		10	TWThFS	105F	¶	
6	2	Solid Geometry		Soph., jr., sr. who have not had Solid Geometry		1-2 or 3-4 or 5-9
		11	WF	101F	Bussey	
9a	5	Pl. & Sol. Anal. Geom.		Soph., jr., sr.		2 or 4 or 5
		9	TWThFS	101F	Slobin	
		2	MTWThF	102F	Brink	
9b	5	Pl. & Sol. Anal. Geom.		Fr., soph., jr., sr.		2 or 4 or 5
		9	TWThFS	104F	¶	
		10	TWThFS	105F	¶	
11a	3	Differential Calculus		Soph., jr., sr.		7 or 9
		11	TThS	102F	Barton	
11b	3	Differential Calculus		Soph., jr., sr.		7 or 9
		9	TThS	102F	Bauer	
		2	MWF	102F	Brink	
51a	3	Integral Calculus		Soph., jr., sr.		11
		11	TThS	101F	Bauer	
51b	3	Integral Calculus		Soph., jr., sr.		11
		11	TThS	102F	Slobin	
54a	2	Teachers' Course		Jr., sr.		11
		3	TTh	115Ed	Reeve	
54b	2	Teachers' Course		Jr., sr.		11
		3	TTh	115Ed	Reeve	
62	3	Theory of Equations.....		Jr., sr.		11
		2	MWF	125F	Bussey	
71	3	Solid Anal. Geom.		Jr., sr.		11
		9	MWF	102F	Underhill	

No.	Credits	Title	Offered to	Prereq. courses
102	3	Adv. Pl. Anal. Geom.	Jr., sr., grad.	11
		9 MWF	102F	Shumway
107	3	Adv. Differential Calculus.....	Jr., sr., grad.	51
		11 MWF	102F	Bussey

Any of the following courses for which a sufficient number of students apply will be given in 1917-18.

106a or 106b	3	Differential Equations..	Sr., grad.	51
119a or 119b	3	Modern Higher Algebra	Sr., grad.	51, 62
125-126	6	Differential Geometry..	Sr., grad.	51
127a or 127b	3	Infinite Series	Sr., grad.	17 cred. besides Alg. and Trig.
140	2	Meth. of Least Squares	Sr., grad.	51

54a,b. TEACHERS' COURSE. Text and assigned readings. Special attention paid to the fundamental principles of Algebra and Geometry. REEVE.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 59-61.

MILITARY SCIENCE AND TACTICS

REQUIRED WORK

All physically fit male students are required to take military training during the first two undergraduate years of their course unless they have secured such training at an approved institution endorsed by the Military Department. When this course is entered upon it must be carried to completion as a prerequisite for graduation. No credits are allowed for this work.

ELECTIVE WORK

(a) All juniors and seniors who have completed two years of drill may register for the course required by General Orders No. 49 War Department for members of the Reserve Officers' Training Corps. Such students sign a written agreement to continue in this corps for the remainder of the college course. The completion of this work is a prerequisite to promotion. Any student who for satisfactory reasons is permitted to withdraw from this course must reimburse the War Department for all moneys received.

Juniors and seniors who take the course required by General Orders No. 49, which includes two camps for four weeks each, will receive an allowance of thirty cents per day for subsistence while pursuing the course and will have all expenses paid to and from the encampments. They also are eligible for appointment as temporary second lieutenants in the Infantry branch of the Regular Army for six months with a salary of one hundred dollars per month upon graduation and a commission in the Reserve Corps. The Reserve Corps furnishes officers for Citizens' Training Camps in time of peace, and commission in the United States Volunteers in time of war, such officers having preference for commissions in the

volunteers immediately below experienced officers in the federal service.

The course includes three hours a week of drill and three of study in the Military Department and also includes recommended courses offered by the respective colleges which have a direct bearing upon the work of the Corps, such as Military History and International Law in the Liberal Arts College. The work carries three credits in each semester in the Military Department, and such additional credits as the respective curricula of the colleges may permit.

(b) Any student having completed the two years of required Military Training may continue the work for credit in the third and fourth years. Credit for such work is allowed in practically all of the colleges of the University, the maximum being three credits a year.

MUSIC

Professor CARLYLE SCOTT; Assistant Professor DONALD FERGUSON; Instructor GERTRUDE REEVES; Special Instructors MAXIMILIAN DICK, THADDEUS GIDDINGS, GERTRUDE HULL.

REQUIREMENTS OF THE DEPARTMENT

For a Minor, twelve credits, not including Courses 11-12 and 21-22.

A Major is offered only to those who take the four-year course in Arts and Music.

For the curriculum of the four-year course in Arts and Music, leading to the degree of Bachelor of Arts in Music, see page 63 of the Science, Literature, and the Arts bulletin. The tabular statement and description of courses given below are for the guidance of other students in the College of Science, Literature, and the Arts who desire to elect Music.

COURSES

No.	Credits	Title			Offered to	Prereq. courses
1-2	6	Harmony			Jr., sr.	None
			11	MWF	Mu	Scott
			11	TThS	Mu	Scott
3-4	4	Counterpoint			Jr., sr.	Harmony
			11	TTh	Mu	Ferguson
5-6	4	Composition			Jr., sr.	.....
			Ar	Ar	Mu	Ferguson
7-8	2	Analysis			Jr., sr.	Harmony
			12	W	Mu	Scott
9-10	6	History of Music.....			Soph., jr., sr.	None
			9	MWF	Mu	Ferguson
11-12	2	Appreciation of Music.....			Jr., sr.	None
			1	M	Mu	Reeves
13-14	4	Bach-Beethoven			Jr., sr.	None
			1, 2	T	Mu	Ferguson
15-16	4 or 8	Pianoforte			Jr., sr.	.....
17-18			Ar	Ar	Mu	Scott, Ferguson, Reeves
19-20	4 or 8	Violin			Jr., sr.	.....
			Ar	Ar	Mu	Dick

No.	Credits	Title		Offered to	Prereq. courses
21-22	4	Voice		Jr., sr.	.....
		Ar	Ar	Mu	Hull
27-28	6	Public School Music.....		Jr., sr.	.....
		4, 5	WF	Ed	Giddings
29-30	6	Normal Piano		Jr., sr.	.....
		3	TF	Mu	Reeves
31-32	4	Ensemble		Jr., sr.	.....
		12	F	Mu	Dick
33-34	2	Ear Training		Jr., sr.	None
		2	Th	Mu	Reeves
35-36	2	Orchestra		Soph., jr., sr.	.....
		7:30	M	ME	Ferguson
37-38	6	Advanced Normal Piano.....		Sr., grad.	29-30
		4	TF	Mu	Reeves
39-40	6	Adv. Public School Music...		Sr., grad.	27-28
		4, 5	WF	Ed	Giddings

27-28. PUBLIC SCHOOL MUSIC. Preparation for teachers and supervisors of music in public, high schools, and normal schools. Piano playing, singing, and ready reading prerequisite. Four hours in class and one half day weekly in public school visiting. Practice teaching demanded. GIDDINGS.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 62-63.

PHILOSOPHY

Professors NORMAN WILDE, DAVID F. SWENSON; Assistant Professor RUPERT C. LODGE.

REQUIREMENTS OF THE DEPARTMENT

For B.A. with Honors, besides the general requirements, twenty-four credits in starred courses, including one of the following: 124, 125, 136, 138, 141-142.

Except where otherwise noted, six credits in Psychology may be counted toward the prerequisites.

COURSES

First Semester

No.	Credits	Title		Offered to	Prereq. courses
1	3†	Problems of Philosophy..		Soph., jr., sr.	None
		9	MWF	322F	Swenson
		11	TThS	322F	Lodge
3a	3†	Ethics		Soph., jr., sr.	None
		10	TThS	322F	Wilde
55	3	Esthetics		Jr., sr.	6 credits
		8	TThS	322F	Swenson
63	3	Development of Religion.		Jr., sr.	6 credits
		9	TThS	322F	Swenson
117	3	Advanced Ethics		Jr., sr., grad.	6 credits incl. 3
		10	MWF	322F	Wilde

† 1 and 2 or 3 may be combined as a year course.

No	Credits	Title	Offered to	Prereq. courses
121-122	6	General History of Philos.	Jr., sr., grad.	6 credits
		11 MWF	322F	Wilde
125	3	Plato	Jr., sr., grad.	9 credits incl. 6 in Phil.
		Ar Ar	316F	Lodge
133	3	Ancient Phil. Theories of the State	Jr., sr., grad.	6 credits in Phil. or Political Science
		2 MWF	322F	Lodge
141-142	6	Seminar in Philosophy...	Jr., sr., grad.	12 credits in Phil.
		Second Semester		
2	3†	Logic	Soph., jr., sr.	None
		9 MWF	322F	Swenson
		11 TThS	322F	Lodge
3b	3†	Ethics	Soph., jr., sr.	None
		9 MWF	304F	Wilde
20	3	Present Day Philosophy..	Jr., sr.	6 credits
		10 TThS	322F	Wilde
64	3	Philosophy of Religion...	Jr., sr.	6 credits
		9 TThS	322F	Swenson
100	3	Critical Idealism	Jr., sr., grad.	6 credits in Phil.
		11 MWF	311F	Lodge
121-122	3	History of Philosophy...	Jr., sr., grad.	6 credits
		11 MWF	322F	Wilde
124	3	19th Century Philosophy.	Jr., sr., grad.	9 credits incl. 6 in Phil.
		Ar Ar	316F	Lodge
136	3	Scandinavian Philosophy.	Jr., sr., grad.	9 credits
		4-5:30 WF	322F	Swenson
138	3	Advanced Logic	Jr., sr., grad.	9 credits incl. 2
		10 MWF	322F	Swenson
141-142	3	Seminar in Philosophy..	Sr., grad.	12 credits
		Ar Ar	316F	Wilde

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 64-66.

PHYSICAL EDUCATION

FOR MEN

Director LOUIS J. COOKE; Assistant Director WILLIAM K. FOSTER; Instructor JOHN C. WEST; Assistant BOTTOLF M. OHNSTAD.

GENERAL STATEMENT

The purpose of the department is to provide all men of the University opportunity for exercise in order to maintain and build up their general health. It also provides special training for the correction of physical defects and functional derangements.

A physical examination is required of all new matriculants, and of all others using the department privileges, at the beginning of the year, and as often during their college course as their physical condition may indicate. Students taking the required work in physical education are

examined also at the close of the year. A study of these records shows a marked improvement in the standard of health of the average student during his college course.

The gymnasium, swimming pool, and baths are open to all students of the University, who are free to use the apparatus and to pursue a course in physical training under the supervision of the director and his assistants.

Those students, taking the required course in physical education who can not swim, must make a reasonable effort as determined by the department, to pass the swimming and life-saving requirements, and will be assigned special hours for instruction.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
1	None	Personal Hygiene		Fr.	None
		2	MF	201A	Cooke
		3	MF	201A	Cooke
		11	TS	201A	Cooke
		11	WF	201A	Cooke
3-4	None	Gymnasium		Fr.	None
		2	MF	100A	Foster-West
		3	MF	100A	Foster-West
		11	TS	100A	Foster-West
		11	WF	100A	Foster-West
5-6	None	Intermediate Gymnastics ...		Fr.	None
		2	MF	100A	Foster-West
		3	MF	100A	Foster-West
		11	TS	100A	Foster-West
		11	WF	100A	Foster-West
7-8	2†	Advanced Leaders		Soph., jr., sr.	1, 3-4, 5-6
		2	MF	100A	Foster-West
		3	MF	100A	Foster-West
		11	TS	100A	Foster-West
		11	WF	100A	Foster-West
9-10	None	Corrective Gymnastics		All	None
		Ar	Ar	100A	Ohnstad
11-12	None	Wrestling		Soph., jr., sr.	None
		5	MWF	106A	Foster-Ohnstad
13-14	None	Advanced Gymnastics		Soph., jr., sr.	None
		Ar	Ar		West-Foster
15-16	None	Intermediate Swimming		All	None
		Ar	Ar		Ohnstad
17-18	None	Advanced Swimming		All	15-16
		Ar	Ar		Foster-Ohnstad

† Both semesters must be completed before credit is given for the first semester.

For description of the above courses see College of Science, Literature, and the Arts bulletin, pages 67-68.

PHYSICAL EDUCATION

FOR WOMEN

Assistant Professor J. ANNA NORRIS; Instructors MAY S. KISSOCK,[1] VALERIA G. LADD, GERTRUDE B. SCHILL, ALICE H. TOLG, LILLIAN HANSEN.

INTRODUCTORY STATEMENT

This department aims primarily to promote the health of the women students. It gives physical examination and advice to all on entrance; conducts yearly consultations with, and examines when necessary, all upper class students; plans systematically to keep in touch with those students whose physical condition suggests the need of supervision; gives courses in hygiene; organizes physical work to meet the varying needs and physical tastes of students; coöperates closely with the Woman's Athletic Association in encouraging and organizing athletic sports; holds regular office hours for the purpose of consultation with all students who desire its advice; and investigates cases of illness which come to its attention.

Work in this department is required of all newly entering students (See Courses 1-2 and 11), and of all students permitted, for reasons connected with their physical condition, to carry less than the minimum number of credit hours. Sophomores required to register for swimming; this requirement waived in case student can pass examination. Physical examinations for consultations required annually of all students.

Elective classes arranged in gymnastics, dancing, swimming, field hockey, basket-ball, baseball, and other organized games.

For a teacher's certificate, minor recommendation, the following courses must be taken: 1-2, 3-4, 5-6, 13, 15-16, 21-22, 31-32, 33-34. Course 5-6 must be taken in senior year.

Six credits the maximum number that can be gained by taking courses in exercise (Courses 3-4, 5-6); only one of these courses may be taken for credit in a semester.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
1-2	None	Elem. Physical Training....		Required of all new students	None
		10	TThS	3, 151, 153WGm	¶
		11	MWF	3, 151, 153WGm	¶
		11	TThS	3, 151, 153WGm	¶
		3	MWF	3, 151, 153WGm	¶
3-4	3	Intermediate Phys. Training		Soph., jr., sr.	Equivalent of 1-2
		3	TTh	153WGm	Schill
		One other hour to be arranged			
5-6	3	Advanced Phys. Training...		Jr., sr.	3-4, permission of director
		4	TTh	153WGm	Ladd
		One other hour to be arranged			

[1] On leave of absence 1917-18.

No.	Credits	Title		Offered to	Prereq. courses
11	None	Preliminary Hygiene		Required of all new students	None
		12	M	201WGm	¶
		2	T	201WGm	¶
		11	W	201WGm	¶
		8	S	201WGm	¶
13	3	Personal Hygiene		Soph., jr., sr.	An. Biol. 1-2
		9	TThS	201WGm	Norris
14	3	Hygiene of the Family....		Jr., sr.	13
		9	TThS	201WGm	Norris
15-16	6	Principles of Phys. Educ...		Sr.	1-2, 3-4, 21-22, 31-32, 33-34
		Lect. 10	MWF	201WGm	Ladd, Schill, Tolg
		Lab. 2	MWF	3, 151, 153WGm	Ladd, Schill, Tolg
21-22	None	Elem. Dancing		All	None
		4	MWF	153WGm	Ladd
31-32	None	Folk Dancing & Org. Games		All	None
		10	WF	151WGm	Ladd, Schill
		2	TTh	151WGm	Ladd, Schill
33-34	None	Hockey, Basket & Base Ball		All	Permission of director
		4	MW	151WGm	Schill
		4	TTh	151WGm	Schill
43-44	None	Elementary Swimming		Required of soph. who need instr. in swimming	None
		2	MF	51WGm	Hansen
		2	TTh	51WGm	Hansen
		3	MF	51WGm	Hansen
		3	TTh	51WGm	Hansen
		4	MF	51WGm	Hansen

The natatorium will be open and instruction will be given to beginners or advanced students at 2:30 MTThF, 3:30 MTThF, 4:30 MThF. General swimming (without instruction) at 12 TTh and 5 MW.

Roller skating at 1:00 MWF.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 68-69.

PHYSICS

Professors Henry A. Erikson, Anthony Zeleny; Associate Professor Louis W. McKeehan; Assistant Professor John T. Tate; Instructors Ernest O. Dieterich, Paul E. Klopsteg.

REQUIREMENTS OF THE DEPARTMENT

For B.A. with Honors, the general requirements; work chosen from any courses above 40, except 90; and any course in mathematics open only to juniors and seniors if approved by the department. Mathematics 106, 107, 108, 140 have already been thus approved. Thesis in connection with any course in Physics above 150.

For a Teacher's Certificate, fourteen credits, including Course 90.

Courses 21, 22, 31, 42, 44, 161, 52, 54, with prerequisites in mathematics comprise a three-year course in Physics beginning with the freshman year.

It is designed to meet the needs of those who intend to take up the teaching of Physics or who are planning to enter the field of industrial research. It is recommended to those students desiring honors in Physics. Students who have completed courses 1, 2, 3, 4, or Courses 7, 8, 9, 10, may continue with the second year of this course after conference with the department.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
1	3	General Physics		Soph., jr., sr.	Math. 2 or 4 or reg. in Math. 2 or 4
		1	M	30Ph	Zeleny
		8	TTh	17Ph	Klopsteg
		9	TTh	17Ph	Zeleny
		10	TTh	17Ph	Zeleny
		11	TTh	17Ph	Klopsteg
		11	WF	17Ph	Klopsteg
2	3	General Physics		Soph., jr., sr.	1 or 7
		1	M	30Ph	Zeleny
		8	TTh	17Ph	Klopsteg
		9	TTh	17Ph	Zeleny
		10	TTh	17Ph	Zeleny
		11	TTh	17Ph	Klopsteg
		11	WF	17Ph	Klopsteg
3	1	General Lab. Practice.....		Soph., jr., sr.	Registration in 1
		Ar	Ar	23Ph	Ar
4	1	General Lab. Practice.....		Soph., jr., sr.	See statement
		Ar	Ar	23Ph	Ar
7	4	General Physics		Soph., jr., sr.	Math. 2 or 4, see statement
		1	F	30Ph	Erikson
		8	MWF	17Ph	Tate
8	4	General Physics		Soph., jr., sr.	7, see statement
		1	F	30Ph	Erikson
		8	MWF	17Ph	Tate
9	1	General Lab. Practice.....		Soph., jr., sr.	See statement
		Ar	Ar	23Ph	Ar
10	1	General Lab. Practice.....		Soph., jr., sr.	See statement
		Ar	Ar	23Ph	Ar
21	3	Elements of Mechanics...		Fr., soph.	High School Physics, Math. 2 or 4 or reg. in Math. 2 or 4
		Lect. Ar	Ar	Ar	Tate
		Lab. Ar	Ar	16Ph	Tate
22	3	Elements of Mechanics...		Fr., soph.	21, Math. 9 or reg. in Math. 9b
		Lect. Ar	Ar	Ar	Tate
		Lab. Ar	Ar	16Ph	Tate
31	3	Acoustics		Soph., jr., sr.	See statement
		9	TThS	30Ph	Erikson
42	3	Heat		Soph., jr., sr.	2, 8, or 22, Math. 2 or 4
		Ar	Ar	Ar	Ar
44	1	Experiments in Heat.....		Soph., jr., sr.	Registration in 42
		Ar	Ar	Ar	Ar

No.	Credits	Title	Offered to	Prereq.courses
52	3	Light	Soph., jr., sr.	2, 8, or 22, Math. 2 or 4
		Ar Ar	Ar	Ar
54	1	Experiments in Light.....	Soph., jr., sr.	Reg. in 52
		Ar Ar	Ar.Ph	Erikson
81	2	Physical Manipulation and Laboratory Technique ..	Soph., jr., sr.	2 & 4, 8 & 10, or 22
		2, 3, 4 TTh	2Ph	McKeehan
82	2	Physical Instruments of Precision	Soph., jr., sr.	81
		2, 3, 4 TTh	2Ph	McKeehan
90	2	Teachers' Course	Sr.	2 & 4, 8 & 10, or 2 years of physics
		Ar Ar	Ar	Klopsteg
121-122	6	Dynamics	Jr., sr., grad.	2 or 8 or (22) and Math. 51
		Ar Ar	17Ph	Tate
155	3	Spectrometry	Jr., sr., grad.	52 and 82
		Ar Ar	4Ph	Erikson
161	4	Electricity and Magnetism.	Jr., sr., grad.	2 & 4, 8 & 10, or 22, Math. 51
		Ar Ar	Ar.Ph	Zeleny
162	3	Electrical Measurements ..	Jr., sr., grad.	161, 2 & 4, or 8 & 10
		Ar Ar	Ar	Zeleny
		10, 11 TTh	31Ph	Zeleny
163	2	Electrical Measurements ..	Jr., sr., grad.	161, 2 & 4, or 8 & 10
		Ar Ar	Ar	Zeleny
166	3	Elec. Meas. of Precision..	Jr., sr., grad.	162 or 163
		3, 4, 5 MF	31Ph	Zeleny
174	3	Radioactivity and Roentgen Rays	Sr., grad.	2 and 4
		Ar Ar	Ar	McKeehan
177	3	Radioactivity	Sr., grad.	8 cr. in Physics and Math. 11
		4 MWF	15Ph	McKeehan
178	3	Radioact. Measurements ..	Sr., grad.	177
		Ar Ar	15Ph	McKeehan
181	3	Adv. Phys. Measurements.	Sr., grad.	82 or 155 or 166 or 178
		2, 3, 4 MW	Ar	Ar
182	3	Adv. Phys. Measurements.	Sr., grad.	181
		2, 3, 4 MW	Ar	Ar
191a	3	Elem. Phys. Investigation.	Sr., grad.	82 or 155 or 166 or 178
		2, 3, 4 MW	Ar	Ar
192a	3	Elem. Phys. Investigation.	Sr., grad.	82 or 155 or 166 or 178
		2, 3 MWF	Ar	Ar
191b	3	Elem. Phys. Investigation.	Sr., grad.	191
		2, 3 MWF	Ar	Ar
192b	3	Elem. Phys. Investigation.	Sr., grad.	191
		2, 3, 4 MW	Ar	Ar

90. TEACHERS' COURSE. Methods of presentation; selection of lecture and laboratory experiments; laboratory management. KLOPSTEG.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 69-71.

POLITICAL SCIENCE

Professors WILLIAM A. SCHAPER, CEPHAS D. ALLIN, JEREMIAH S. YOUNG; Instructor WILLIAM ANDERSON; Teaching Fellow RINEHART J. SWENSON.

REQUIREMENTS OF THE DEPARTMENT

For a Minor, twelve credits.

For a Major, twenty-four credits.

For B.A. with Honors, see general requirements.

For a Teacher's Certificate in Government, courses 1, 6, and 7 in Political Science and eighteen credits in History.

The Departments of Economics, Political Science, History, and Sociology and Anthropology constitute a social science group. The subjects are intimately interrelated, 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 with at least the elements of the subjects offered in the other departments. A student who takes his major in any one of them ought to have more than the elements of the others.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
		Introductory Courses			
1a	3	American Government		Soph., jr., sr.	None
		9	MWF	109MA	Swenson
		9	TThS	102MA	Schaper
		10	MWF	209MA	Anderson
		11	TThS	202MA	Young
		11	MWF	109MA	Anderson
		2	MWF	102MA	Young
1b	3	American Government		Soph., jr., sr.	None
		9	TThS	109MA	Anderson
		10	MWF	202MA	Anderson
		2	MWF	209MA	Swenson
		General Courses			
3	3	Comparative Government		Soph., jr., sr.	1
		10	TThS	102MA	Anderson
5	3	European Municipal Admin....		Soph., jr., sr.	1
		11	MWF	213MA	Schaper
6	3	American Municipal Admin....		Soph., jr., sr.	1
		11	MWF	109MA	Schaper
7a	3	State and Local Government..		Soph., jr., sr.	1
		9	TThS	109MA	Anderson
7b	3	State and Local Government..		Soph., jr., sr.	1
		11	TThS	202MA	Young
		2	MWF	202MA	Anderson
51	3	Business Law, I.....		Jr., sr.	6 cred. in Pol. Sci., or 6 in Econ., or 3 in each
		9	MWF	202MA	Young

No.	Credits	Title	Offered to	Prereq. courses
52	3	Business Law, II.....	Jr., sr.	51
		9 MWF	202MA	Young
54	3	Latin American Governments..	Jr., sr.	6 credits
		9 TThS	102MA	Schaper
58	3	Amer. Diplomatic Problems....	Jr., sr.	6 credits
		11 TThS	213MA	Anderson
		Special Courses		
25	3	American Govt. (Eng.).....	Jr., sr.	None
		11 TThS	Ar	
26	3	Business Law (Eng.).....	Jr., sr.	25
		8 TThS	Ar	
28	3	Business Law (Agr.).....	Jr., sr.	1 or 6 credits in Economics
		1 MWF	Ar	
56-57	3	Teachers' Course	Jr., sr.	See statement
		4 MW	Lib.	Schaper
		Advanced Courses		
101	3	Constitutional Law	Jr., sr., grad.	6 credits
		9 MWF	213MA	Schaper
102	3	Modern Political Thought.....	Jr., sr., grad.	6 credits
		9 MWF	213MA	Schaper
105	3	Comparative Administration ...	Jr., sr., grad.	6 credits
		10 MWF	102MA	Young
106	3	Legislative Power and Methods	Jr., sr., grad.	6 credits
		10 MWF	102MA	Young
108	3	Police Power	Jr., sr., grad.	6 credits
		3 MWF	213MA	Young
109	3	Diplomacy	Jr., sr., grad.	6 credits or 1 and History 10
		2 MWF	213MA	Allin
110	3	International Law	Jr., sr., grad.	1 and 3 or 58 or 109
		2 MWF	102MA	Allin
114	3	Govt. of the British Empire..	Jr., sr., grad.	6 credits or 1 and History 7
		10 TThS	102MA	Allin
133	3	Anct. Phil. Theories of the State	Jr., sr., grad.	6 credits in either Political Science or Philosophy
		2 MWF	322F	Lodge
201-202		Seminar	Sr., grad.	Major in Political Sci.
		3-4 Th	213MA	Schaper et al.

56-57. TEACHERS' COURSE. Lectures on teaching Government in the secondary schools, given in coöperation with the Department of History and credited as part of History 56-57. SCHAPER.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 72-74.

PSYCHOLOGY

Professors ROBERT M. YERKES, MELVIN E. HAGGERTY; Associate Professor HERBERT WOODROW; Assistant Professors JOSEPH PETERSON, HENRY T. MOORE; Instructor KARL S. LASHLEY; Teaching Fellow J. D. Dodson.

REQUIREMENTS OF THE DEPARTMENT

For B.A. with Honors, besides the general requirements, twenty-four credits in starred courses. Starred courses in Educational Psychology and, to the extent of six hours, in philosophy, may be counted in partial fulfillment of this requirement.

COURSES

First Semester

No.	Credits	Title		Offered to	Prereq. courses
1	3	General Psychology		Soph., jr., sr.	None
		4	F	...F	Yerkes
		8	MW	321F	Peterson
		9	MW	321F	Yerkes
		9	TTh	321F	Moore
		9	TTh	304½F	Lashley
		10	MW	321F	Moore
		10	TTh	321F	Moore
		11	MW	321F	Dodson
		1	MW (Farm)	Ar(Farm)	Woodrow
		2	MW	321F	Lashley
		2	TTh	321F	Peterson
		3	MW	321F	Lashley
		3	TTh	321F	Peterson
101a	3	Experimental Psychology ...		Jr., sr., grad	1-2
		4	T	316F	Woodrow
		2, 3	TTh	318F	Woodrow
103	3	Comparative and Genetic Psychology		Jr., sr., grad	1-2
		11	TThS	321F	Yerkes and Lashley
105	2	Mental Retardation		Jr., sr., grad	1-2
		4, 5	Th	321F	Moore
107	3	Social Psychology		Jr., sr., grad	1-2
		3	MWF	322F	Moore
111	3	History of Psychology.....		Sr., grad.	9 credits
		8	TThS	321F	Peterson
115	3	Seminar in Experimental and Physiological Psychology..		Sr., grad.	12 credits
		Ar		316F	Woodrow, Peterson
117	3	Seminar in Comparative and Genetic Psychology		Sr., grad.	12 credits
		Ar		316F	Yerkes and Lashley

Second Semester

2	3	General Psychology ..... (See 1st semester).		Soph., jr., sr.	None
101b	3	Experimental Psychology ...		Jr., sr., grad.	1-2
		4	T	316F	Woodrow
		2, 3	TTh	318F	Woodrow
104	3	Comparative and Genetic Psychology		Jr., sr., grad.	1-2
		11	TThS	321F	Yerkes and Lashley
108	3	Applied Psychology		Jr., sr., grad.	1-2
		3	MWF	322F	Moore
110	3	Abnormal Psychology		Jr., sr., grad.	1-2
		8	TThS	321F	Peterson

No.	Credits	Title	Offered to	Prereq. courses
116	3	Seminar in Experimental and Physiological Psychology.. Ar Ar	Sr., grad. 316F	12 credits Woodrow and Peterson
118	3	Seminar in Comparative and Genetic Psychology ..... Ar Ar	Sr., grad. . 316F	12 credits Yerkes and Lashley

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 64-66.

RHETORIC AND PUBLIC SPEAKING

Professor JOSEPH M. THOMAS; Assistant Professors DANIEL FORD, HALDOR GISLASON, CHARLES W. NICHOLS, SIDNEY F. PATTISON, ANNA H. PHELAN, FRANK M. RARIG,[1] CHARLES E. SKINNER, HELEN A. WHITNEY; Instructors ELIZABETH HAWTHORN, CYRIL A. HERRICK, JAMES T. HILLHOUSE, ELIZABETH JACKSON, ERNEST P. KUHL, MARTIN B. RUUD, FRANK SMOYER, ARTHUR J. TIEJE, HOWARD T. VIETS; Assistant RAY M. WILCOX.

REQUIREMENTS OF THE DEPARTMENT

For a Major, twenty-four credits, which may include not more than six credits in Public Speaking.

For a Minor, twelve credits in addition to Course 1-2, including Courses 11-12 or 15-16.

For a Minor in Public Speaking, twelve credits in Public Speaking.

For B.A. with Honors, the general requirements. A reading knowledge of either Latin, French, or German. At least fifteen credits in departmental starred courses, four of these credits to be in Course 119-120.

For a Teacher's Certificate in English, (a) English as the major subject of teaching: Rhetoric 1-2, either 11-12 or 15-16, and 41-42; English 1-2, 3, 5 or 7, and 28. (b) English as a minor subject of teaching: Rhetoric 1-2, and either 11-12 or 15-16; English 1-2, and 3. In order to be recommended, a student must secure an average of at least one and one-half honor points for each credit hour of all the work taken in the Departments of English and Rhetoric.

For a Teacher's Certificate in Public Speaking, a student must satisfy the Department that he is actively interested in some phase of Public Speaking either as a member of a literary or debating society, or as a participant in a contest or dramatic performance, or as a lecturer; must have the approval of the Department of Rhetoric and Public Speaking and must complete the following courses: Rhetoric 1-2, 11-12 or 15-16, 41-42, and six additional hours in Public Speaking.

[1] On leave of absence 1917-18.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
1-2	6	Composition and Rhetoric..		Fr.	None
		8	MWF	To be assigned on registration	
		9	MWF	To be assigned on registration	
		10	MWF	To be assigned on registration	
		11	MWF	To be assigned on registration	
		2	MWF	To be assigned on registration	
		3	MWF	To be assigned on registration	
		8	TThS	To be assigned on registration	
		9	TThS	To be assigned on registration	
		10	TThS	To be assigned on registration	
		11	TThS	To be assigned on registration	
1b	3	Composition and Rhetoric..		Fr.	None
		11	MWF	306F	¶
		3	MWF	305F	¶
		11	TThS	303F	¶
2a	3	Composition and Rhetoric..		Fr.	None
		11	MWF	306F	¶
		3	MWF	305F	¶
3-4	6	Composition for Engineers.		Fr. Eng	None
		See program for the College of Engineering.			
11-12	6	Exposition, Description, Narration		Soph., jr., sr.	1-2
		9	MWF	311F	Hillhouse
		11	MWF	303F	Skinner
		2	MWF	311F	Ruud
		9	TThS	311½F	Whitney
		10	TThS	306F	Phelan
15-16	6	Exposition and Argument..		Soph., jr., sr.	1-2
		9	MWF	303F	Ford
		11	TThS	305F	Tieje
31	2	Technical Writing		Sr. Eng.	3-4
		See program for the College of Engineering.			
41-42	6	Public Speaking		Soph., jr., sr.	1-2
		9	MWF	308F	¶
		2	MWF	308F	Wilcox
		8	TThS	308F	Wilcox
		9	TThS	308F	Gislason
		10	TThS	308F	¶
		11	TThS	308F	¶
41	3	8	MWF	308F	¶
45	3	Argumentation and Debate		Soph., jr., sr.	See note
		10	MWF	308F	Gislason
47	3	Advanced Debate			See note
		Ar		308F	Gislason
80a	3	Teachers' Course		Jr., sr.	See note
		3-4:30	TTh	206Ed	Inglis
80b	3	Teachers' Course		Jr., sr.	See note
		3-4:30	TTh	206Ed	Inglis
81-82	6	Interpretative Reading		Jr., sr.	1-2, 41-42
		11	MWF	308F	Wilcox
84	3	Advanced Public Speaking.		Jr., sr.	1-2, 41-42
		3	MWF	308F	Gislason
102	3	Versification		Jr., sr., grad.	See note
		10	TThS	302F	Nichols

No.	Credits	Title	Offered to	Prereq. courses
103-104	6	Studies in Structure and Style	Jr., sr., grad.	1-2, 11-12, or 15-16
		2 MWF	303F	Ford
107	3	Imitative Writing	Jr., sr., grad.	See note
		11 MWF	304F	Thomas
110	3	Short-story Writing	Jr., sr., grad.	See note
		11 MWF	304F	Thomas
111-112	6	Essay Writing	Jr., sr., grad.	1-2, 11-12, or 15-16
		11 TThS	302F	Pattison
115-116	6	Dramatic Technique	Sr., grad.	See note
		Rec. 2 WF		
		Lab. Ar Ar	302F	Skinner
119-120	4	Seminar in Writing.....	Sr., grad.	See note
		2-4 T	302F	Thomas
201-202	6	Seminar in Rhetoric.....	Sr., grad.	See note
		2-4 Th	302F	Thomas

80a,b. TEACHERS' COURSE. Methods of teaching English in high schools. Course of study, textbooks, and equipment; visits to high schools; theme-correcting. Open to juniors, seniors, graduates, qualifying for a major recommendation in English. Credit only in Education. INGLIS.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 74-76.

ROMANCE LANGUAGES

Professors EVERETT W. OLMSTED, COLBERT SEARLES; Assistant Professors FRANCIS B. BARTON, JULES FRELIN, RUTH S. PHELPS, EDWARD H. SIRICH; Instructors HARRY E. ATWOOD, GEORGE S. BARNUM, PEDRO HENRÍQUEZ UREÑA, WILLIAM D. MAYNARD; Teaching Fellows HERBERT CLEFTON, ENRIQUE JIMÉNEZ, CHARLES MILLER.

REQUIREMENTS OF THE DEPARTMENT

For B.A. with Honors, general requirements; a reading knowledge of Latin or German with two years work in Spanish or Italian. In the Junior year, Courses 61-62, 63-64, 75-76, 101-102; in the Senior year, Courses 103-104, 107-108, 109-110, 115-116 (or 117-118). Substitutions for these courses may be granted by the Department in special cases. Alternation of courses required in the Junior and Senior years is allowable.

For Major Recommendation for Teacher's Certificate, in addition to Courses 1a and 3a, twenty-six credits.

For Minor Recommendation for Teacher's Certificate, in addition to Courses 1a and 3a, twelve credits in one Romance Language.

Prerequisite for Teachers' Course, in addition to Course 5-6, one Conversation-Composition Course and one Literary Course.

COURSES

No.	Credits	Title		Offered to	Prereq. courses
1a	6	Beginning French		All	None
		8	MTWThFS	201F	Maynard
		9	MTWThFS	201F	Frelin, Atwood, Sirich
		10	MTWThFS	227F	Searles, Clefton
		11	MTWThFS	226F	Barnum, Miller
1b	6	Beginning French		All	None
		10	MTWThFS	205F	Atwood
		11	MTWThFS	227F	Frelin
2a	3	Beg. French (2nd half of 1a) (Not given in 1917-1918)		All	1 yr. H. S. French
		9	MWF		
3a	6	Intermed. French		All	1a or equiv.
		10	MTWThFS	205F	Barnum
		11	MTWThFS	25F	Frelin
3b	6	Intermed. French		All	1a or equiv.
		8	MTWThFS	201F	Maynard
		9	MTWThFS	201F	Frelin, Atwood, Sirich
		10	MTWThFS	227F	Searles, Clefton
		11	MTWThFS	226F	Barnum
4	6	Survey French Lit.		All	3a or equiv.
		9	MTWThFS	227F	Barnum
5-6	6	Survey Fr. Lit. (year course)		All	3a or equiv.
		9	TThS	202F	.....
		10	TThS	202F	Phelps
		11	TThS	5F	Atwood, Maynard
		2	MWF	15F	Barton
7-8	2	Element. French Convers.		All	3a or equiv.
		9	TTh	227F	Barton
		3	MW	227F	Frelin
9-10	2	Element. French Compos..		All	3a or equiv.
		9	S	227F	Barton
		3	F	227F	Frelin
31a	6	Beginning Spanish		All	None
		9	MTWThFS	301F	Maynard
		10	MTWThFS	25F	Henríquez
31b	6	Beginning Spanish		All	None
		10	MTWThFS	25F	Barton
33-34	6	Beginning Spanish (year course)		All	None
		8	TThS	202F	Barnum
		11	MWF	201F	Olmsted
		11	TThS	205F	Sirich
35a	6	Intermed. Spanish ..... See statement		All	31a or equiv.
35b	6	Intermed. Spanish		All	31a or equiv.
		9	MTWThFS	15F	Maynard
		10	MTWThFS	125F	Henríquez
37-38	6	Intermed. Span. (year course)		All	31a or equiv.
		10	TThS	201F	Sirich
39-40	6	Survey of Span. Lit. ...		All	35a or equiv.
		9	MWF	227F	Henríquez
41-42	2	Elemen. Spanish Convers.		All	35a or equiv.
		2	MW	226F	Jiménez

No.	Credits	Title	Offered to	Prereq. courses
43-44	2	Elemen. Spanish Compos.	All	35a or equiv.
		2 F	226F	Jiménez
51-52	6	Beginning Italian	All	None
		9 MWF	202F	Phelps
53-54	6	Represent. Italian Authors	Soph., jr., sr.	51-52 or equiv.
		11 TThS	201F	Phelps
61-62	2	Advanced French Convers.	Jr., sr.	7-8 or equiv.
		11 TTh	202F	LeCompte
63-64	2	Advanced Fr. Compos. ..	Jr., sr.	9-10 or equiv.
		11 S	202F	LeCompte
75-76	6	French Lit.: 19th Century	Soph.,† jr., sr.	5-6 or equiv.
		11 TThS	15F	Barton
101-102	6	French Lit.: 18th Century	Jr., sr., grad.	5-6 or equiv.
		11 MWF	202F	Searles
103-104	6	French Lit.: 17th Century	Jr., sr., grad.	5-6 or equiv.
		10 MWF	201F	Olmsted
105-106	6	French Lit.: 16th Century	Jr., sr., grad.	101-102; 103-104 or equiv.
		11 MWF	Seminar	Sirich
107-108	4	French Oral Diction.....	Jr., sr., grad.	61-62 or equiv.
		10 MW	202F	LeCompte
109-110	2	French Syntax	Jr., sr., grad.	63-64 or equiv.
		10 F	202F	LeCompte
111-112	4	Lectures in French.....	Jr., sr., grad.	5-6; 61-62 or equiv.
		2 MW	201F	.....
113-114	4	Fr. Literature: Classicism	Sr., grad.	103-104 or equiv.
		11 TTh	Seminar	Searles
115-116	4	French Lyric Poetry.....	Sr., grad.	103-104 or equiv.
		(Not given in 1917-18)		
117-118	4	French Dramatic Lit. ...	Sr., grad.	103-104 or equiv.
		10 TTh	Seminar	Olmsted
131-132	2	Advanced Span. Convers.	Jr., sr., grad.	41-42 or equiv.
		2 MW	227F	Henríquez
133-134	2	Adv. Spanish Compos. ..	Jr., sr., grad.	43-44 or equiv.
		2 F	227F	Henríquez
135-136	2	Spanish Novel		
		(Not given in 1917-18)		
137-138	..	Spanish Literature 19th Century		
		(Not given in 1917-18)		
147-148	4	Spanish Lectures	Jr., sr., grad.	41-42; 43-44; or equiv.
		3 MW	201F	Henríquez
151-152	4	Dante, Petrarch, Boccaccio	Jr., sr., grad.	51-52 or equiv. and either 53-54; 5-6 or English 1
		2 MW	202F	Phelps
153-154	2	Dante, (In English).....	Jr., sr., grad.	Hist. 1-2 and either Engl. 1 or Fr. 5-6. Prereq. for persons taking in addition Course 151-152 same as listed for 151-152
		2 F	202F	Phelps
161-162	2	Teachers' Course	Jr., sr., grad.	See above
		2 Th	201F	Barton, et al.

† Who have had the five years' preparation required.

NOTE: Course 7-8 may be taken only with 9-10. 9-10 may be taken separately. Course 41-42 may be taken only with 43-44. 43-44 may be taken separately. Course

61-62 may be taken only with 63-64. 63-64 may be taken separately. Course 151-152 may be taken only with 153-154. 153-154 may be taken separately. Courses 1, 3, 31, 35, 4, are double courses. Students are advised to take Course 75-76 as a natural preparation for Courses 101-102 and 103-104. Permission to register for courses from 75-76 to 161-162 inclusive may be granted by the department in special cases. Both semesters of any year course must be completed before credit is allowed for the first semester. The preceding statement applies also to Courses 1a and 3b for freshmen and Courses 31a and 35b for freshmen.

161-162. TEACHERS' COURSE. Lectures and discussions on methods, text-books, etc. BARTON, et al.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 77-79.

SCANDINAVIAN

Professors GISLE BOTHNE, ANDREW A. STOMBERG.

REQUIREMENTS OF THE DEPARTMENT

For a Minor, twelve credits, not including Courses 1 and 5.

For a Major, twenty-four credits.

For B.A. with Honors, the general requirements, and six credits of Scandinavian in addition to what is required for a major.

COURSES

No.	Credits	Title	Offered to	Prereq. courses
1	6‡	Beginning Norwegian.....	All	None
		8 MTWThFS	206F ¶	
2	6‡	Intermediate Norwegian...	All	1
		8 MTWThFS	206F ¶	
3-4	6†	Advanced Norwegian	Soph., jr., sr.	2
		9 TThS	110F	Bothne
5	6‡	Beginning Swedish.....	All	None
		9 MTWThFS	206F	Stomberg
6	6‡	Intermediate Swedish.....	All	5
		9 MTWThFS	206F	Stomberg
7-8	6	Advanced Swedish	Soph., jr., sr.	6
		8 MWF	205F	Stomberg
9	2	Beginning Norwegian	See statement	None
10	2	Advanced Norwegian	See statement	9
11-12	4	Norwegian Literature	See statement	10
		4, 5 T	206F	Bothne
13-14	6	History of North. Europe.	Soph., jr., sr.	Consult department
		11 MWF	206F	Stomberg
101-102	6	Modern Norwegian Lit. ...	Jr., sr., grad.	3-4
		10 TThS	206F	Bothne
103	3	Earlier Norwegian Lit. ...	Sr., grad.	101-102
		11 TThS	206F	Bothne
104	2	Henrik Ibsen	Sr., grad.	101-102
		11 TTh	206F	Bothne
107-108	6	Swedish Literature	Jr., sr., grad.	7-8
		2 MWF	206F	Stomberg

† Both semesters must be completed before credit is given for the first semester.

‡ Freshmen must complete intermediate course before credit is given for beginning course.

No.	Credits	Title	Offered to	Prereq. courses
109	2	Strindberg	Sr., grad.	107-108
		Ar Ar	206F	Stomberg
110	2	Teachers' Course in Norwegian	Sr., grad.	3-4
		4 & 5 Th	206F	Bothne
113-114	4	Old Norse (Icelandic) ...	Sr., grad.	See statement
		Ar Ar	206F	Bothne
116	2	Teachers' Course in Swedish	Sr., grad.	7-8
		Ar Ar	206F	Stomberg

110. TEACHERS' COURSE IN NORWEGIAN. For students who expect to teach Norwegian in the high schools. BOTHNE.

116. TEACHERS' COURSE IN SWEDISH. For students who expect to teach Swedish in the high schools. STOMBERG.

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 79-80.

SOCIOLOGY AND ANTHROPOLOGY

Professors ALBERT ERNEST JENKS, ARTHUR J. TODD; Associate Professor LOUIS L. BERNARD; Assistant Professor HENRY T. MOORE; Lecturers FRANK J. BRUNO, OTTO W. DAVIS, ARTHUR H. TAYLOR; Superintendents of State Board of Control Institutions.

REQUIREMENTS OF THE DEPARTMENT

For a Minor, twelve credits.

For a Major, twenty-four credits.

For B.A. with Hnoors, see general requirements.

For Recommendation for Teaching, credits in the following courses: 1, 4, 6, and two advanced courses.

Modern university education is not complete unless the graduate has obtained the social point of view. To this end the department offers elementary courses dealing with peoples, with social forces, institutions, and movements. Its more advanced courses are designed especially for students majoring in the Social Sciences; namely, Sociology and Anthropology, Economics, History, and Political Science.

COURSES

No.	Credits	Title	Offered to	Prereq. courses
		Introductory Courses		
1a	3	General Introduction	Soph., jr., sr.	None
		8 MWF	203He	Bernard
		10 MWF	9F	Jenks
		10 TThS	9F	Todd
		2 MWF	301F	Bernard
1b	3	2 MWF	301F	Bernard
4	3	Cultural Anthropology ...	Soph., jr., sr.	1
		10 MWF	9F	Jenks

No.	Credits	Title	Offered to	Prereq. courses
6	3	Social Reform Movements.	Soph., jr., sr.	1
		10 TThS	9F	Todd
		General Courses		
51	3	Treatment of Dependents and Defectives	Jr., sr.	1, or 6
		8 TThS	9F	Bruno
52	3	Child Welfare	Jr., sr.	51
		8 TThS	9F	Taylor
53	3	Treatment of Delinquents.	Jr., sr., grad.	1 or 6 & Psychol. 1-2
		9 MWF	9F	Todd
55	2	Housing Problems	Jr., sr.	1 and 6
		8 MW	9F	Davis
14	3	Rural Community	Jr., sr.	1
		8 MWF	203He	Bernard
		Advanced Courses		
102a	3	Social Theory	Jr., sr., grad.	1, 9 or 10, & 1 other
		9 TThS	9F	Bernard
104	2	State Care of Dep., Def., and Delinquents	Jr., sr., grad.	51, and 52 or 53
		3, 4 F	9F	Todd and Supts.
107	3	Social Psychology	Jr., sr., grad.	See statement
		3 MWF	322F	Moore
110a	3	Physical Anthropology ...	Jr., sr., grad.	See bulletin statement
		2 MWF	9F	Jenks
112	3	American Negro	Jr., sr., grad.	1 and two others
		2 MWF	9F	Jenks
113	3	American People	Jr., sr., grad.	1 and two others
		11 MWF	9F	Jenks
114	3	American People (cont'd.).	Jr., sr., grad.	1, 113, and one other
		11 MWF	9F	Jenks
119	3	The Family	Jr., sr., grad.	9 credits
		11 TThS	9F	Todd
120	3	Social Progress	Sr., grad.	See bulletin statement
		11 TThS	9F	Todd
123-124	3 (each)	Seminar in Anthropology..	Sr., grad.	For sr. four correlated courses
		2, 3 Th	205Lib	Jenks
201-202	2 or Ar	Research in Sociology.....	Grad.	Graduate standing
		Ar Ar	Ar	Todd
204	Ar	Sem. in Anthropology.....	Grad.	Graduate standing
		Ar Ar	Ar	Jenks

All of the above courses receive credit in the College of Education. For description see College of Science, Literature, and the Arts bulletin, pages 80-83.

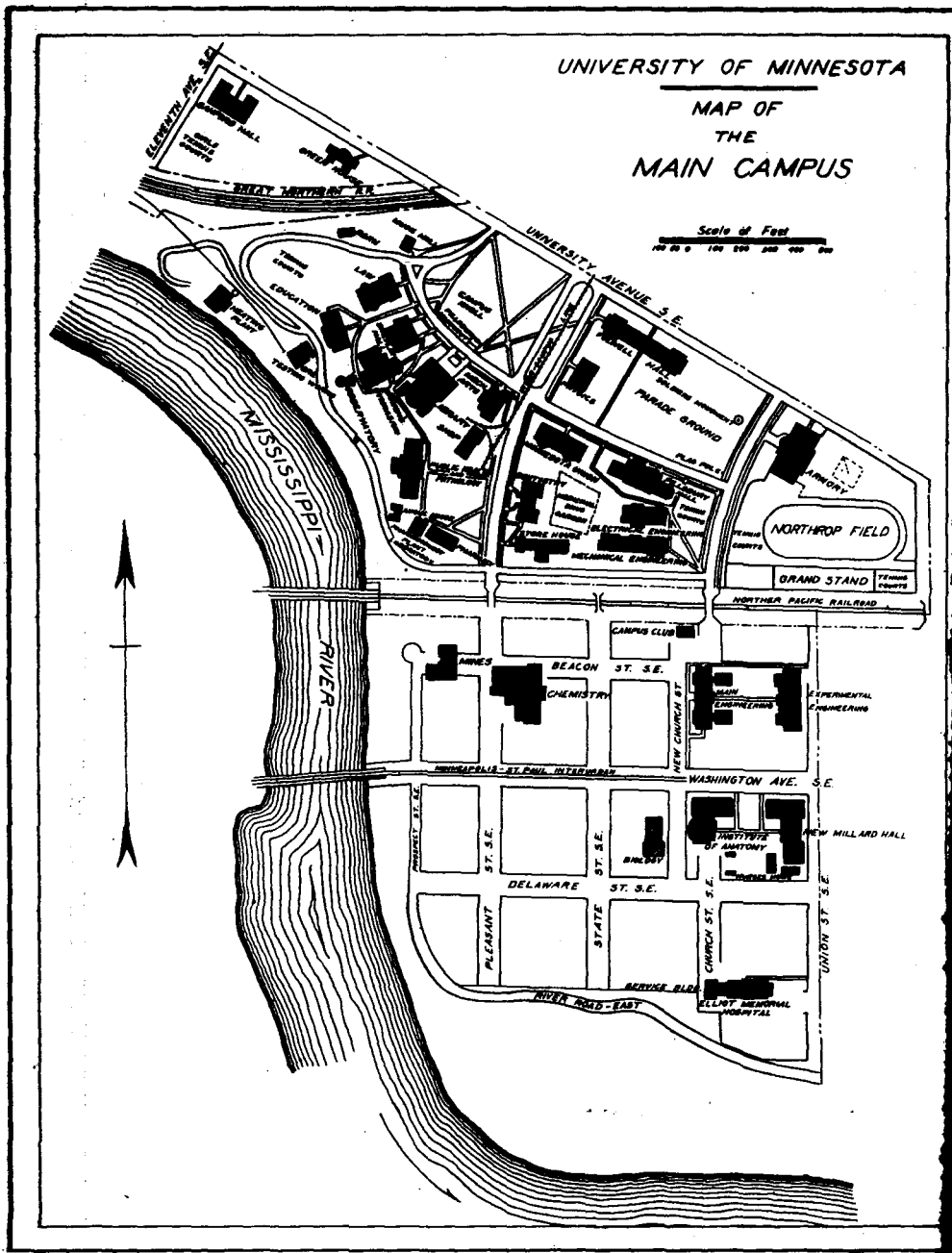
INDEX

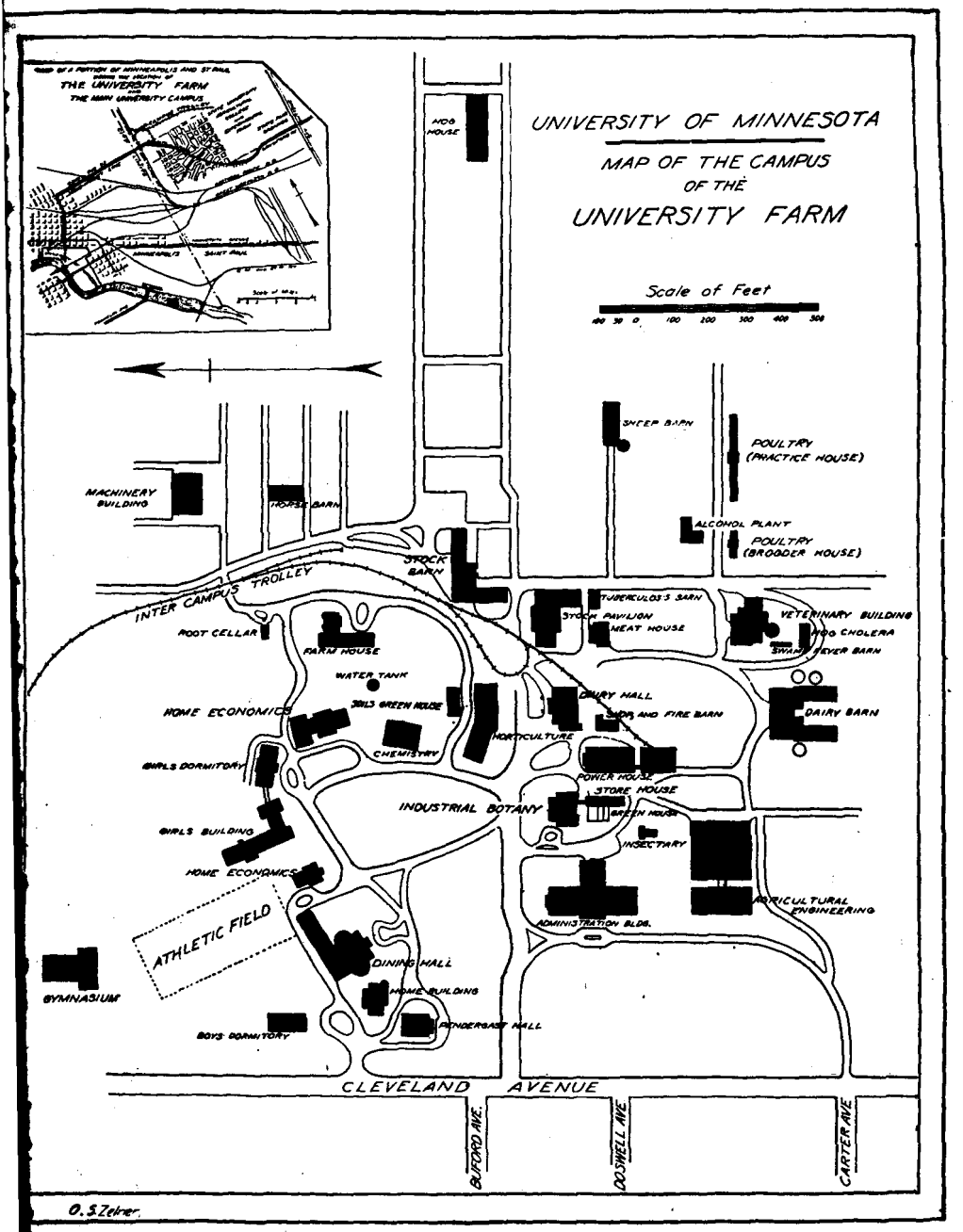
The Bulletin *of the* University *of* Minnesota

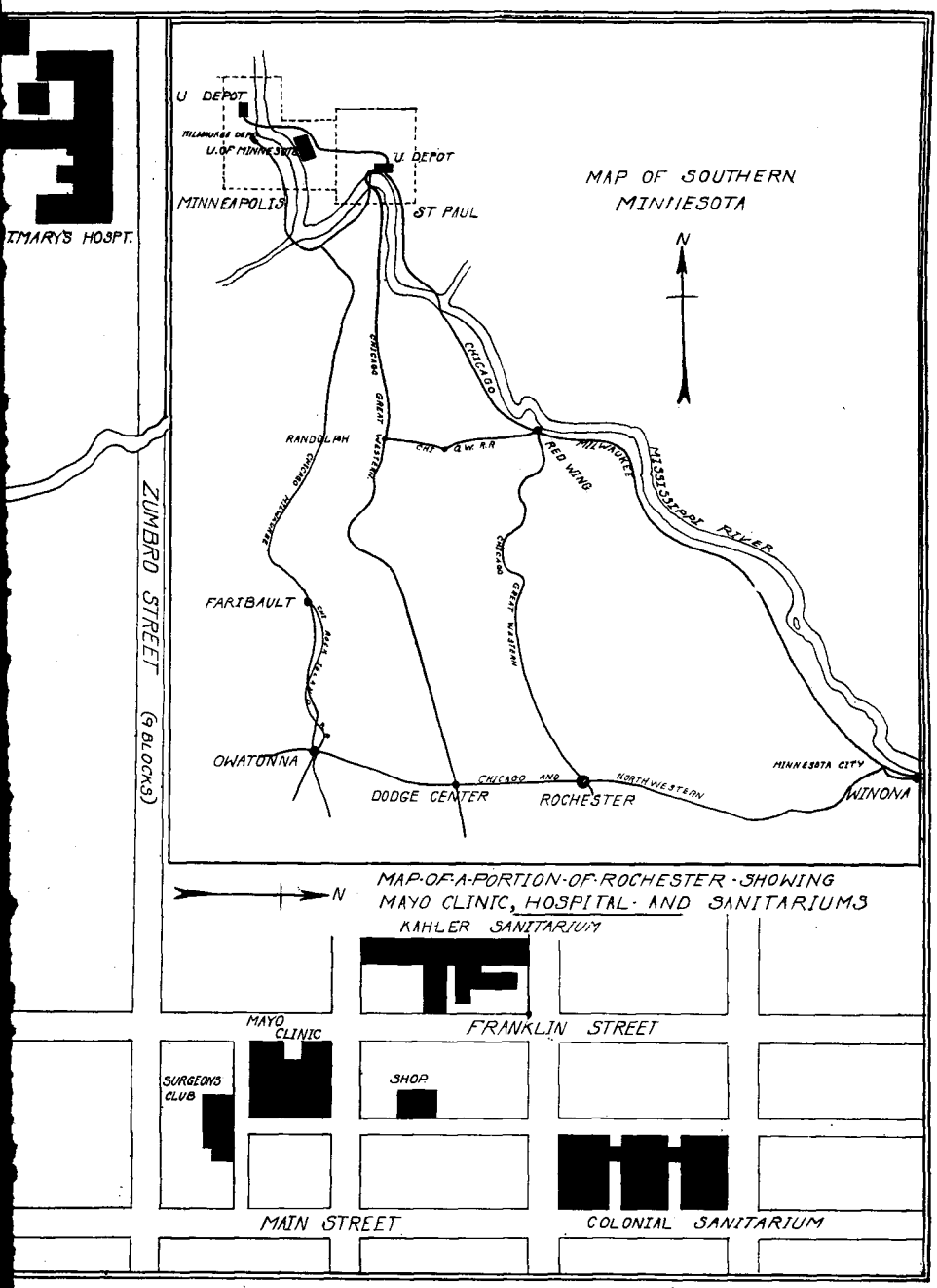
The Graduate School Announcement for the Year 1917-1918

Catalog Series No. 14
Vol. XX No. 43 September 22 1917

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


UNIVERSITY OF MINNESOTA
MAP OF
THE
MAIN CAMPUS
Scale of Feet
UNIVERSITY AVENUE S.E.
ELEVENTH AVE. S.E.
GREAT NORTHERN R.R.
MISSISSIPPI
RIVER
PARADE GROUND
NORTHROP FIELD
GRAND STAND
NORTHERN PACIFIC RAILROAD
CAMPUS CLUB
BEACON ST. S.E.
CHEMISTRY
MAIN ENGINEERING
EXPERIMENTAL ENGINEERING
NEW CHURCH ST.
MINNEAPOLIS - ST. PAUL INTERURBAN
WASHINGTON AVE. S.E.
NEW MILLARD HALL
INSTITUTE OF ANATOMY
BIOLOGY
DELAWARE ST. S.E.
PLEASANT
STATE
CHURCH ST. S.E.
UNION ST. S.E.
SERVICE BLDG.
ELLIOT MEMORIAL HOSPITAL
RIVER ROAD - EAST
ARMORY


UNIVERSITY OF MINNESOTA
MAP OF THE CAMPUS OF THE UNIVERSITY FARM
Scale of Feet
400 300 0 100 200 300 400 500
THE UNIVERSITY FARM
THE MAIN UNIVERSITY CAMPUS
MINNEAPOLIS
SAINT PAUL
HOG HOUSE
SHEEP BARN
POULTRY (PRACTICE HOUSE)
ALCOHOL PLANT
POULTRY (BROODER HOUSE)
MACHINERY BUILDING
HORSE BARN
STOCK BARN
INTER CAMPUS TROLLEY
TUBERCULOSIS BARN
STOCK PAVILION
MEAT HOUSE
VETERINARY BUILDING
HOG CHOLERA
SWAMP FEVER BARN
ROOT CELLAR
FARM HOUSE
WATER TANK
SOILS GREEN HOUSE
DAIRY HALL
SHOP AND FIRE BARN
DAIRY BARN
HOME ECONOMICS
CHEMISTRY
HORTICULTURE
GIRLS DORMITORY
POWER HOUSE
STORE HOUSE
INDUSTRIAL BOTANY
GREEN HOUSE
INSECTARY
GIRLS BUILDING
HOME ECONOMICS
AGRICULTURAL ENGINEERING
ADMINISTRATION BLDG.
ATHLETIC FIELD
DINING HALL
HOME BUILDING
GYMNASIUM
BOYS DORMITORY
VANDERBILT HALL
CLEVELAND AVENUE
BUFORD AVE.
DOSWELL AVE.
CARTER AVE.
O. S. Zehner


IMARY'S HOSPT.
ZUMBRO STREET (9 BLOCKS)
U DEPOT
MILWAUKEE DEPOT
U. OF MINNESOTA
U DEPOT
MINNEAPOLIS
ST PAUL
MAP OF SOUTHERN MINNESOTA
N
CHICAGO GREAT WESTERN
CHICAGO
RANDOLPH
CHI Q.W. R.R
RED WING
MILWAUKEE
MISSISSIPPI RIVER
CHICAGO GREAT WESTERN
CHICAGO
FARIBAULT
CHI MILW. ST. PAUL
OWATONNA
CHICAGO AND NORTHWESTERN
DODGE CENTER
ROCHESTER
MINNESOTA CITY
WINONA
N
MAP OF A PORTION OF ROCHESTER SHOWING
MAYO CLINIC, HOSPITAL AND SANITARIUMS
KAHLER SANITARIUM
FRANKLIN STREET
MAYO CLINIC
SURGEONS CLUB
SHOP
MAIN STREET
COLONIAL SANITARIUM

1917

JULY

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

AUGUST

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

SEPTEMBER

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

OCTOBER

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

NOVEMBER

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

DECEMBER

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

1918

JANUARY

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

FEBRUARY

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

MARCH

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

APRIL

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

MAY

Su	Mo	Tu	W	Th	Fr	Sa
..	..	..	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

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

JULY

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

AUGUST

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

SEPTEMBER

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

OCTOBER

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

NOVEMBER

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

DECEMBER

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

UNIVERSITY CALENDAR

(As applicable to the Graduate School)

1917-1918

1917			
October	2-9	Week	Registration of new students and payment of fees
October	10	Wednesday	First semester begins
October	20	Saturday	Last day for registration of graduate students without penalty
November	15	Thursday	Last day for filing at the Dean's office of all thesis subjects for the Master's degree
November	28	Wednesday	Thanksgiving recess begins 9:00 p.m.
December	3	Monday	Thanksgiving recess ends 8:00 a.m.
December	21	Friday	Christmas vacation begins 9:00 p.m.
1918			
January	2	Wednesday	Christmas vacation ends 8:00 a.m.
February	12	Tuesday	Lincoln's Birthday; a holiday
February	18	Monday	Second semester begins
February	28	Saturday	Last day for registration of graduate students without penalty
February	22	Friday	Washington's Birthday; a holiday
March	1	Friday	Last day for filing applications for the Shevlin Fellowships and Howard Scholarship and departmental scholarships
March	28	Thursday	Easter recess begins 9:00 p.m.
April	1	Monday	Easter recess ends 8:00 a.m.
May	1	Wednesday	Last day for filing at the Dean's office of three copies of completed Master's or Doctor's thesis
May	23	Thursday	Last day for written examinations in the field of the major of candidates for the Master's or Doctor's degree
May	30	Thursday	Memorial Day; a holiday
June	6	Thursday	Last day for final oral examination of candidates for the Master's or Doctor's degree
June	16	Sunday	Baccalaureate service
June	19	Wednesday	Alumni Day
June	20	Thursday	Forty-sixth Annual Commencement
June	24	Monday	Summer Session begins

THE GRADUATE SCHOOL

ORGANIZATION

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

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

ADMISSION

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

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

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

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

REGISTRATION

Full directions concerning registration will be found in a booklet issued by the Registrar's office for the information of new students.

FEES

All students taking full work in the Graduate School except those in clinical medicine and surgery are required to pay an incidental fee of

fifteen dollars a semester, or a proportionate fee for less work. The tuition fee for graduate work in medicine and surgery is twenty-five dollars a semester. Fellows, scholars, and members of the scientific and instructional staff in the University may register for graduate work in the regular session without payment of fees or tuition. The fees for graduate work in the summer session are stated in the summer session bulletin.

FELLOWSHIPS AND SCHOLARSHIPS

Four graduate fellowships have been established by the late Thomas H. Shevlin, of Minneapolis, each yielding $500 per annum. They are awarded annually. Candidates for these fellowships should file their applications before March 1 with the Dean of the Graduate School.

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

THE ALBERT HOWARD SCHOLARSHIP

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

CLASS OF 1890 FELLOWSHIP

On the twenty-fifth anniversary of its graduation the class of 1890 founded a fellowship yielding $150 and exemption from tuition. This fellowship is open to graduates of the Colleges of Science, Literature, and the Arts, and Engineering desiring to pursue advanced work. Applications should be filed with the Dean of the Graduate School before March 1.

DEPARTMENTAL SCHALARSHIPS

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

Other assistantships and teaching fellowships, some yielding as high as $600, are available, but the amount of work required is greater and the length of residence of the holder of one of these appointments would be increased proportionately.

Inquiries and requests for application blanks may be addressed to the Dean of the Graduate School, or to the Head of the Department in question.

GRADUATE WORK IN THE SUMMER

Work of graduate character done in the Summer Session of the University of Minnesota under a member of the Graduate Faculty may be

counted for residence credit for advanced degrees. The course work for the Master's degree may be completed in four summer sessions. The rest of the residence needed to cover the academic year of thirty-six weeks may be completed after the thesis is begun by registering early and remaining in residence working under direction after the Summer Session has closed. Students working for the Master's degree in Summer Sessions must file the subjects of their theses before the completion of the first half of the required work.

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

Students who intend to offer work in the summer for an advanced degree should register for purposes of record with the Dean of the Graduate School.

Members of the Graduate Faculty may, with the approval of the Dean, offer summer work for graduate students apart from the work regularly listed in the Summer Session bulletin. Students taking such properly authorized summer work may be allowed by the Executive Committee to substitute it for an equal amount of residence during the academic year.

GRADUATE WORK IN MEDICINE

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

WORK IN THE LAW SCHOOL

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

CHARACTER OF GRADUATE WORK

In general it should be noted that graduate courses are intensive in character and require more of the student's time than do undergraduate courses with corresponding credits.

Special prerequisites necessary for entrance to the various courses and also any special requirements for majors or minors, will be noted under the corresponding departmental statements in the bulletin of the

Graduate School. In all cases, the undergraduate work must be sufficient in quantity and quality to prepare the students for the desired graduate work.

No work done "in absentia" will be accepted unless approved by the Executive Committee of the Graduate School.

REQUIREMENTS FOR THE MASTER'S DEGREE

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

The requirements for the degrees of Master of Arts or Master of Science are covered in general by the statement that these degrees may be earned by properly qualified students only by at least one full academic year's work in residence at this University. Students who have not adequate preparation in the specific chosen field of work, or who are doing outside work in excess of ten hours a week, will be required to devote more than one year to attain the Master's degree.

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

Program of study.—The work for the year must cover the necessary courses in the fields of the major and minor and the preparation of a satisfactory thesis. The work must be selected from graduate courses offered in this bulletin and amounting, as a rule, to not less than six or more than nine credit hours each semester, in addition to thesis work. The usual study list of a candidate for the Master's degree will include one course in the minor, two courses in the major, and the thesis (or course work upon which the thesis is based).

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

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

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

The Executive Committee of the Graduate Faculty may in exceptional cases allow the minor subject to be taken in the same department as that of the major.

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

Approval of candidacy.—At the beginning of the second semester, properly qualified candidates, whose thesis subjects have been approved by the corresponding group committees, will be approved as candidates by vote of the Executive Committee of the Graduate School.

The Master's thesis.—Before the fifteenth of November the candidate should file at the office of the Graduate School the subject of his thesis. This subject must be approved by his adviser and by the corresponding group committee. It should be on a topic falling within the field of the major. It is expected that the candidate will devote approximately one half his time to the preparation of this thesis. The thesis must be written in acceptable English and show ability to work independently, and give evidence of power of independent thought both in perceiving problems and making satisfactory progress toward their solution. Familiarity with the bibliography of the special field and correct citation of authorities are expected.

The thesis is required to be in triplicate in order to facilitate its consideration. One copy must be upon the specially required linen stock and the other two may be carbon copies on cheap paper. Samples in the Dean's office of both the linen stock and carbon paper should be examined before the thesis is typewritten. The body of the thesis should be double spaced, but foot-notes may be single spaced.

The thesis must be finished and three copies deposited in the office of the Dean of the Graduate School by the first of May of the year in which he presents himself as a candidate for the degree.

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

If the thesis is accepted, the candidate must deposit with the Registrar, at least one week before Commencement, the sum of one dollar for binding one copy of the thesis, which will be cataloged and deposited in the University Library.

Examinations.—All candidates for this degree will meet the regular requirements as to examinations, topics, reports, etc., of the classes in

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

The final written examination will be held not later than four weeks before Commencement. It will cover the work of the candidate in the field of the major, and may include any work fundamental thereto. This examination will be held by the members of the Graduate Faculty in the major department, the adviser acting as chairman.

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

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

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

Candidates meeting the requirements as above outlined will be reported by the Dean to the Graduate Faculty, who will by vote recommend to the Board of Regents those approved for degrees.

Candidates upon whom degrees are to be conferred are required to be present at Commencement, unless especially excused by the Dean of the Graduate School and the President of the University.

TABULAR SUMMARY OF REQUIREMENTS FOR THE MASTER'S DEGREE

Work	Under the Direction of	Date
Program, Major and Minor	Adviser and Dean of the Graduate School.	On entrance.
Approval of thesis subject	Adviser and Group Committee....	November 15.
Language requirement....	Adviser and language department..	Before close of first semester.
Approval of candidacy....	Executive Committee.....	Beginning of second semester.
Filing of thesis.....	Dean of the Graduate School.....	May 1.
Examination of thesis.....	Thesis Committee.....	Before admission to final oral examination.
Final written examination in major.	Major department members of the Graduate Faculty.	Not later than four weeks before Commencement and before final oral.
Final oral examination on all work.	Thesis Committee; all instructors; head of major department.	Not later than two weeks before Commencement.
(Course examinations as required at the usual time).		
Fee for binding thesis.....	Registrar.....	One week before Commencement.

DOCTOR'S DEGREE

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

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

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

PROGRAM OF WORK

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

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

Second and third years.—Before beginning the work of the second year, the student shall submit to his adviser and the group committee for approval a tentative outline of his work for the second and third years, including both the major and minor subjects. This program is then to be submitted to the Dean for final approval.

Language requirements.—Before admission to the preliminary examination, the student must present to the Dean of the Graduate School statements from the French and German departments, certifying that the applicant has a reading knowledge of those languages. In addition, a knowledge of other languages may be required in certain cases, as the candidate's major department may prescribe.

THE MAJOR WORK

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

During the period of work for the Doctor's degree a student shall spend not less than two thirds of his time* on the major subject, including the work on the thesis. During the last two years, he shall carry an average of at least one course per semester in his major outside the work from which his thesis is to come.

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

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

THE MINOR WORK

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

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

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

* In estimating the distribution of time, a week of fifteen credit hours may be assumed.

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

THESIS

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

Not later than May 1, the student shall deposit at the Dean's office his thesis, typewritten, in triplicate copy to facilitate reading by the Thesis Committee. No special size or form is required since it is to be printed subsequently.

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

Printing of the thesis.—If the thesis be accepted, the student shall deposit with the Registrar, not later than one week before Commencement, a sufficient bond or such sum of money as will be required to print 100 copies of the thesis for the use of the University and as many additional copies as the candidate may require for himself. If the thesis is to be published elsewhere, reprints will be acceptable, if bound with covers in the special form required by the University.

EXAMINATIONS

Language.—The examination in German and French will be conducted, on application of the student, by a member of the language department concerned, with the coöperation of the student's adviser. The purpose of this examination is to demonstrate that the student possesses a satisfactory reading knowledge of the language in the field of his major work.

Preliminary.—At least one calendar year before the degree is conferred, a preliminary examination of the student shall be given by a committee consisting of the student's adviser as chairman, a representative of the group committee other than his adviser, and all members of the Graduate Faculty in his major and minor departments. Certificates of the proficiency in French and German and completion of the minor and the recommendation of the major department shall be required before admission to this examination. The examination shall cover graduate work previously taken by the student, and may include any work fundamental thereto. This examination shall be in addition to the usual course examinations. Only after the successful completion of this examination may the student be enrolled as a candidate for the

Doctor's degree. Students failing to pass this preliminary examination shall not be reëxamined until at least one semester has passed.

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

Final oral.—After successful completion of the written examination and acceptance of the thesis and not less than two weeks before Commencement, the final oral examination shall be given. This examination shall be conducted by a committee consisting of the adviser as chairman, of a majority of the members of the Graduate Faculty of the department in which the major work was done and at least three other members of the Graduate Faculty appointed by the Dean. At least one member of this committee shall be from a group other than the one in which the major department is included. This examination is to cover the field of knowledge represented by the major work and shall not exceed three hours.

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

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

Candidates meeting the requirements as above outlined will be reported by the Dean to the Graduate Faculty, who will by vote recommend to the Board of Regents those approved for degrees.

Candidates upon whom degrees are to be conferred are required to be present at Commencement, unless especially excused by the Dean of the Graduate School and the President of the University.

TABULAR SUMMARY OF REQUIREMENTS FOR THE DOCTOR'S DEGREE

Work	Under Direction of	Date
First Year		
Major	Adviser and Dean of Graduate School	
Minor		
Second Year		
Tentative program of entire second and third year's work.	Adviser, Group Committee and Dean of Graduate School.	Before beginning work of second year.
Major including thesis	As for tentative program	
Minor	Adviser and minor department	Before admission to preliminary examination.
Language	Adviser and language department.	
Recommendation	By major department	
Preliminary Examination	Special Committee	One calendar year before degree is to be conferred.
Third Year		
Major, including thesis	Adviser, Group Committee and Dean of Graduate School.	
Filing of thesis	Dean	May 1.
Examination of thesis	Thesis Committee	Before admission to final oral examination.
Final written examination	Major Department members of the Graduate Faculty.	Four weeks before Commencement and before final oral examination.
Final oral examination	Adviser, majority of members of major department and other members appointed by Dean of Graduate School.	Not later than two weeks before Commencement.
Bond for publication of thesis.	Registrar	Not later than one week before Commencement.

DEPARTMENTAL STATEMENTS

AGRICULTURAL BIOCHEMISTRY

Professor Ross Aiken Gortner; Associate Professor Clyde H. Bailey, Assistant Professor John J. Willaman.

Prerequisites.—For major work, a minimum of six credits each in general chemistry and qualitative analysis, in organic chemistry, and in quantitative analysis; twelve credits in biological science, and four credits in college physics. For minor work, six credits in general chemistry and qualitative analysis, three credits in organic chemistry, and twelve credits in biological science.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

105. Detection of Adulteration of Foods and Feeding Stuffs. The use of proximate analyses and special tests for the determination of quality and the detection of adulteration of foods and feeds. Includes chemical and microscopical examinations. Prerequisite: Quantitative analysis. Three credits. Willaman.

106. Agricultural Products and By-Products. The composition of the principal products and by-products of agriculture and their utilization as raw material in various industries, and the methods of chemical control work in these industries. Three credits. Bailey.

108. Chemistry of Wheat and Wheat Products. A lecture course, with collateral library reference work, on the chemical technology of the production and milling of wheat and the conversion of its products into human food. Two credits. Bailey.

110. Flour Laboratory Methods. A laboratory course in the methods of analyses of wheat and its products; milling tests of wheat; and baking and special tests of flour. Prerequisite: quantitative analysis; parallel course, 108. Three credits. Bailey.

111. Phytochemistry. An advanced course in the chemistry of fats, carbohydrates, tannins, proteins, enzymes, and colloids, and their relation to the vital processes involved in plant growth and nutrition. Prerequisite: organic chemistry; two years of biology. Three credits. Morrow.

113. Biochemical Laboratory Methods. Special methods of examination of plant and animal tissues for particular fats, carbohydrates, proteins, and enzymes. Prerequisite: quantitative analysis; parallel course 111. Two credits. Morrow.

114. Laboratory Problems in Biochemistry. Special laboratory work in the preparation or isolation of pure compounds which occur in

living cells, in the study of biochemical reactions, or in special methods of identification or determination of biochemical products. Prerequisite: course 111. Three or five credits. GORTNER.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. SEMINAR. Regular meetings for the discussion of methods of research, formulation of research problems, and reviews of current literature. One credit. GORTNER.

203-204. RESEARCH PROBLEMS. Special work on particular research problems other than the student's major thesis. Facilities are provided for biochemical investigations and for advanced studies in plant, animal, or human nutrition. Three or five credits. GORTNER, or .....

205. SPECIAL TOPICS IN BIOCHEMICAL LITERATURE. Library work followed by the preparation of written reports upon either the historical development of biochemical researches or the current literature of special biochemical problems, with practice in abstracting, indexing and reviewing literature references. A reading knowledge of German is necessary and of French desirable. Prerequisites: course 206, 207, or 208. Three credits, either semester. GORTNER.

206. COLLOIDS. An advanced study of the colloidal condition, of the preparation and properties of colloidal solutions, and the relation of these to biochemical properties. (Offered in alternate years; offered in 1917-18). Prerequisite: course 111; physical chemistry, advised. Three credits. GORTNER.

207. ENZYMES. An advanced study of the nature of enzyme action including methods of preparation and investigation of enzymes, their physical and chemical properties and their method of action. Prerequisite: course 111. Three credits. This course will be replaced by course 208 in the first semester of 1917-18. GORTNER.

208. PROTEINS. A detailed study of the composition, structure, biochemical reactions and functions of the proteins and amino acids, with special emphasis upon those which are concerned in plant growth and metabolism, animal foods, and industrial processes. (Offered in alternate years. This course replaces 207 in the first semester of 1917-18). Prerequisite: course 111. Three credits. GORTNER.

209-210. THE CHEMISTRY OF PLANT PROTOPLASM. A biochemical and microchemical study of the constituents of protoplasm, of the chemical organization of the cell and of the chemical reactions and colloidal phenomena which govern cell activities. (Not offered in 1917-18). Prerequisites: courses 206, 207 and 208. Six credits. WILLAMAN.

AGRICULTURAL EDUCATION

Professor ASHLEY V. STORM; Associate Professor WILBUR H. BENDER; Assistant Professor WILLIAM F. LUSK.

Prerequisite.—For major or minor work, fifteen credits in Agricultural Education and preparation in agricultural subjects satisfactory to the Graduate Committee of the Department of Agriculture. Exemption from the language requirement for the Master's degree may be made in individual cases.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

131a,b. METHODS IN TEACHING HIGH-SCHOOL AGRICULTURE. Method in teaching as distinctly related to teaching agriculture in the high school. Organization of subject matter, and the selection and manipulation of devices. Classroom and laboratory method. Specific plans for teaching secondary agriculture. Three credits. BENDER.

141a,b. TEACHING. Observation of regular classes; interpretation of class practices; preparation of lesson plans and actual teaching of classes under careful supervision in recitation and laboratory; criticism and discussion of plans, methods, and results of student's teaching. Three credits. BENDER, LUSK, STORM.

151a,b. ORGANIZATION AND MANAGEMENT. Organization and management of work in secondary schools, particularly of Minnesota, with special reference to agricultural work, courses of study, programs, equipment, laboratory and class management, extension work, plots and coördination of work. Three credits. STORM.

PRIMARILY FOR GRADUATES

221a. GRADUATE PROBLEMS. Making investigations, gathering data and formulating plans regarding agricultural education. Three credits. STORM, BENDER.

AGRICULTURAL ENGINEERING

Professor JOHN T. STEWART.

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

PRIMARILY FOR GRADUATE STUDENTS

202. SPECIAL PROBLEMS. Open to graduates of Engineering and Agricultural Colleges. Investigation, collection of data, and compilation of facts, relating to various problems of engineering applied to agriculture. Offered to students having necessary preparation for line of work desired. Three credits. STEWART.

AGRONOMY AND FARM MANAGEMENT

Professor ANDREW BOSS; Associate Professor HERBERT K. HAYES; Assistant Professor MAXWELL J. DORSEY.

Prerequisites.—In Farm Crops and Plant Breeding, for major work, courses 103, 106, and 107 or their equivalents, and a reading knowledge of German. For minor work, two years of botany, one year of zoology, and the elementary courses in farm crops.

In Farm Management, for major work, courses 102 and 105 or their equivalents, and at least six credits in elementary and agricultural economics. For minor work, at least twelve credits in elementary agricultural sciences (as Farm Crops I, Soils 3 and 4, Animal Husbandry 3 and 7). Exemption from the language requirement for the Master's degree may be made in individual cases.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

102. FARM MANAGEMENT II. A course in which the business side of farming is emphasized. Special attention is given to farm organization, equipment, and operation. Three credits. Boss.

103. PRINCIPLES OF GENETICS. A course of lectures designed to familiarize the student with the underlying principles of breeding. Heredity, variation, and evolution are emphasized. Three credits. HAYES, DORSEY.

105. FARM MANAGEMENT PROBLEMS. An advanced course, including a study of farm practices, farm equipment, cost of production, and efficiency of labor. Three credits. Boss.

106. PLANT BREEDING. A course which emphasizes the practical side of plant breeding. The method of breeding each of the important crops is studied separately, with attention to experiment station investigations and to methods used by plant breeders. Three credits. HAYES, DORSEY.

107. FARM CROPS II. A systematic study of the form and structure of the entire plants of the cereal, forage, fibre, and root crops adapted to the North Central states. Three credits. Boss.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. ADVANCED PLANT BREEDING. Research problems in plant breeding with opportunities for original investigation. HAYES.

203-204. GENETICS SEMINAR. A discussion of the broader genetic problems, applied biology, and the recent advances in genetic work. Weekly meetings throughout the year. HAYES, DORSEY.

205-206. ADVANCED FARM MANAGEMENT. Research problems in organization and operation of large farm enterprises. BOSS.

207-208. FARM MANAGEMENT SURVEYS. Research work in farm management surveys of a certain territory, or of special types of farming. BOSS.

209-210. Research problems in farm crops. BOSS.

ANATOMY

Professors CLARENCE M. JACKSON, JOHN B. JOHNSTON, THOMAS G. LEE, RICHARD E. SCAMMON.

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

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

For the description of courses, see the special bulletin on Graduate Work in Medicine.

ANIMAL BIOLOGY

Professors HENRY F. NACHTRIEB, HAL DOWNEY, JOHN B. JOHNSTON, CHARLES P. SIGERFOOS; Assistant Professors ELMER J. LUND, OSCAR W. OESTLUND; Instructor CHARLES E. JOHNSON.

Prerequisites.—For major work, course 1-2 and twelve credits of advanced work approved by the department; for minor work, course 1-2 or the equivalent.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101-102. ADVANCED ENTOMOLOGY. Advanced work in the ecology and taxonomy of insects. Lectures, laboratory, and field work. Prerequisite: Animal Biology 23-24. Six credits. OESTLUND.

117-118. MAMMALOGY. Structures and classification of North American mammals. The mammalian skeleton; its modifications; consideration of our domestic animals; dissection of a typical mammal. Classification, natural history and geographic distribution with special reference to Minnesota mammals. JOHNSON.

119-120. VERTEBRATE HISTOLOGY. Primarily advanced work on vertebrate tissues. Conference, reference, and laboratory work. Pre-

requisites: Animal Biology 7-8; Human Anatomy 112. Six credits. DOWNEY.

123-124. BLOOD OF VERTEBRATES. A comparative study of blood and blood-forming organs of vertebrates. A portion of the time is devoted to research. Prerequisites: Animal Biology 131-132 or Human Anatomy 102. Six or twelve credits. DOWNEY.

131-132. EMBRYOLOGY. A brief survey of general embryology and the organogeny of the vertebrates with special reference to the circulatory system. Conference, reference, and laboratory work with Kellicott's *General Embryology*, and *Outlines of Chordate Development* as texts. Prerequisites: Animal Biology, 7-8. Six credits. NACHTRIEB.

143-144. GENETICS AND EUGENICS. Facts and theories of heredity and the application of the laws governing natural inheritances for the improvement of a race. Lectures, reference, conference, and laboratory work. Prerequisites: Animal Biology 7-8, 15-16. Six credits. NACHTRIEB.

161-162. PROBLEMS. Advanced work in some special line. DOWNEY, JOHNSON, JOHNSTON, LUND, NACHTRIEB, OESTLUND, SIGERFOOS.

COURSES FOR GRADUATE STUDENTS

Schedule for advanced graduate work is to be arranged with the instructor in charge of the line of work to be pursued.

201-202. RESEARCH IN ENTOMOLOGY. OESTLUND.

215-216. RESEARCH ON THE MORPHOLOGY OF VERTEBRATES. JOHNSON.

217-218. RESEARCH ON THE GROSS AND MICROSCOPIC ANATOMY OF THE GANOIDS. NACHTRIEB.

219-220. RESEARCH IN ANIMAL HISTOLOGY. DOWNEY.

221-222. RESEARCH ON VERTEBRATE CONNECTIVE TISSUE. With special reference to the cellular elements. DOWNEY.

223-224. RESEARCH IN VERTEBRATE HEMATOLOGY. DOWNEY.

237-238. RESEARCH IN VERTEBRATE EMBRYOLOGY. NACHTRIEB.

[illegible] COMPARATIVE NEUROLOGY. A study of the structure and [illegible] of the nervous system of vertebrate animals and of the [illegible] of the chief nervous mechanisms. Prerequisite: two years [illegible] comparative or human anatomy. Six credits. JOHNSTON.

243-244. RESEARCH IN NEUROLOGY. JOHNSTON.

249-250. GENERAL PHYSIOLOGY. Chemical and physical composition of cells, and their environments. Interpretation of nutrition, secretion, enzyme action, permeability, stimulation, cell division, growth, regeneration, acclimatization from the viewpoint of the science of solution and energetics. LUND.

251-252. Research in the physiology of the lower organisms with special reference to the Protozoa. LUND.

ANIMAL HUSBANDRY

See Dairy and Animal Husbandry.

ANTHROPOLOGY

See Sociology and Anthropology

ASTRONOMY

Professor FRANCIS P. LEAVENWORTH; Assistant Astronomer WILLIAM O. BEAL.

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

Prerequisites:—For major work, course 51-52 and Mathematics 7 and 11; for minor work, Mathematics 7 and 11 and three credits in Astronomy.

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

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101-102. PRACTICAL ASTRONOMY. Theory and use of astronomical instruments in determining time, latitude, longitude, positions of heavenly bodies; astronomical photography, with measures of plates; study of method of least squares. Prerequisite: Mathematics 11. Three or six credits. LEAVENWORTH.

140. METHOD OF LEAST SQUARES. The combination and adjustment of observations and the discussion of their precision as applied especially to engineering physics, and astronomy. Mathematics 51. Two or three credits. LEAVENWORTH.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. ADVANCED PRACTICAL ASTRONOMY. Prerequisite: Astronomy 101-102. Three credits. LEAVENWORTH.

205-206. ASTROPHOTOGRAPHY. Photography of the heavenly bodies, measurement of plates, determination of positions, parallax, etc. Prerequisite: Astronomy 102. Three credits. LEAVENWORTH.

209-210. CALCULATION OF ORBITS. Prerequisite: Mathematics 51. Three credits. BEAL.

211-212. CELESTIAL MECHANICS. Prerequisite: Mathematics 51. Three credits. BEAL.

BACTERIOLOGY

See Pathology, Bacteriology, and Public Health.

BOTANY

Professors ..... CARL OTTO ROSENDAHL, JOSEPHINE E. TILDEN; Assistant Professors FREDERIC K. BUTTERS, HERBERT F. BERGMAN; Instructor WILLIAM S. COOPER.

Prerequisites.—For major work, twenty-four credits in botany; for minor work, two two-year courses, one introductory and one intermediate.

FOR ADVANCED UNDERGRADUATE AND GRADUATE STUDENTS

103. PLANT FOODSTUFFS AND TEXTILES. A special study of the botany of foods, textiles fibers and fabrics, together with an inquiry into the relation of plants to household processes and problems. For young women. Nine credits prerequisite. Three credits. TILDEN.

105-106. ALGAE. A detailed comparative study of the structure and classification of the algae, including an examination of the blue-green and green freshwater forms and the more important brown and red marine species. Nine credits prerequisite. Six credits. TILDEN.

107-108. COMPARATIVE MORPHOLOGY OF MOSSES AND FERNS. Designed for students who wish to pay special attention to the morphology and taxonomy of liverworts, mosses, and ferns. Lecture, laboratory, and field work. Prerequisite: nine credits, including Botany 2 or 3 or 5-6. Six credits. BUTTERS.

110. MORPHOLOGY AND TAXONOMY OF GYMNOSPERMS. A comparative study of cycads, conifers, and their allies, their structure and his-

tory with especial attention to the classification of living forms. Lectures, reference reading, and laboratory work. Prerequisites: Botany 7-8 or 107-108. Three credits. BUTTERS.

111-112. ADVANCED TAXONOMY. An advanced course in which special attention is given to the taxonomy of difficult natural groups, involving systematic principles and practice, rules of nomenclature, systems of classification, etc. Laboratory, field work, lectures, and quizzes. Prerequisite: Botany 7-8. Six credits. ROSENDAHL.

117-118. CYTOLOGY. A survey of cell structure and the various phenomena of division, fusion and metamorphosis, together with a review of the history of cytological investigation. Methods of cytological research indicated in the laboratory. Eighteen credits prerequisite. Six credits. ROSENDAHL.

119-120. ADVANCED INDUSTRIAL BOTANY. A study of the origin, distribution and cultivation of plants yielding products of economic value, the nature and uses of these products, and the processes by which they are obtained from the plants. Prerequisite: Botany 11-12. Six credits. TILDEN.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. RESEARCH PROBLEMS IN MORPHOLOGY. Research work may be pursued upon the morphology of vascular plants. Important literature and necessary material will be provided for whatever research is entered upon. ROSENDAHL, BUTTERS.

203-204. RESEARCH PROBLEMS IN TAXONOMY. The herbarium of 300,000 specimens of vascular plants offers facilities for monographic work, especially on the plants of temperate North America, and problems in plant geography in the same region. ROSENDAHL.

205-206. RESEARCH PROBLEMS IN ALGOLOGY. Work on special groups or along following lines: fresh-water algae of Minnesota; algae of Minneapolis and St. Paul water supplies; hot spring algae; lime-depositing algae; marine algae, from Vancouver, Hawaiian Islands, Tahiti, New Zealand, Australia. TILDEN.

209-210. RESEARCH PROBLEMS IN CYTOLOGY AND EMBRYOLOGY. Research work may be taken along following lines: minute structure of cell; microchemistry of cell; development of sporangia and spores; fecundation; development of embryo; origin and development of primary tissues; development of organs, correlation, etc. ROSENDAHL.

211-212. RESEARCH PROBLEMS IN INDUSTRIAL BOTANY. Economic plant material from Tahiti, New Zealand, and Australia is avail-

able for original investigation. Certain important food and fiber plants of the tropics are in especial need of study. TILDEN.

CHEMISTRY

Professors GEORGE B. FRANKFORTER, CHARLES F. SIDENER; Associate Professors EVERHART P. HARDING, WILLIAM H. HUNTER; Assistant Professors IRA H. DERBY, FRANK H. MACDOUGALL, EDWARD E. NICHOLSON, STERLING TEMPLE; Instructors ROSS A. BAKER, LAWRENCE M. HENDERSON, EDWARD B. PECK, CARL L. SCHUMANN.

Prerequisites.—For major work, at least six credits in inorganic chemistry and qualitative analysis, and six credits in quantitative analysis or organic chemistry, this work to be equivalent to the work offered at the University of Minnesota. In addition, at least six credits must be offered in chemistry, physics, or college mathematics. The work presented as prerequisite must be satisfactory to the instructor with whom the student wishes to work.

Either course 139-140 or course 175-176 will be acceptable as a minor for the Master's degree, or for not more than one-half of a minor for the Doctor's degree.

Candidates for the Master's degree must have a reading knowledge of German or French. A knowledge of German will be of more advantage to the candidate.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

106. MINERAL AND ORE ANALYSIS. Theory and practice in accurate analysis of silicate rocks, and the rapid determination of certain constituents of ores. Prerequisite: Chemistry 11-12. Two credits. SIDENER.

107-108. ADVANCED QUANTITATIVE ANALYSIS. The work in this course will be adapted as far as possible to the needs and desires of the individual student. Prerequisite: Chemistry 11-12. Six credits. SIDENER.

109. WATER ANALYSIS. The course includes an exhaustive discussion of the chemical and sanitary properties of water. Prerequisite: Chemistry 11-12. One credit. FRANKFORTER.

113. GENERAL TOXICOLOGY. A discussion of the chemistry of the various poisonous compounds, both organic and inorganic; also methods of their isolation from animal tissue, together with tests for same. Prerequisite: Chemistry 35-36. Two credits. DERBY.

114. ORGANIC ANALYSIS. Practice in elementary analysis, determination of special groups, and identification of pure compounds. Prerequisite: Chemistry 35-36. Three credits. HUNTER.

115. ADVANCED ORGANIC CHEMISTRY. Selected topics: constitution work, quinones, etc.; the study of organic reactions. Prerequisite: Chemistry 35-36. Two credits. HUNTER.

116. THEORETICAL ORGANIC CHEMISTRY. This course will take up theories which apply especially to carbon compounds, such as relation of properties to constitution, carbon valence theory, etc. Prerequisite: Chemistry 35-36. Two credits. HUNTER.

117. THE COAL-TAR DYES. The chemistry of the coal-tar dyes and their intermediate products. Prerequisite: Chemistry 35-36. Two credits. FRANKFORTER.

118. THE CHEMISTRY OF THE ESSENTIAL OILS. A discussion of the constituents of the essentials oils, including the terpenes and perfumes. Prerequisite: Chemistry 35-36. Two credits. FRANKFORTER.

119. CHEMISTRY OF THE NEWER MEDICINAL COMPOUNDS. The course includes a discussion of the chemistry of synthetic organic substances which have medicinal properties. (Continued in Pharmacology second semester.) Prerequisite: Chemistry 35-36. Two credits. FRANKFORTER, HUNTER.

121-122. PHYSICAL CHEMISTRY. Consideration of theories and laws, phenomena and processes forming basis of chemical science. Charts, models, and experiments employed to supplement and illustrate discussions. Open only to those who have had or are taking course 35-36. Four credits. DERBY, MACDOUGALL.

123-124. PHYSICO-CHEMICAL LABORATORY PRACTICE. Physico-chemical methods and measurement. Open only to students pursuing course 121-122, or who have had it or its equivalent. Two credits. DERBY, MACDOUGALL.

125-126. ADVANCED PHYSICAL CHEMISTRY. Theories of chemistry treated systematically from the standpoint of thermo-dynamics and the molecular theory. Suited to the needs of candidates for the higher degrees and all others interested in the advances of modern physical chemistry. Prerequisite: Chemistry 121-122. Six credits. DERBY.

127. RADIOCHEMISTRY. The occurrence, methods of isolation and investigation, and physico-chemical properties of the radioactive substances, together with a brief consideration of the chemical, geological, and biological bearing of the subject. Prerequisite: Chemistry 7-8 or 11-12. Two credits. HENDERSON.

128. LABORATORY COURSE IN RADIOACTIVITY. To follow course 127. Two credits. HENDERSON.

129-130. ADVANCED PHYSICO-CHEMICAL LABORATORY. Advanced measurements in physical chemistry adapted to the desires and qualifications of the individual student. Assigned reading will accompany

the experimental work. Prerequisite: Chemistry 123-124. Three to six credits. DERBY, MACDOUGALL.

131. FOOD ANALYSIS. The course includes the chemical analysis of the various food products and the detection of the common adulterants. Prerequisite: Chemistry 11-12. Two credits. HARDING.

132. FOOD ANALYSIS. Continuation of course 131. Prerequisite: Chemistry 11-12. Two credits. HARDING.

134. MICROCHEMISTRY. This course includes the precipitation, examination, and identification of minute quantities of substances, and the examination of food materials, fibres, etc., by means of the microscope. Prerequisite: Chemistry 11-12. One credit. HARDING.

135. GAS AND COAL ANALYSIS. Course comprises methods of collecting and storing gases previous to their analysis; methods of manufacturing commercial gases; their chemical analysis, calorific and photometric determination; also ultimate and proximate analysis of coals and their calorific determination. Prerequisite: Chemistry 11-12. Two credits. HARDING.

137. PAINT ANALYSIS. This course comprises the quantitative separation of pigments and vehicles; a chemical and physical examination of the vehicles; and qualitative and quantitative analyses of the pigments. Prerequisite: Chemistry 11-12. Two credits. HARDING.

139-140. QUANTITATIVE ANALYSIS. Discussion of representative gravimetric and volumetric procedures used in the laboratory. The laboratory work includes the gravimetric analysis of a number of salts, minerals, ores, and alloys; volumetric precipitation methods, acidimetry, alkalimetry, oxidation and reduction. Other special work also required. Ten credits. SIDENER.

141. INDUSTRIAL CHEMISTRY. This course includes the discussion of methods and apparatus used in chemical technology, the testing of commercial chemical products, and excursions. Prerequisite: Chemistry 11-12. Three credits. TEMPLE.

142. INDUSTRIAL CHEMISTRY. Continuation of Course 141. Prerequisite: Chemistry 35-36, 141. Three credits. TEMPLE.

143. SUGAR CHEMISTRY. The course includes the technology of sugar manufacture. Prerequisite: Chemistry 35-36. One credit. NICHOLSON.

144. ELECTROCHEMISTRY. A discussion of electro-analytical methods and industrial electrochemical processes, with their underlying principles. Prerequisite: Chemistry 11-12. Two credits.

145. ELECTRIC FURNACES. Theory and practice in the design, construc-

tion, and operation of electric furnaces. Prerequisite: Chemistry 11-12. Two credits.

147. ELECTROCHEMICAL PREPARATIONS. Theory and practice in the electrochemical preparation of organic and inorganic substances. Prerequisite: Chemistry 11-12, 35-36. Two credits.

150. INDUSTRIAL CHEMICAL CALCULATIONS. Practice in the mathematical treatment of chemical data as applied to industry. Lectures, reading, and reports. Three credits. PECK.

155. WOOD CHEMISTRY. The course includes a general survey of the chemistry of the carbohydrate group, special attention being given to the resins, the terpenes, cellulose and lignocellulose. Prerequisite: Chemistry 35-36. Two credits. FRANKFORTER.

156. TECHNOLOGY OF PAPER PULP. Preparation of various wood products as pure cellulose. Commercial methods for preparation of wood pulp and manufacture of paper constitute a large part of work. Factory control of these processes is also given special attention. Prerequisite: Chemistry 155. Two credits. TEMPLE.

161. CHEMICAL LITERATURE. The course aims to familiarize the students with chemical literature and will include required reading, reports, and bibliographical work. HENDERSON.

167-168. ADVANCED INORGANIC CHEMISTRY. Designed to systematize and broaden the student's knowledge of inorganic chemistry. Based largely on the Periodic System. Important types of chemical reactions are studied with reference to their analytical and industrial significance. Consists of lectures and recitations, supplemented by assigned reading. Prerequisite: two years of college chemistry. Four credits. BAKER.

169-170. CHEMISTRY OF THE RARE ELEMENTS. The descriptive chemistry of the rare elements and their analytical separation. Prerequisite: Chemistry 11-12. Four credits. NICHOLSON.

171. OSMOTIC AND DIFFUSION PHENOMENA IN SOLUTION. A study of the solution process and properties of solutions with reference to solubility, osmotic pressure, diffusion, etc. This course is of importance to students in geology, biology, and physiology. A knowledge of calculus is desirable. Three credits. DERBY.

172. COLLOIDS AND COLLOIDAL MIXTURES. Aqueous and non-aqueous solutions of colloids. Preparation, methods of study, and observation of solute with reference to adsorbtion, swelling, solubility, brownian movement, osmosis, electrical properties, etc. Of special interest to the biologist and physiologist. Three credits. DERBY.

173. THERMOCHEMISTRY AND CHEMICAL AFFINITY. Special attention given to reactions to technical importance. Will include a study of

chemical equilibrium and reaction velocity, of catalysis and chemical affinity in general. Two credits. MacDougall.

174. Electrochemistry. The modern theories of solutions and the principles of thermodynamics in their application to electro-chemical energy transformations, electrical quantity, and electromotive force. Two credits. MacDougall.

175-176. Organic Chemistry. A full discussion of the aliphatic and aromatic series with the preparation of some of the more important compounds. Certain other work of special nature will also be required. Offered to graduate students taking their minor in chemistry. Ten credits. Frankforter.

Laboratory work to accompany courses 125, 126, 171, 172, 173, 174, 175 may be arranged for by electing the desired number of credits in courses 129 and 130.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. Research Work in Inorganic Chemistry. Frankforter.
203-204. Research Work in Inorganic Chemistry. Baker.
207-208. Research Work on the Rare Elements. Nicholson.
211-212. Research Work in Quantitative Analysis. Sidener.
221-222. Research Work in Organic Chemistry. Frankforter.
223-224. Research Work in Organic Chemistry. Hunter.
227-228. Research Work on Oils and Varnishes. Schumann.
231-232. Research Work in Physical Chemistry. Derby.
233-234. Research Work in Physical Chemistry. MacDougall.
235-236. Research Work in Physical Chemistry. Peck.
237-238. Research Work in Radioactivity. Henderson.
241-242. Research Work on Foods. Harding.
243-244. Research Work on Fuels. Harding.
251-252. Research Work in Industrial Chemistry. Temple.
253-254. Research Work in Applied Electrochemistry.
255-256. Research Work in Photochemistry. Peck.

COMPARATIVE PHILOLOGY

Professor Frederick Klaeber.

This department besides offering courses in the general principles of linguistic science, affords an opportunity for elementary studies in comparative Indo-European Philology, and more particularly the investigation of Old Germanic dialects. Related courses in English Philology will be found under English Language and Literature.

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

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

NOTE ON THE GROUPING OF GRADUATE COURSES IN THE DEPARTMENTS OF COMPARATIVE PHILOLOGY, ENGLISH, GERMAN, AND SCANDINAVIAN

Candidates for the Master's degree in these departments are advised to choose at least three courses from one of the following groups:

GROUP I. GERMANIC PHILOLOGY—

Comparative Philology 101 (Science of Language), 102 (Life of Words), 106 (Advanced Science of Language), 108 (Comparative Phonology), 203-204 (Gothic), 207-208 (Old Saxon), 209-210 (Old High German).

English 201 (Anglo-Saxon), 204 (Beowulf).

German 107-108 (Middle High German), 109-110 (History of the German Language).

Scandinavian 201-202 (History of the Scandinavian Languages), 203-204 (Old Norse).

GROUP II. EARLIER GERMANIC LITERATURE—

Comparative Philology 207-208 (Old Saxon).

English 101 (Middle English), 103 (Piers the Plowman,) 58 (Elizabethan Literature), 211-212 (Drama in England before Shakespeare), 204 (Beowulf).

German 107-108 (Middle High German).

Scandinavian 103 (Early Norwegian Literature), 107-108 (Swedish Literature), 203-204 (Advanced Old Norse).

GROUP III. LATER GERMANIC LITERATURE—

English 105, 107 (Eighteenth-Century Literature), 108 (Romantic Movement), 109-110 (English Humorists), 111, 112 (Seventeenth-Century Literature), 113-114 (Drama: Structure and Evolution), 123-124 (Meredith), 215-216 (Drama as a Form and Phase of Modern Thought), 225-226 (Political Prose of the Protectorate).

German 231-232 (Faust), 119-120 (Drama of Schiller), 127-128 (Lyric Poetry of the Eighteenth and Nineteenth Centuries).

Scandinavian 101-102 (Modern Norwegian Literature), 107-108 (Swedish Literature), 104 (Henrik Ibsen).

209-210 (Swedish Language and Literature), 109 (Strindberg).

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101. GENERAL INTRODUCTION TO THE SCIENCE OF LANGUAGE. Prerequisite, one of the following groups: (1) Five years foreign language, four may be in high school and one in college; (2) two years foreign language in college; (3) six credits Old English; (4) Courses 3 and 5 in English. Two credits. KLAEBER.

102. SCIENCE OF LANGUAGE (Advanced Course). Investigation of linguistic problems. Study of standard works. Reports on recent publications. Prerequisites the same as those for Course 101. Alternates with Course 106. Two credits. KLAEBER.

104. INTRODUCTION TO GERMANIC PHILOLOGY. Prerequisites the same as those for Course 101. A fair knowledge of German necessary. Two credits. KLAEBER.

105. UNIVERSAL LANGUAGE. Comparison of families of languages grammatically and lexically. Movement for creation of an international language. Consideration of Volapük, Esperanto, Ido, etc. Prerequisites same as for Course 101. Two credits. KLAEBER.

106. THE LIFE OF WORDS. Etymology and semasiology. Growth of vocabulary; change of words in form and meaning. Special reference to English and Germanic languages. Prerequisites same as for Course 101. Alternates with Course 102. Two credits. KLAEBER.

109-110. HISTORY OF THE GERMAN LANGUAGE. Lectures, discussions, assigned readings. Prerequisites, German 53-54. This course is identical with German 109-110. Alternates with Course 141-142. Four credits. KLAEBER.

141-142. HISTORICAL GRAMMAR OF THE ENGLISH LANGUAGE. I. Sounds and Spelling. II. Accidence and Syntax. Alternates with Course 109-110. Four credits. KLAEBER.

COURSES PRIMARILY FOR GRADUATE STUDENTS

202. COMPARATIVE GRAMMAR OF THE GREEK, LATIN, AND GERMANIC LANGUAGES. A general survey of the field of Indo-Germanic Philology will be included. KLAEBER.

203-204. GOTHIC. The relation of Gothic to other Germanic dialects will be particularly emphasized. Study of the grammar (Braune, J. Wright, Streitberg), reading of texts (Stamm-Heyne-Wrede's *Ulfilas*, or Streitberg's *Gotische Bibel*), discussion of problems. KLAEBER.

205. URGERMANISCHE GRAMMATIK. Lectures and study of standard works (Brugmann, Kluge, Noreen, Streitberg, *et al.*). KLAEBER.

206. COMPARATIVE PHONOLOGY OF ENGLISH AND GERMAN. Elements of phonetics; history of English and German sounds; orthography. Prerequisites same as for Course 101. Students must have completed German 3-4 (or 5-6) and 7-8. Alternates with Course 106. Two credits. KLAEBER.

207-208. OLD SAXON. Old Saxon grammar; interpretation of the *Heliand* and *Genesis*. KLAEBER.

209-210. OLD HIGH GERMAN. Braune's *Althochdeutsche Grammatik;* Braune's *Althochdeutsches Lesebuch.* This course is identical with German 105-106. KLAEBER.

211-212. RESEARCH SEMINAR. Competent graduate students will be advised and assisted in research along special lines. KLAEBER.

DAIRY AND ANIMAL HUSBANDRY

Professors THEOPHILUS L. HAECKER, CARL W. GAY, HENRY H. KILDEE; ROBERT M. WASHBURN; Assistant Professor THOMAS G. PATERSON.

Prerequisite.—Twenty-two credit hours of work in the division.

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

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

106. ADVANCED MEATS AND JUDGING. Work along this line is a continuation of that begun in course 9. More attention is given the more important details concerning meat, and a minute study of its physical and chemical composition is required. PATERSON.

110. ADVANCED STUDY OF THE DAIRY BREEDS. Origin, history, and characteristics of the most important strains and families of the leading breeds of Dairy Cattle. Judging and pedigree work will be given in addition to lectures. Two credits. KILDEE.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. RESEARCH PROBLEMS IN ANIMAL NUTRITION. A study of the laws of animal nutrition with special reference to the relation of feed nutrients to animal growth and animal products. HAECKER.

203-204. PRODUCTION PROBLEMS IN DAIRY HUSBANDRY. Advanced study of the dairy breeds, milk production, and herd management. Special problems. KILDEE.

205-206. SEMINAR. Critical review of research methods and current dairy problems. Twice a week. KILDEE.

ECONOMICS

Professors JOHN H. GRAY,* E. DANA DURAND; Assistant Professors ROY G. BLAKEY, J. FRANKLIN EBERSOLE,* THOMAS WARNER MITCHELL; Instructors LLOYD M. CROSGRAVE, ROBERT J. MCFALL.

Prerequisites.—For major or minor work, twelve credits in Economics including the equivalent of courses 3-4 (General Economics), and adequate training in the other social sciences for the particular work to be undertaken.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101. THEORY AND PRACTICE OF STATISTICS. Principles of collection, tabulation, and interpretation of statistical material, illustrated by present-day statistical data. Lectures, assigned readings, and special investigations by individual members of the class. Prerequisites: six credits including Economics 3. Three credits. DURAND.

* On leave of absence, 1917-18.

103. DISTRIBUTION OF WEALTH. An advanced course in economic theory, devoted chiefly to a study of recent theories of distribution. Assigned readings, reports, and discussions.

104. HISTORY OF ECONOMIC IDEAS. History of economic thought; scope and logical methods, relation to other social sciences; methods of investigation and instruction. Assigned readings, reports, and class discussions. Prerequisite: Economics 3 and 4. Three credits.

119. MARKETING OF FARM PRODUCTS. Prerequisite: Six credits in Economics. Three credits. DURAND.

131. COST ACCOUNTING. Analysis of production cost; methods of recording materials, labor, and machine costs; apportioning indirect expenses; relation of cost to general accounts; use of cost data to enforce operating efficiency. Laboratory lectures. Prerequisites: Economics 3 and 35-36. Three credits. MITCHELL.

132. ACCOUNTING PROBLEMS. A selection from C. P. A. examinations and other sources of difficult problems that confront the public accountant. Prerequisites: Economics 3 and 35-36. Three credits. MITCHELL.

133. ACCOUNTING SYSTEMS. The special accounting problems of building societies, banks, department stores, insurance companies, railroad companies, and other types with a description of their accounting systems. Prerequisites: Economics 35-36, and 131 or 132. Three credits. (Not given in 1917-18.) MITCHELL.

134. AUDITING. Preparation for, and conduct of, an audit; the auditor's report and certification, and legal responsibilities. Textbook, assigned readings, class discussions, and lectures. Prerequisites: Economics 35-36, and 131 or 132. Three credits. (Not given in 1917-18.) MITCHELL.*

139. BANK ADMINISTRATION. The modern commercial bank from the manager's point of view. Legal problems, department functions, profit-making methods, credits, adjustment of bank policy to prospective business conditions. Lectures, and laboratory work in local banks. Prerequisites: Economics 3 and 43, and consent of instructor. Three credits. (Not given in 1917-18). EBERSOLE.

142. INVESTMENT AND SPECULATION. The social process of saving and investment; government, municipal, corporation, and real estate loans; stock exchange operations and money market influences as they affect the prices and net yield of prime securities. Prerequisites: Economics 3 and 43 or 143. Three credits. HODGE.

143. MONEY AND PRICES. The functions of money; the nature and effects of credit; changes in general prices, their causes and effects; international movements of gold; monetary standards and currency

systems; the problem of securing an ideal money. Prerequisites: Economics 3 and 42 or 43. Three credits. STEHMAN.

144. PANICS, COMMERCIAL CRISES, AND CYCLES OF TRADE. American business conditions since 1890 with regard to the great cycles of alternate prosperity and depression, the financial panics. Critical examination of all the available business barometers designed to forecast similar conditions. Prerequisites: Economics 3 and 43 or 143. Three credits. (Not given 1917-18.) EBERSOLE.

145. THE MODERN BUSINESS CORPORATION. The organizing, financing, and managing of corporations; the position of the corporation before the law; methods of accounting; the relation of the government to the corporation; the question of trusts in its various phases. Prerequisites: six credits including Economics 3. Three credits. HODGE.

146. PUBLIC UTILITIES. Economic and legal bases of classification, the relative advantages of public ownership and regulation. Central and municipal regulation compared. The basis of rates; relative rates; rates and service. Different theories of valuation. Prerequisite: Economics 145. Three credits. DURAND.

161. LABOR PROBLEMS. Modern labor problems: woman and child labor, industrial education, unemployment, poverty, industrial hygiene, welfare work, profit sharing, coöperation, labor unions, strikes, boycotts, conciliation, and arbitration; economic causes and effects of immigration. Prerequisites: Economics 3 and 4. Three credits. CROSGRAVE.

162. LABOR LEGISLATION. American industrial conditions that may be improved by labor legislation; experiences of foreign countries and American states; constitutional aspects of the subject. Emphasis will be laid upon present problems, especially those of Minnesota. Three credits. CROSGRAVE.

164. THE ECONOMIC FUNCTIONS OF THE STATE. The proper limits of state interference with private property, freedom of contract and individual liberty. Police powers of the state. Legislation concerning factories, female and child labor, minimum wage, social insurance, etc. Prerequisites: six credits including Economics 3. Three credits. (Not given 1917-18.) GRAY.

165. HISTORY AND THEORY OF SOCIALISM. Economic utopias from Plato to Proudhon. Special attention to the theory, history, and practical significance of modern socialism. Lectures, assigned readings, and discussions. Prerequisites: six credits including Economics 3. Three credits. CROSGRAVE.

173. RAILWAY PROBLEMS. Survey of railways and railway policy of the United States and representative foreign countries; canal and

ocean transportation; railway organization and finance; railway discriminations, competition, pooling, and combination; the railways and labor. McFall.

174. Railway Rate Regulation. Rate-making in practice; Federal and State legislation; cost and value of service in rate-regulation; railway earnings and valuation; regulation of rate-schedules and particular rates; classification; representative opinions of the Interstate Commerce Commission; Minnesota rate-regulation. McFall.

191. Public Finance. Public expenditures; public debt; budgetary legislation; tax systems. Blakey.

192. State and Local Taxation. Problems of state and local taxation. Historic survey of various taxes and examination of present procedure in taxing different kinds of property; tax reforms. Particular attention given to conditions in Minnesota. Blakey.

COURSES PRIMARILY FOR GRADUATE STUDENTS

251-252. Seminar in Agricultural Economics. Research problems in the marketing and distribution of farm products, agricultural credit, farm ownership and tenancy, and agricultural organizations. Prerequisite: Economics 3, 17, and six other credits in Economics or Farm Management. Six credits. Durand.

253-254. Seminar in Accounting and Management. Student reports and theses dealing with accounting systems, published reports, and interpretations of the accounts of business establishments located in or near the Twin Cities. Prerequisite: twelve credits including Economics 35-36, and 131. Six credits. Mitchell.

255-256. Seminar in Money and Banking. The various unsettled monetary and banking problems of the United States will furnish topics for individual investigation. Prerequisite: twelve credits including Economics 43. Six credits. (Not given 1917-18.) Ebersole.

257-258. Seminar in Economic Development and Taxation. Original investigation of various industries in the Middle West. The development of tax systems. Present problems in taxation. Twelve credits prerequisite. Six credits. (Not given in 1917-18.)

259-260. Seminar in Corporation and Trust Problems. Practical and independent investigation by each student, under the guidance of the instructor, of some specific problem pertaining to corporations, trusts, and other monopolies. Twelve credits prerequisite. Six credits. Durand.

ECONOMIC ZOOLOGY

Professor Frederick L. Washburn; Associate Professors Charles W. Howard, William Moore, Arthur G. Ruggles.

Prerequisites.—Eighteen credits in Economic Zoology and Animal Biology.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

104. METHODS IN ECONOMIC ENTOMOLOGY. Methods of breeding insects; identification of insects in various stages; photography of insects; general field work, etc. Prerequisite: Economic Zoology 3. Three credits. MOORE.

105-106. SPECIAL PROBLEMS. Investigations of special problems for those intending to specialize in entomology or economic zoology. Problems may be chosen in any section of the Division. Those taking the course are expected to be in attendance during the Summer Session. Prerequisite: Economic Zoology 104. Six credits. WASHBURN, RUGGLES, HOWARD, MOORE.

107-108. IMMATURE STAGES OF INSECTS. A study of immature forms of economic insects. Laboratory work. Prerequisite: Economic Zoology 3. Three or six credits. RUGGLES.

109-110. ACTION OF INSECTICIDES. A study of the common insecticides and their action on insects and their hosts. Laboratory and conference work. Prerequisite: Economic Zoology 3. Three or six credits. MOORE.

COURSES PRIMARILY FOR GRADUATE STUDENTS

203-204. RESEARCH IN ECONOMIC VERTEBRATE ZOOLOGY. Problems in life history, food habits, etc., of birds and mammals of economic interest to agriculture and horticulture. Study of control measures of injurious species. Prerequisite: twelve credits in Economic Zoology and Animal Biology. Six to fifteen credits. WASHBURN.

205-206. RESEARCH IN ECONOMIC ENTOMOLOGY. Problems relating to insects attacking trees or crops. Prerequisite: Economic Zoology 12. Six to fifteen credits. RUGGLES.

207-208. RESEARCH IN PARASITOLOGY AND MEDICAL ENTOMOLOGY. Problems in parasites of man and domestic animals; medical entomology. Prerequisite: twelve credits in Economic Zoology and Animal Biology. Six to fifteen credits. HOWARD.

209-210. RESEARCH IN INSECTICIDES. Problems relating to the action and uses of various insecticides on insects and their hosts. Prerequisite: Economic Zoology 109-110, and six credits more in Economic Zoology and Animal Biology. Six to fifteen credits. MOORE.

EDUCATION

Professors LOTUS D. COFFMAN, MELVIN E. HAGGERTY, ALBERT W. RANKIN, FLETCHER H. SWIFT; Assistant Professor WILFORD S. MILLER.

Prerequisites.—For major work, at least a year's work in psychology and in addition to this a total of not less than two years of undergraduate work in Education.

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

Departmental Conferences.—Every alternate Monday all graduate students majoring in Education are expected to meet with the departmental staff from 7:15 to 9 p.m. for conference regarding subjects of original investigation. This work carries no credit.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

Note: Candidates for the University State Teachers' Certificate may offer courses 101-102 in place of Education 3.

101. FOUNDATIONS OF MODERN EDUCATION. An interpretative historical study of those elements in modern education derived from the Hebrews, Greeks, Romans, Middle Ages, and Renaissance. Emphasis will be laid upon secondary and higher education and the cultural conception of education. Prerequisite: Psychology 1-2 and six credits in History. Three credits. SWIFT.

102. HISTORY OF EDUCATION FROM THE REFORMATION TO THE PRESENT TIME. Modern educational institutions, theories, and problems in the light of their history. Special emphasis upon elementary educacation. Prerequisite: Psychology 1-2 and six credits in History. Three credits. SWIFT.

103. EDUCATIONAL CLASSICS. An intensive study of selected writings of educational leaders, ancient, medieval, and renaissance. Prerequisite: Education 1 or 101-102. Three credits. SWIFT.

104. EDUCATIONAL CLASSICS. An intensive study of selected writings of educational leaders from Locke to the present. Prerequisite: Education 1 or 101-102. Three credits. SWIFT.

105. EDUCATIONAL PSYCHOLOGY. Advanced work in genetic psychology, the origin and nature of the human organism, the origin, development and control of instincts, and the relation of instincts to the formation of habits, introductory to the psychology of learning. Prerequisite: Psychology 1-2. Three credits. HAGGERTY.

106. EDUCATIONAL PSYCHOLOGY. The psychology of learning. Methods of measuring the rate of learning; study of typical learning experiments; conditions of the most economic learning; study of individual differences, and the psychology of the school subjects. Prerequisite: Psychology 1-2. Three credits. HAGGERTY.

109. EDUCATIONAL DIAGNOSIS. Typical educational problems involving the use of educational scales and standard tests. The nature of the tests; methods of their use; analysis of results; programs of

remedial educational procedure based on the results. Prerequisite: Education 1 (or 101-102) and 3. Two credits. HAGGERTY.

119. SCHOOL CURRICULA. A study of the ideas implicit in a democratic society and an attempt to apply those ideas in the selection of the material of school curricula. Consideration of the constructive aims and methods of education. Prerequisite: Education 1 (or 101-102) and 3. Three credits. RANKIN.

121a,b. SCHOOL ORGANIZATION AND ADMINISTRATION. An introductory course in school administration for students of teaching experience and for those looking forward to work as principals and superintendents. Prerequisite: Education 1 (or 101-102) and 3. Three credits. RANKIN.

123. THEORY OF SUPERVISION. The problems involved in the training of teachers in service; studies of qualities of merit in teachers; factors in selecting teachers; the distribution of subject matter by grades; the time allotment of studies. Prerequisite: Education 1 (or 101-102) and 3. Three credits. COFFMAN.

124. EDUCATIONAL ADMINISTRATION. The interpretation of present tendencies in the administration of state and city school systems. Prerequisite: Education 121. Three credits. COFFMAN.

125. METHODS IN EDUCATIONAL RESEARCH. A study of statistical and other methods as applied to educational investigation. This course is ordinarily required of all candidates for advanced degrees. Prerequisite: Education 1 (or 101-102) and 3. Three credits. COFFMAN.

131. GERMAN SCHOOLS. A study of the existing school systems of Germany with emphasis upon present conditions and problems. Prerequisite: Education 1 (or 101-102) and 3. Three credits. SWIFT.

132. FRENCH SCHOOLS. A study of the existing school systems of France with emphasis upon present conditions and problems. Prerequisite: Education 1 (or 101-102) and 3. Three credits. SWIFT.

134. MENTAL DIAGNOSIS OF SCHOOL CHILDREN. A study of mental variation in children, its nature, degree, causes, and effects. Introductory lectures on the anatomy, physiology and pathology of childhood. Methods of treating superior and subnormal children in the schools. Prerequisite: Psychology 1-2. Two credits. HAGGERTY, SCAMMON, SEDGWICK, NEWHART, MORRISON and KEENE.

135. MENTAL TESTS. A study of individual differences by means of mental tests. Laboratory work in giving and taking tests introductory to the use of group tests for the measurement of age-level, etc. Prerequisite: Psychology 1-2. Two credits. HAGGERTY.

136. EXPERIMENTAL EDUCATION. The application of experimental methods to educational research. Problems in mental measure-

ment, educational and mental diagnosis and the psychology of learning will be set as individual problems for properly prepared students. Prerequisite: Psychology 1-2. Two credits. HAGGERTY.

137-138. PSYCHO-EDUCATIONAL CLINIC. The Psycho-educational clinic is conducted in close coöperation with the Medical School clinics in pediatrics and nervous and mental diseases. Students obtain practical experience in mental examination, diagnosis, and treatment of individual cases. Prerequisites: Psychology 1-2 and Education 109, 134 or 135. One to six credits. HAGGERTY.

141. SCHOOL SANITATION AND PUBLIC HEALTH. A course in school hygiene in its broader aspects. Designed for all teachers and supervisors who are responsible for the health of school children. Treats of medical supervision and other problems arising from school environment. Prerequisites: Education 1 (or 101-102) and 3. Three credits. RANKIN.

142. INDUSTRIAL EDUCATION. Existing types of industrial and vocational schools and systems of training. Comparison of conditions in American and foreign countries. Organization of course of study. Prerequisites: Education 1 (or 101-102) and 3. Three credits. RANKIN.

146. HISTORY AND PRINCIPLES OF RELIGIOUS EDUCATION. Part I: The influence of religion and religious education as social and spiritual forces among certain selected types. Part II: Principles of education as applied to religious instruction and training. This course may be pursued as a graduate course under certain conditions. Prerequisites: Psychology 1-2. Three credits. SWIFT.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. SEMINAR IN SELECTED PROBLEMS IN EDUCATIONAL HISTORY. Research work for graduate students. Prerequisites: Education 101-102 and six credits in History. Four credits. SWIFT.

203-204. SEMINAR IN EDUCATIONAL PSYCHOLOGY. A research course for graduate students. Topic for year 1917-18: "Educational and Mental Diagnosis for School Children." Required of all students writing theses in Educational Psychology and related topics. Prerequisite: Education 105. Four credits. HAGGERTY.

205-206. SEMINAR IN EDUCATIONAL ADMINISTRATION. Prerequisites: Education 124, 125. Four credits. COFFMAN.

ELECTRICAL ENGINEERING

Professors GEORGE D. SHEPARDSON, FRANK W. SPRINGER; Assistant Professor WILLIAM T. RYAN; Instructors HUBERT M. TURNER, ERNEST A. REID.

Prerequisites.—For major work, twelve credits in the department. For minor work, six credits in Physics.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101-102. ELECTRICAL MACHINERY. Electrical engineering measuring instruments and their use; units; theory of dynamo-electric machinery; methods of regulation; construction and operation of generators and motors; methods of testing. Prerequisite: one year of Physics. Three credits. SPRINGER, TURNER.

103-104. ELECTRICAL LABORATORY. To be taken with Course 101-102. Electrical engineering measurements, calibration of instruments, operation and characteristic curves of generator and motor. Lectures and practice. Prerequisite: Physics 12-13. Two credits. TURNER, REID.

105-106. ALTERNATING CURRENTS. Phenomena, measurement, and use of alternating currents; theory of line, transformer, generator, and motor; types of apparatus. Prerequisites: Electrical Engineering 101-102 and 103-104. Three credits. SHEPARDSON.

107-108. ELECTRICAL LABORATORY. To be taken with Course 105-106. Experimental study of alternating currents, regulation and efficiency tests of alternators, transformers, motors, and rotaries. Prerequisites: Electrical Engineering 101-104. Three credits. SPRINGER.

111. ELECTRIC LIGHTING. Principles of vision; photometers and measurement of light; methods and calculations of illumination; various sources of light; development of electric illuminations; distribution systems. Lectures, problems, and laboratory practice. Prerequisite: one year of Physics. Two credits. SHEPARDSON.

115-116. JOURNAL READING. Weekly discussion of current electrical periodicals. SHEPARDSON.

117-118. ELECTRICAL DESIGN. The design of direct and alternating generators and motors, and alternating current transformers; complete working drawings and specifications to accompany each design. Prerequisites: Electrical Engineering 101-102 and 105. RYAN.

COURSES PRIMARILY FOR GRADUATE STUDENTS

205. CENTRAL STATIONS. Lectures, recitations, and assigned problems and readings, treating of the operation, design, and construction of electric power generating stations. Prerequisites: Electrical Engineering 101-102 and 105-106. Two credits. RYAN.

206. ELECTRICAL TRANSMISSION. Considerations involved in the selection of conductors in actual practice; Kelvin's law and its limitations; the transmission line as a mechanical structure; lighting arresters; study of particular high-tension lines. Prerequisite: Electrical Engineering 205. Two credits. RYAN.

213-214. TRANSIENT ELECTRIC PHENOMENA. Transient phenomena accompanying a change of circuit conditions, with their differential equations; abnormal currents, voltages, and frequencies produced by switching, short circuits, and arcing grounds. Distributed capacity and inductance, standing waves, traveling waves, etc. Prerequisite: Electrical Engineering 105-106. Two credits. TURNER.

215-216. RADIO-SIGNALING. Maxwell's electromagnetic theory, experimental work of Hertz, phenomena of electric oscillations in simple and coupled circuits, generation and reception of damped and undamped waves, propagation of electromagnetic waves through space, effect of curvature of the earth, absorption by obstacles, etc. Prerequisite: Electrical Engineering 105-106. Two credits. TURNER.

219. TELEGRAPH AND TELEPHONE APPARATUS. Theoretical and experimental study of apparatus used for signaling, telegraphy, and telephony. Lectures and laboratory. Prerequisite: Electrical Engineering 105-106. Two credits. SHEPARDSON.

220. TELEGRAPH AND TELEPHONE CIRCUITS. Theoretical and experimental study of telephone circuits and the phenomena of telephonic transmission; applications of hyperbolic functions to line phenomena. SHEPARDSON.

221-222. PRECISE ELECTRICAL ENGINEERING MEASUREMENTS. Lectures and laboratory work. Precise measurements of resistance, voltage, current, self-induction, and capacity; standardization of measuring instruments. Open to a limited number subject to approval. Prerequisites: Electrical Engineering 107, 111 and 105-106. One credit. SPRINGER.

226. ILLUMINATING ENGINEERING. 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 quality of lights for obtaining desired illumination. Prerequisite: Electrical Engineering 111. Two credits. SHEPARDSON.

229-230. ELECTRICAL LABORATORY. Efficiency tests and special problems. Prerequisite: Electrical Engineering 103-104. SHEPARDSON, SPRINGER, TURNER.

232. ELECTRICAL DESIGN. Special problems. Prerequisites: Electrical Engineering 101-102, 105-106, and 117. RYAN.

ENGLISH

Professors RICHARD BURTON,* CARLETON BROWN, HARDIN CRAIG,** OSCAR W. FIRKINS, FREDERICK KLAEBER, ELMER E. STOLL; Associate Professor JOSEPH W. BEACH; Assistant Professor GEORGE N. NORTHROP.**

* Absent on leave during second semester. ** Absent on leave.

Prerequisites.—For major work, not less than eighteen credit hours in the subject, including satisfactory introductory courses in Old English and Shakespeare.

For minor work, not less than eighteen credit hours in the subject. In cases where the nature of the work to be undertaken by candidates for the Master's degree warrants it, another foreign language may be substituted for French or German.

Before registering for graduate courses, students should consult with the department Secretary for Graduate Work.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101. INTRODUCTION TO MIDDLE ENGLISH. An outline of Middle English grammar, including the interpretation of selected texts. (Not offered in 1917-18.) Prerequisites: English 1-2, 3 and 5. Two credits. BROWN.

103. PIERS THE PLOWMAN. A critical study of *Piers the Plowman.* (Not offered in 1917-18.) Prerequisites: English 1-2, 3, and 5. Two credits. BROWN.

105. EIGHTEENTH CENTURY POETRY. The Rise of Naturalism and Romanticism. Eighteenth century English poetry from Pope to Burns, with special reference to the rise and growth of naturalism and romanticism. (Not offered in 1917-18.) Prerequisites: English 1-2 and six credits in courses numbered below 10. Three credits. CRAIG.

107. EIGHTEENTH CENTURY PROSE. Lectures on eighteenth century prose and prose writers with readings by the students and essays on approved topics; special study of fiction and the essay. Prerequisites: English 1-2 and six credits in courses numbered below 10. Three credits. CRAIG.

108. THE ROMANTIC MOVEMENT. The Romantic School of poets from Wordsworth to Keats and influence of the revolution in France. (Not offered in 1917-18.) Prerequisites: English 1-2 and six credits in courses numbered below 10. Three credits. CRAIG.

109-110. ENGLISH HUMORISTS. Comic spirit in modern literature; humor, wit, comedy, and satire, with reference to their use in criticism of life. Illustrations from dramatists, novelists, essayists, and poets. (Not offered in 1917-18.) Prerequisites: English 1-2 and six credits in courses numbered below 10. Six credits. BEACH.

112. SEVENTEENTH CENTURY PROSE. General survey of prose of the century to 1660. (Not offered in 1917-18.) Prerequisites: English 1-2 and six credits in courses numbered below 10. Course 3-4 in History is a desirable prerequisite. Three times a week, one hour. Three credits. NORTHROP.

113-114. THE DRAMA: STRUCTURE AND EVOLUTION. First semester: theory of the drama, and history up to the nineteenth century. Second semester: recent drama, continental, English; open only to those who have completed the first semester. Prerequisites: English 1-2, 7 and three credits in courses numbered below 10. Three times a week, one hour. Six credits. FIRKINS.

115. ENGLISH IDIOM. A discussion of current idiom with the purpose of relating it to the underlying principles of historic development. (Not offered in 1917-18.) Prerequisites: English 1-2 and six credits in courses numbered below 10. Two credits. BURTON.

118. THE BIBLE AS LITERATURE. A literary study of the Old Testament with special attention to forms and the critical study of selected readings. Prerequisites: English 1-2 and six credits in courses numbered below 10. Three times a week, one hour. Three credits. BURTON.

119-120. PRINCIPLES OF LITERARY CRITICISM. Elements in literature. e. g., clearness, vigor, beauty, etc.; exposition of literary types, e.g., the lyric, epic, short story, etc., in relation to standards of judgment, Prerequisites: English 1-2 and six credits in courses numbered below 10. Three times a week, one hour. Six credits. FIRKINS.

123-124. SEMINARY IN NOVELISTS. First semester, Thomas Hardy; second semester, Henry James. Credit may be given on completion of one semester. Prerequisites: English 1-2 and six credits in courses numbered below 10. Once a week, two hours. Four credits. BEACH.

125-126. BIOGRAPHY. The rise and development of English biography, with attention to journals, memoirs, and letters. (Not offered in 1917-18.) Open to graduate students having undergraduate major in English or History; upon approval of instructor, to seniors with twelve credits in English. Four credits. NORTHROP.

129. MODERN DRAMA. Contemporary drama from 1870 to the present; the new impulse in dramatic literature under the stimulus of latter-day thought. Prerequisites: English 1-2, 7 and three credits in courses numbered below 10. Three times a week, one hour. Three credits. BURTON.

133. THE ENGLISH AND SCOTTISH POPULAR BALLADS. The study of a large number of traditional ballads, English and foreign, and the study of ballad style and origins. (Not offered in 1917-18.) Prerequisites: English 1-2 and six credits in courses numbered below 10. Two credits. STOLL.

136. ADVANCED SHAKESPEARE. Shakespeare's development traced to the end. A careful analysis of four plays. Problems in the interpretation of Shakespeare's dramatic methods. Prerequisites: Eng-

lish 1-2, 7 and three credits in courses numbered below 10. Three times a week, one hour. Three credits. STOLL.

138. HISTORY OF CRITICISM. This course traces the rise, growth, and present status of the principles of criticism as applied to literature. (Not offered in 1917-18.) Prerequisites: English 1-2 and six credits in courses numbered below 10. Two credits. BURTON.

140. ADVANCED STUDY OF CHAUCER. Further study of The Canterbury Tales and of the Minor Poems. Prerequisites: English 1-2, 5a or 5b and three credits in courses numbered below 10. Twice a week, one hour. Two credits. BROWN.

141. HISTORICAL GRAMMAR OF THE ENGLISH LANGUAGE, I. Sounds and spelling. This course is identical with Comparative Philology 141. (Not offered in 1917-18.) Two credits. KLAEBER.

142. HISTORICAL GRAMMAR OF THE ENGLISH LANGUAGE, II. Accidence and Syntax. This course is identical with Comparative Philology, 142. (Not offered in 1917-18.) Two credits. KLAEBER.

143. RECENT ENGLISH POETRY. Poetry in England and America since 1870. The main poetic traditions and tendencies now prevailing. Prerequisites: English 1-2 and six credits in courses numbered below 10. Three times a week, one hour. Three credits. BEACH.

146. THE METRICAL ROMANCES. A study of the more important Middle English romances: designed as an introduction to the great stories of love and chivalry current in the Middle Ages, particularly those connected with Arthur and the Round Table. Prerequisites: English 1-2 and six credits in courses numbered below 10. Three times a week, one hour. Three credits. BROWN.

PRIMARILY FOR GRADUATE STUDENTS.

201. ANGLO-SAXON. Comparative study of Anglo-Saxon (Old English) grammar and reading of prose texts. Once a week, two hours. Two credits. KLAEBER.

204. BEOWULF. Critical reading of the poem. Once a week, two hours. Two credits. KLAEBER.

209-210. THE MIDDLE ENGLISH LYRIC. A study of the lyrical verse, both secular and religious, written during the Middle English period. The attempt will be made to distinguish the more important types and to trace their development and interrelations. Once a week, two hours. Four credits. BROWN.

211-212. SEMINARY IN SEVENTEENTH CENTURY LITERATURE. Hours and credits to be arranged. MOORE.

215-216. THE DRAMA, AS A FORM AND PHASE OF MODERN THOUGHT. The modern psychological drama. A study of representative English

and foreign playwrights, whose work is typical and important because of its psychological bearings. Once a week, two hours. Four credits. First semester given only in 1917-18. BURTON.

221-222. THE DRAMA IN THE RENAISSANCE. An investigation of the more important dramatic species and character types in England and on the continent, so far as represented in the Elizabethan age. (Not offered in 1917-18.) Once a week, two hours. Four credits. STOLL.

225-226. POLITICAL PROSE OF THE PROTECTORATE. Intensive study of Clarendon and of the letters of this period. (Not offered in 1917-18.) Once a week, two hours. Four credits. NORTHROP.

217. SEMINARY IN ELIZABETHAN DRAMA. The Elizabethan and Jacobean Dramatists, from Lyly to Shirley. Problems assigned may involve Shakespeare as well, and in general his contemporaries will be studied more for their own sake than for the light they shed upon him. Once a week, two hours. Two credits. STOLL.

220. SEMINARY IN THE RESTORATION DRAMA. The drama from the Restoration to the rise of Continental Comedy. Special attention given to the Comedy of Manners (from Etherege to Farquhar) and its relation to the life of the time. Once a week, two hours. Two credits. STOLL.

EXPERIMENTAL ENGINEERING

Assistant Professor CHARLES F. SHOOP; Associate Professor ADOLPH F. MEYER; Assistant Professor FRANKLIN R. MCMILLAN.

Prerequisites.—For major work, twelve credits; for minor work, six credits in the department.

COURSES FOR GRADUATES AND UNDERGRADUATES

101. MATERIALS TESTING LABORATORY. Investigation of strength and physical properties of various metals and engineering materials, including wood, cement, concrete, ropes, cables, belting, and chains. Supplemented by lectures on the various materials of construction and standard methods of testing. Prerequisite: Engineering Mathematics 151 or with Engineering Mathematics 151. Two credits. MCMILLAN.

102. HYDRAULIC AND STEAM LABORATORY. Hydraulic measurements. Calibration of weirs, nozzles, orifices, and meters. Tests of water motors, rams; pulsometers; valve setting, indicator practice, calorimetry, study of lubricants, and introductory steam experiments. Prerequisite: Engineering Mathematics 152 or with Engineering Mathematics 152. Two credits.

103. STEAM AND POWER LABORATORY. Calibration of dynamometers and measurement of power. Study of lubricants. Tests of injectors,

ejectors, steam and power pumps, steam turbines, steam engines, and boilers. Prerequisite: Mechanical Engineering 130 or with Mechanical Engineering 130. Four credits. SHOOP.

104. ADVANCED POWER AND GAS ENGINE LABORATORY. Continuation of Course 103. Tests of complete power and lighting plants. Tests of gas, gasoline, and hot air engines, gas producers, air compressors. Automobile and locomotive testing. Prerequisite: Experimental Engineering 103. Two credits. SHOOP.

108. WATER POWER LABORATORY. Consisting principally of experimental and demonstration work on overfall and siphon spillways. Prerequisite: Experimental Engineering 102. To be taken parallel with Civil Engineering 122. One credit. MEYER.

113. CONCRETE LABORATORY. Aggregates, proportioning, field and laboratory methods of determining choice of materials and mixtures. Tests of plain and reinforced concrete members to determine quality of materials. Prerequisite: Experimental Engineering 101. Three credits. MCMILLAN.

114. STRUCTURAL AND CONCRETE LABORATORY. Tests of structural elements of steel and reinforced concrete. Beams, columns, joints, and frame structures. Building and bridge tests. Prerequisite: Experimental Engineering 101. Three credits. MCMILLAN.

PRIMARILY FOR GRADUATE STUDENTS

116. EXPERIMENTAL LABORATORY. Special research work and commercial tests. Prerequisite: Experimental Engineering 103 or 113. Three credits.

118. SPECIAL HYDRAULIC PROBLEMS. Continuation of Course 108. Study of special hydraulic problems in the field and laboratory. Prerequisite: Experimental Engineering 108 and with Civil Engineering 224. Three credits. MEYER.

121. ADVANCED EXPERIMENTAL LABORATORY. Continuation of courses 104 or 105. Special problems and tests relative to heating and ventilating. Tests of fans, the movement and conditioning of air, different heating systems, heat transmission lines.

122. ADVANCED EXPERIMENTAL LABORATORY. A continuation of course 121.

123. ADVANCED EXPERIMENTAL LABORATORY, continuation of courses 104 or 105. Special problems, tests and investigations relating to gas and steam power and allied subjects. SHOOP.

124. ADVANCED EXPERIMENTAL LABORATORY. Continuation of course 123. Special problems, tests and investigations. SHOOP.

FARM MANAGEMENT

See Agronomy and Farm Management.

FORESTRY

Professors EDWARD G. CHEYNEY, JOHN ALLISON; Associate Professor JOHN P. WENTLING; Assistant Professor WILLIAM H. KENETY.

Prerequisites.—For major work, Botany 1, 2, and twelve credits in Forestry. For minor work, six credits in the department.

The choice of subject must be made by the candidate and approved by the director and instructor. The laboratories of the Botany Department and the facilities of the Forest Experiment Stations at Cloquet and Itasca are available to students taking this work.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101. ADVANCED DENDROLOGY. A continuation of Courses 2 and 5 with special studies in classification and distribution. Prerequisites: six credits in Botany and five credits in Dendrology. Three credits. WENTLING.

102. RESEARCH METHODS IN SYLVICULTURE. A study of fundamental principles of sylviculture which are broadly applicable, as well as methods used at Forest Experiment Stations in solving problems in forestation, management, protection, and mensuration. Prerequisites: Dendrology 2, 5, 34, and Botany 9. Two credits. KENETY.

103. USES OF WOOD. A thoro study of the woods used by the various wood-using industries. Woods for special uses, fancy woods, cabinet woods, wood substitutes. Prerequisites: Dendrology 5. Three credits. CHEYNEY, WENTLING.

COURSES PRIMARILY FOR GRADUATE STUDENTS

201-202. RESEARCH PROBLEMS IN THE SCIENCE AND PRACTICE OF SYLVICULTURE. WENTLING.

203-204. RESEARCH PROBLEMS IN MANAGEMENT AND WORKING PLANS. ALLISON.

205-206. LUMBER MARKETS AND PRICES. A careful study of the regions of production and the centers of distribution of different kinds and grades of lumber, together with the prices of the same in the various markets. CHEYNEY.

GEOLOGY AND MINERALOGY

Professors WILLIAM H. EMMONS, CLINTON R. STAUFFER; Associate Professor FRANK F. GROUT; Assistant Professors A. WALFRED JOHNSTON, CHESSLEY J. POSEY, TERENCE T. QUIRKE.

Prerequisites.—For major work in:

General Geology and Economic Geology—

Courses 1, 6, 21, 22; a knowledge of general chemistry. 105 must be carried along with other graduate work.

Petrology, 1, 6, 21, 22—

Elementary chemistry and physics.

Paleontology, 1, 6, 57, 58, or 1, 6, 11, 12—

Animal biology is a desirable antecedent.

Geography, 1, 6, 29, 36, or 1, 2, 21, 32.

For minor work, Geography 1 and 6 or their equivalent.

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

105. ELEMENTS OF ROCK STUDY. Occurrence and genesis of igneous, sedimentary, metamorphic rocks; their composition, structure, texture, and alteration. Classification, methods of identification, and description of rocks. Open to students who have had course 1 and are taking course 22. Three credits. GROUT.

106. PETROLOGY. The identification and study of minerals and rocks by optical methods; the study of igneous rocks, crystalline schists, and metamorphic rocks. The origin and classification of rocks. Laboratory work, lectures, and reference reading. Open to students who have had elementary mineralogy and course 105 or its equivalent. Three credits. GROUT.

108. PALEONTOLOGIC PRACTICE. The collection, preparation, and study of materials with a view to gaining a working knowledge of groups of fossils. Open to students who have taken or are taking course 57. Three credits. STAUFFER.

109. PALEONTOLOGIC GEOLOGY. The Ordovician fauna with special emphasis on the Ordovician of Minnesota and neighboring states. Three credits. STAUFFER.

110. PALEONTOLOGIC GEOLOGY. A continuation of course 109. Three credits. STAUFFER.

111. ORE DEPOSITS. The nature, distribution, and genesis of ore deposits of the United States; relations of ore deposits to geological structure; the deformation and superficial alteration of ore deposits. Prerequisites: General Geology, Petrology, and Mineralogy. Four credits. EMMONS.

112. PROBLEMS IN ORE DEPOSITS. Field excursions, map work, lectures on field and laboratory methods. Prerequisite: Geology 111. Four credits. EMMONS.

116. GEOGRAPHY OF LATIN AMERICA. The regional geography of the Latin-American countries; their geology, topography, climate, natural resources, people, industries, and trade. The trade relations between Latin-American countries and the United States given special attention. Alternates with course 118. Prerequisites: Geology 1, 29 or 31, 32 and three credits in Geography. Three credits. POSEY.

118. GEOGRAPHY OF EURASIA. Regional geography of Eurasia; its geology, topography, climate, natural resources, people, industries, and trade. Attention to attitude of the major European countries to the "new" lands of Asia. Alternates with course 116. Similar prerequisites. Three credits. POSEY.

124. STRUCTURAL AND METAMORPHIC GEOLOGY. The conditions, processes, and results of metamorphism; structural features resulting from deformation under varying conditions of load. Prerequisites: Geology 6, 22, 105. Three credits. JOHNSTON.

131-132. ADVANCED PETROLOGY. Advanced optical methods. Criteria for rapid identification of minerals and rocks. The uses of schedules and tables. Standard rock types. Regional and genetic studies. Petrographic reports. Prerequisite: Geology 106. Six credits. GROUT.

137. TESTING ECONOMIC MINERALS. Methods of determining quality of mineral deposits, described and illustrated by laboratory tests of coals, oil, building stone, metallic ores, etc. Prerequisites: Geology 6, 22, 105. Three credits. GROUT.

140. APPLIED PETROLOGY. To follow or accompany course 132. Determination of transparent and opaque ores and gangue minerals. Microscopic studies of paragenesis of ores and other mineral associations by means of reflected light. Practical petrographic problems. Credits to be arranged. GROUT.

144. CONSTRUCTION OF GEOLOGIC MAPS. Methods of geological examination; problems in construction and interpretation of geologic maps and sections, with special reference to underground mapping of metalliferous areas; field practice in plane table methods of topographic and geologic mapping. Prerequisites: Geology 1, 6. Three credits. QUIRKE.

151. ADVANCED GENERAL GEOLOGY. Geologic processes and their results; development of the North American continent. Prerequisite: Geology 6. Three credits. STAUFFER.

152. ADVANCED GENERAL GEOLOGY. A continuation of course 151. Three credits. STAUFFER.

160. FIELD GEOLOGY. Two weeks in the field in the summer vacation period. Fields for 1918, the Mesabi and Vermilion ranges. Cred-

it given only on completion of a satisfactory report. Prerequisite: Geology 1. Three credits. JOHNSTON.

PRIMARILY FOR GRADUATE STUDENTS

211. ADVANCED PALEONTOLOGY. Selected groups of fossils. Class work supplemented by reference readings and thesis. Three credits. STAUFFER.

214. SEMINAR IN ORE DEPOSITS. Three credits. EMMONS.

220. GLACIAL GEOLOGY. Hours to be arranged. The drift sheets, glacial lakes, the gorge of St. Anthony Falls, the Dalles of the St. Croix, and other problems. Lectures, reference reading, and field work.

241. FIELD COURSE IN GEOLOGY. To be arranged with individual students upon application to the department. Credit will be given for field work done satisfactorily as prescribed in the joint announcement of various universities.

243-244. RESEARCH COURSE IN GEOLOGY. Advanced work in general geology; chiefly individual work on selected subjects. Data and collections of material gathered in the course of field work studied under direction of instructor. As far as practicable, methods follow standards of Federal and State Surveys. EMMONS, STAUFFER.

246. PRE-CAMBRIAN GEOLOGY. The problems of pre-Cambrian correlation and structure; the pre-Cambrian stratigraphy of North America. Given in alternate years. Three credits. JOHNSTON.

247. GEOLOGY AND EXPLORATION OF LAKE SUPERIOR REGION. The geology of the Lake Superior iron districts. The methods used in the exploration of iron ore; interpretation of drill cores; cartographic expression of drill data; models of drilled areas. The principles of magnetic surveying. Three credits. JOHNSTON.

251-252. ORIGINAL PROBLEMS. Morphology and physical measurements of minerals. Three credits each. GROUT.

253-254. RESEARCH COURSE IN ORE DEPOSITS. Advanced work in ore deposits; chiefly individual work on selected subjects. Collections of material gathered in field work studied under direction of instructor. As far as practicable, methods follow standards of Federal and State Surveys. Three credits each. EMMONS, GROUT.

263-264. RESEARCH COURSE IN PETROLOGY. Advanced work in petrology; individual work on selected subjects. Collections of material gathered in course of field work studied under direction of instructor. As far as practicable, methods follow standards of Federal and State Surveys. Three credits each. EMMONS, GROUT.

289-290. RESEARCH COURSE IN GEOGRAPHY. Students will be required to do semi-independent work on selected subjects. Three credits. POSEY.

GERMAN

Professor CARL SCHLENKER; Assistant Professors OSCAR C. BURKHARD, JAMES DAVIES, SAMUEL KROESCH, WALTER R. MEYERS; Instructor ARTHUR R. GRAVES.

Prerequisites.—For major work, twenty-four credits, not including courses 1 to 3. For minor work, eighteen credits, not including courses 1 to 3. For courses in Germanic Philology see the statement of the Department of Comparative Philology.

107-108. BEGINNING MIDDLE HIGH GERMAN. Phonology, accidence, the syntax of Middle High German with reference to New High German. *Der arme Heinrich, Nibelungenlied,* selected poems of Walther. Lectures on the epic and on German life in 12th and 13th centuries. Prerequisite: Four credits in starred courses. Four credits. KROESCH.

109-110. HISTORY OF THE GERMAN LANGUAGE. Its development, with special reference to modern German. Based on Behaghel's *Deutsche Sprache,* Etymology, word formation, syntax, comparison of English and German, etc. Prerequisite: Four credits in starred courses. Four credits. KLAEBER.

119-120. THE DRAMA OF SCHILLER. Plays considered with reference to development of the dramatic idea, from expression of the Storm and Stress movement in the early plays to the classic form of the last works. Prerequisite: Four credits in starred courses. Four credits. MYERS.

127-128. LYRIC POETRY OF THE EIGHTEENTH AND NINETEENTH CENTURIES. Historical review of the best lyric poetry and the chief writers. Prerequisite: Four credits in starred courses. Four credits. DAVIES.

131-132. THE GERMAN NOVELLE. A study of the technique and development. Assigned readings and reports. (Not given in 1917-18.) Prerequisite: Four credits in starred courses. Four credits. BURKHARD.

133-134. ENGLISH INFLUENCES IN GERMAN LITERATURE. A study of the literary relations between England and Germany, with special reference to the effect upon German literature. The subject matter of the course will be varied from year to year. (Not given in 1917-18.) Prerequisite: Four credits in starred courses. Four credits. MYERS.

137-138. ASPECTS OF GERMAN LITERATURE OF THE 19TH CENTURY. The subject of the course will be announced from year to year. Subject 1917-18: The development of Realism before the rise of Naturalism. BURKHARD.

143-144. HEINE. His life and works. Assigned readings and reports. GRAVES.

PRIMARILY FOR GRADUATE STUDENTS

225-226. LITERARY PROBLEMS SEMINAR. The subject to be investigated will be announced from year to year. Subject for 1917-18: the Social Drama. SCHLENKER.

231-232. FAUST SEMINAR. (Not given in 1917-18.) SCHLENKER.

GREEK

Professor CHARLES ALBERT SAVAGE.

Prerequisites.—For major work, courses 101, 102 or their equivalent. For minor work, courses 51, 52 or their equivalent.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101. LYRIC POETRY. Selections from the elegiac, iambic, lyric, and bucolic poets. Three times a week. Prerequisite: Greek 51 or 52. Three credits. SAVAGE.

102. TRAGEDY. Aeschylus or Sophocles. Special attention given to the development of the drama, and to the literary form and dramatic representation of the plays read. Three times a week. Prerequisite: Greek 101 or equivalent. Three credits. SAVAGE.

PRIMARILY FOR GRADUATE STUDENTS

*203-204. ORATORY (advanced). A study of the development of oratorical style among the Greeks. Three times a week, one or two semesters. SAVAGE.

*205-206. DRAMATIC POETRY (advanced). The reading and critical study of representative Greek plays. Three times weekly, one or two semesters. SAVAGE.

HISTORY

Professors GUY STANTON FORD, WILLIAM STEARNS DAVIS, WALLACE NOTESTEIN, ALBERT BEEBE WHITE; Associate Professors SOLON JUSTUS BUCK, AUGUST CHARLES KREY.

Prerequisites—Of the four fields in which general survey courses in history are usually given, namely, Ancient, American, English, and European, students entering upon graduate work in history will usually be expected to have covered two of these courses, with credits not exceeding twelve hours. For the other six hours, they should have a more advanced course in one of these fields and a second course in some field of history

* For the year 1917-18, students will be expected to choose between advanced oratory and advanced drama, as the courses will not be offered simultaneously.

in which intensive work is done with the beginnings of investigation. In meeting these requirements consideration will be given to work done from the historical point of view in others of the social sciences, especially political science. The department attaches considerable importance to adequate preparation in the foreign languages, which may be used by the student in the course of advanced and research work. An especially good equipment here will be taken into consideration in weighing the student's preparation for graduate work.

101. THE FRENCH REVOLUTION. A study of the conditions in France at the opening of the Revolution, and of the revolutionary movement from 1789 to 1799. Nine credits prerequisite. Three credits. FORD.

104. THE NEAR EAST. Turkey, the Balkan States, and European diplomacy in the East since 1453, with special reference to the causes of the war of 1914. Nine credits prerequisite. Three credits. DAVIS.

121-122. HISTORY OF GREECE. Political and social development of the Greek states up to their incorporation into the Roman Empire. Permanent influence of Greek civilization. Prerequisites: nine credits in History, or six credits in History and a major in Greek. Not open to those having taken History 21. (Not offered in 1917-18.) Six credits. DAVIS.

123-124. HISTORY OF ROME. Social and political development with considerable attention to cultural subjects. Prerequisites: nine credits in History, or six credits and a major in Latin. (Not offered in 1917-18.) Six credits. DAVIS.

125. HISTORY OF THE OLD ORIENT. Origin of Egyptians, Babylonians, Assyrians, and Persians, and main features of their political history and civilization. History of the Hebrews discussed so far as it bears upon general Oriental problems. Alternates with Course 104. (Not offered in 1917-18.) Three credits. DAVIS.

133-134. ANCIENT CIVILIZATION. First semester, Greece, second semester, Rome. Social and intellectual life of antiquity, with special reference to those factors which have persisted to the present day. A working knowledge of the political history assumed. Prerequisites: twelve credits in History, or a major in Greek or Latin and six credits in History. Six credits. DAVIS.

136. OUTLINES OF PRUSSIAN HISTORY TO THE DEATH OF FREDERICK THE GREAT. (Not offered in 1917-18.) Three credits. FORD.

137. ENGLISH CONSTITUTIONAL HISTORY. Origin and early development of the English government, with emphasis upon judicial institutions. Three credits. WHITE.

141. THE WEST IN AMERICAN HISTORY TO 1815. The westward movement of population and civilization; its political, economic, and

social aspects; and the results upon national development. Three credits. BUCK.

144. HISTORY OF MINNESOTA SINCE 1815. The settlement and development—political, economic, and social—of a typical American commonwealth. Three credits. BUCK.

ADVANCED OR INTENSIVE COURSES

155. SOCIAL AND ECONOMIC DEVELOPMENT OF THE UNITED STATES, 1860-1876. A study of the economic development of the United States, with the consequent social development, during the period of the Civil War and Reconstruction. Three credits.

162. THE BEGINNINGS OF PARLIAMENT. Parliamentary beginnings from the Norman Conquest to the reign of Edward I, based wholly on original sources. Prerequisites: twelve credits in history, including Course 3-4, and permission of the instructor; knowledge of at least high school Latin. Three credits. WHITE.

163. ORIGIN OF THE ENGLISH JUDICIAL SYSTEM. The origin and early development of the most distinctive features in England's present day courts and procedure. Prerequisites: same as Course 161. (Not offered in 1917-18.) Three credits. WHITE.

171-172. GERMAN HISTORY. A general survey with special reference to the rise of Brandenburg-Prussia since 1640. Prerequisites: the permission of the instructor; twelve credits in History, or History 1-2 and a major in German. (Not given in 1917-18.) Six credits. FORD.

181. ENGLISH BACKGROUNDS OF AMERICAN HISTORY. A survey of the political and social institutions of England in the reign of Charles I, with special emphasis upon the local institutions. (Not offered in 1917-18.) NOTESTEIN.

182. ENGLISH COLONIZATION IN AMERICA. Alternates with Course 184. A study of institutions in New England and Virginia. (Not offered in 1917-18.) Three credits. NOTESTEIN.

183. THE STUART PERIOD. Emphasizes selected problems connected with the Long Parliament. Three credits. NOTESTEIN.

191. SOCIAL AND ECONOMIC EUROPE IN THE AGE OF THE CRUSADES. A study of Europe and the Latin East during the twelfth and thirteenth centuries. Prerequisites: twelve credits in History; a reading knowledge of two of the following languages: French, German, Latin. Three credits. KREY.

PRIMARILY FOR GRADUATE STUDENTS

201-202. HISTORICAL BIBLIOGRAPHY AND CRITICISM. Required of candidates for advanced degrees in History who do not present evidence of similar training elsewhere. FORD, et al.

203-204. SEMINAR IN ROMAN HISTORY. Political and administrative institutions of the Roman Empire, Augustus to Alexander Severus. DAVIS.

205-206. SEMINAR IN AMERICAN HISTORY. Studies in the history of the West, especially the upper Mississippi valley. BUCK.

207-208. SEMINAR IN MODERN EUROPEAN HISTORY. A study of revolutions and reform movements in Europe outside France. FORD.

209-210. SEMINAR IN ENGLISH HISTORY. Institutional studies, especially in the twelfth, thirteenth, and seventeenth centuries. WHITE, NOTESTEIN.

211-212. SEMINAR IN MEDIEVAL EUROPEAN HISTORY. Special problems in the period of the Crusades. KREY.

HOME ECONOMICS

Professor JOSEPHINE T. BERRY; Assistant Professor ALICE BIESTER.

Prerequisites.—For major or minor work, general chemistry and qualitative analysis, six credits; organic chemistry, three credits; quantitative methods, three credits; zoology, six credits; physiology, three credits; bacteriology, three credits; foods and cookery, and food economics, six credits.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101-102. NUTRITION. A study of the chemistry and physiology of metabolism, involving a qualitative examination of the food principles; of the body tissues; of salivary, gastric, and pancreatic digestion; of blood, bile, milk; urine analysis; metabolism experiments. Five credits. BERRY, BIESTER.

103a,b. DIETETICS. The fundamental principles of human nutrition as applied to the feeding of individuals and groups under conditions of health, and under such pathological conditions as are chiefly dependent upon dietetic treatment. BERRY, WILLIAMS.

105b. EXPERIMENTAL COOKERY. An experimental study of special problems in foods and food preparation. BERRY, WEIGLEY.

PRIMARILY FOR GRADUATE STUDENTS

201-202. SEMINAR. Meetings for the discussion of current literature, the formulation of research problems, and appropriate methods of research. Two credits. BERRY, BIESTER.

203-204. RESEARCH PROBLEMS IN NUTRITION. BERRY, BIESTER.

HORTICULTURE

Associate Professors WILFRID G. BRIERLEY, LEROY CADY, MAXWELL J. DORSEY; Assistant Professor RICHARD WELLINGTON.

Prerequisites.—For major work, twelve credits; for minor work, six credits in the department in addition to two years in Botany and one year in Entomology.

101. ADVANCED FRUIT GROWING. Lectures, laboratory, and special problems. A study in detail of the various tree fruits. Prerequisites: Horticulture 4 and 22 or equivalents. Three credits. BRIERLEY.

103. TROPICAL FRUITS. Lectures, references, and special problems. A study of the various tropical, sub-tropical, and citrus fruits. Alternates with course 101. Prerequisites: Horticulture 4 and 22 or equivalents. (Not given 1917-18.) Three credits. BRIERLEY.

105. SYSTEMATIC POMOLOGY. The classification and distribution of temperate, sub-tropical, and tropical fruits; technical description, identification, and general study of the more important varieties; judging of fruits; fruit literature. Lectures, laboratory work, references. Prerequisites: Horticulture 4 and 22. Three credits. WELLINGTON.

107. ORCHARD MANAGEMENT. Lectures, references, laboratory, and special problems. A study of the principal problems connected with the management of orchard and small fruit tracts. Prerequisites: Horticulture 4, 19 and 22. Three credits. BRIERLEY.

131. ADVANCED MARKET GARDENING. Lectures, references, and special problems. A study in detail of the various vegetables. Prerequisite: Horticulture 32. Three credits. WELLINGTON.

151-152. ADVANCED FLORICULTURE. Lectures, assigned readings, laboratory, and special problems dealing with the culture, botany, and history of florists' plants and methods of greenhouse management. Prerequisites: Horticulture 50 and 54. Three or six credits. CADY.

191. HORTICULTURE LITERATURE. This course includes a critical study of foreign and native horticultural literature and methods used in the preparation of fruit monographs and bulletins. A knowledge of French and German will be a valuable asset. Lectures. Prerequisite: Horticulture 4. Three credits. WELLINGTON.

193-194. HORTICULTURAL SEMINAR. Required of all graduate students and of seniors electing special problem work. The course is also open to properly qualified juniors. Reports and discussions of problems and investigational work. Two credits. BRIERLEY, WELLINGTON.

PRIMARILY FOR GRADUATE STUDENTS

201-202. FRUIT-GROWING RESEARCH. Special problems in fruit culture. Students will be required to continue the work over at least one summer. Open to those who have specialized in fruit-growing. Three or six credits. WELLINGTON, BRIERLEY.

203-204. FRUIT-MARKETING RESEARCH. Special problems in fruit-harvesting, by-products, storage, and marketing. Students must arrange schedules to allow for concentration on problems at most appropriate season. Open to those who have specialized in fruit-growing. Three or six credits. BRIERLEY, WELLINGTON.

205-206. FRUIT-BREEDING RESEARCH. Consists of (a) some thesis problem, (b) development of laboratory technique in breeding. Work involves reading in heredity, cytology, biometry. Students required to continue work over one summer. Open to limited number specializing in fruit-breeding. Three or six credits. DORSEY.

231-232. VEGETABLE GROWING RESEARCH. Special problems in vegetable culture. Students will be required to continue the work over at least one summer. Open to those who have specialized in vegetable-growing. Three or six credits. WELLINGTON, BRIERLEY.

LATIN

Professors JOSEPH B. PIKE, JOHN E. GRANRUD.

Prerequisites.—Courses 5 to 58 and six credits in addition selected from standard courses. A reading knowledge of French, German, or Greek is required of candidates for the Master's degree.

The degree of Master of Arts: For a major in Latin, courses 203-204 and 205-206; or one of them and in addition one course each semester selected from courses 104 to 110. The student will be expected to choose for his thesis some problem connected with one of these courses. Besides, a minor is to be carried throughout the year in one of the following departments: Comparative Philology, English, German, Greek, History, Romance Languages, or Scandinavian. For a minor in Latin, course 203-204 or course 205-206.

Candidates for the degree of Doctor of Philosophy in Latin will be expected to spend at least three years in preparation and will carry each semester in addition to one seminar course and one of the courses listed below, one course in advanced Greek (i.e., in advance of two years of preparatory Greek). A knowledge of Greek and Roman history, Greek and Roman literature, and a special knowledge of a particular Latin author, or group of authors, will be required.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

104. LATIN WRITING. Study of Latin prose style. Twice a week. (Not offered in 1917-18.) Prerequisite: Latin 58. Two credits. PIKE.

105. ROMAN ELEGY. Selections from Catullus, Tibullus, Propertius, and Ovid. The origin, development, and technique of Roman elegy. Three times a week. Prerequisite: Latin 58. Three credits. GRANRUD.

106. THE ROMAN NOVEL. *Cupid and Psyche* by Apuleius, and *Trimalchio's Dinner* by Petronius. A study of the ancient novel. Three times a week. Alternates with course 104. Prerequisite: Latin 58. Three credits. PIKE.

107. CICERO. Selections from his works. A study of his life and times, his literary art and methods. Three times a week. Alternates with Course 105. Prerequisite: Latin 58. Three credits. (Not offered in 1917-18.) GRANRUD.

108. TACITUS. Selections from his works. A study of the sources, methods, and literary characteristics of Tacitus. Three times a week. Prerequisite: Latin 58. Three credits. GRANRUD.

110. ROMAN SATIRE. Selections from Juvenal. The beginnings, evolution, and distinctive qualities of Roman satire. Juvenal as a literary artist and a moralist. Three times a week. Alternates with course 108. Prerequisite: Latin 58. Three credits. (Not offered in 1917-18.) GRANRUD.

PRIMARILY FOR GRADUATE STUDENTS

201-202. LUCRETIUS. Graduate seminar in the interpretation of the text of *De Rerum Natura*, with a study of Lucretius' philosophy and his sources. Once a week (double hour), a third hour by arrangement. PIKE.

203-204. SENECA. Graduate seminar in selections from the works of Seneca. Annotations of selections not annotated in modern tongues. Study of Stoicism. Once a week (double hour), third hour by arrangement. Alternates with course 201-202. (Not offered in 1917-18.) PIKE.

205-206. ROMAN COMEDY. Graduate seminar in the origin, history, and characteristics of comedy. Select plays of Plautus or Terence will form the basis of the work, and special attention will be devoted to the style and technique. Once a week (double hour), a third hour by arrangement. GRANRUD.

MATHEMATICS

Professors GEORGE N. BAUER, WILLIAM E. BROOKE, WILLIAM H. KIRCHNER, FRANCIS P. LEAVENWORTH; Associate Professor WILLIAM H. BUSSEY, ROYAL R. SHUMWAY; Assistant Professors HANS H. DALAKER, BURT L. NEWKIRK, HERMON L. SLOBIN, ANTHONY L. UNDERHILL.

Prerequisites.—For a major or minor work, six credits in addition to Integral Calculus and Solid Analytical Geometry.

Not more than two semester courses, of three credits each, that are open to juniors, seniors, and graduates, may be counted toward a gradute degree.

The mathematical club, consisting of members of the faculty and advanced students, meets every two weeks throughout the university year. It offers an opportunity to acquire breadth of knowledge of mathematics as a whole. The work consists of reports of current research and lectures on classical mathematical achievements of the past.

The following courses in pure and applied mathematics are offered by members of the Department of Mathematics of the College of Science, Literature, and the Arts, and the Departments of Drawing and Descriptive Geometry and Mathematics and Mechanics of the College of Engineering.

OPEN TO GRADUATE AND ADVANCED UNDERGRADUATE STUDENTS

102. ADVANCED PLANE ANALYTIC GEOMETRY. Prerequisite: Mathematics 11. Three credits. SHUMWAY.

104. MODERN SYNTHETIC GEOMETRY. A study of geometry based upon the method of central projection without the use of coördinates. Prerequisite: Mathematics 11. Three credits. BUSSEY.

106. DIFFERENTIAL EQUATIONS. An introductory course dealing with the interpretation and methods of solving ordinary differential equations. Prerequisite: Mathematics 51. Three credits. SLOBIN.

107. ADVANCED DIFFERENTIAL CALCULUS. Infinitesimals of different orders, partial and total derivatives, introduction to infinite series, Taylor's and Maclaurin's Expansions together with applications of the calculus to plane curves. Prerequisite: Mathematics 51. Three credits. BUSSEY.

108. ADVANCED INTEGRAL CALCULUS. The definite integral as the limit of a sum, improper integrals, the Beta and Gamma functions, elliptic integrals, differentiation and integration under the sign of integration, applications to geometry and mechanics. Prerequisite: Mathematics 51 and 101. Three credits. BAUER.

109-110. PROJECTIVE GEOMETRY. General considerations and constructions. Representation, projection, and transformation. Collineation. Curves and polar systems. Applications. KIRCHNER.

111-112. ADVANCED DESCRIPTIVE GEOMETRY. Methods of representation; paralled and central projection. Geometrography, axonometry, and photogrammetry. KIRCHNER.

113a,b. PERSPECTIVE. The principles and practice of perspective, including shadows, reflections, distortions, corrections, systems, methods, the practical problem, and inverse constructions. KIRCHNER.

117a,b. VECTOR ANALYSIS. Applications to geometry, mechanics, and physics. BROOKE.

118a,b. APPLICATIONS OF CALCULUS. A course designed to give a more thoro knowledge of the Calculus in its relation to Engineering problems. A selected list of problems in the various branches of Engineering. Prerequisites: Mathematics and Mechanics 76. Three credits. BROOKE.

119a,b. MODERN HIGHER ALGEBRA. Prerequisite: Mathematics 51. Three credits. SHUMWAY.

125-126. DIFFERENTIAL GEOMETRY. Course 101, which is a prerequisite, may be taken simultaneously. Application of calculus to the geometry of plane curves, space curves and surfaces. Six credits. UNDERHILL.

127a,b. INFINITE SERIES. (Three hours.) Open to seniors and graduate students who have gained seventeen credits in addition to algebra and trigonometry. Three credits. BAUER.

140. METHOD OF LEAST SQUARES. (Two hours.) The combination and adjustment of observations and the discussion of their precision as applied especially to engineering physics and astronomy. Prerequisite: Mathematics 51. Two credits. LEAVENWORTH.

151. MECHANICS OF MATERIALS. The theory of beams, columns, shafts, reinforced concrete, hollow cylinders and spheres, rollers, and plates. The general theory of internal stress. Three credits. BROOKE, NEWKIRK.

152. HYDRAULICS. Laws of the equilibrium, pressure, and flow of liquids. Three credits. BROOKE, NEWKIRK.

153. THERMODYNAMICS. The thermodynamics of steam and gas engines. The mechanical theory of heat as applied to steam, oil, gas, and hot air engines, and to compressors; including the use of steam tables, entropy diagrams, etc. Three credits. BROOKE.

154. STEAM AND HYDRAULIC TURBINES. Various types of turbines, velocity, impulse, and reaction; nozzle, vanes, discs, bearings, governors, thermodynamic analysis, and efficiency. Three credits. BROOKE.

PRIMARILY FOR GRADUATE STUDENTS

201a,b. THEORY OF NUMBERS. (Three hours.) BUSSEY.

203a,b. THE GALVES THEORY OF EQUATIONS. (Three hours.) BUSSEY.

207a,b. HIGHER PLANE CURVES. (Three hours.) SLOBIN.

209-210. THEORY OF FUNCTIONS OF A COMPLEX VARIABLE. (Three hours.) BAUER, DALAKER.

211. THEORY OF FUNCTIONS OF REAL VARIABLES. (Three hours.) UNDERHILL.

212. CALCULUS OF VARIATIONS. (Three hours.) UNDERHILL.

215-216. ADVANCED DIFFERENTIAL EQUATIONS. (Three hours.) Ordinary and partial differential equations; general theory of linear differential equations; most important differential equations of mathematical physics; elements and applications of theory of functions arising in theory of differential equations. SLOBIN.

251-252. ADVANCED ANALYTICAL MECHANICS. (Three hours.) BROOKE.

253-254. ADVANCED TECHNICAL MECHANICS. (Three hours.) Special problems in the dynamics of machinery; vibrations, balancing, whirling shafts, rapidly rotating disks, dynamical stability, gyroscope. NEWKIRK.

255-256. THE MATHEMATICS THEORY OF ELASTICITY. (Three hours.) BROOKE.

258. FOURIER'S SERIES AND SPHERICAL HARMONICS. (Three hours). BROOKE.

MECHANICAL ENGINEERING

Professor JOHN J. FLATHER; Assistant Professor JOHN V. MARTENIS.

Prerequisites.—For major work, eighteen credits; for minor work, six credits in the department.

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

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

111. INDUSTRIAL MANAGEMENT. Shop and factory organization and management; cost and wage systems. Depreciation of equipment. Machine burden. Time studies. Two credits. FLATHER.

112. INDUSTRIAL MANAGEMENT. Same as course 111. FLATHER.

117. MACHINE DESIGN. Calculation and design of such machine parts as fastenings, bearings, rotating pieces, pulleys, spur gearing, bevel gears, spiral gears, and rope driving. Recitations, lectures, and drawing room practice. Prerequisite: Mathematics 76. Three credits. FLATHER, MARTENIS.

118. MACHINE DESIGN. Continuation of Course 117. First six weeks of semester. One credit. FLATHER, MARTENIS.

119. GAS ENGINES AND PRODUCERS. Principles of two-cycle and four-cycle engines; cylinder construction and arrangement; valve gears and starting mechanisms; speed control, ignition, and cooling. Application of the indicator and consideration of indicator diagrams. A study of the power-gas producer. Prerequisite: Chemistry 38. Three credits. MARTIN.

120. MACHINE DESIGN. Application of graphical methods to the design of valve-gears and link motions. Zeuner diagrams, indicator cards. Lectures and drawing-room practice. Last twelve weeks. Prerequisite: Mechanical Engineering 130. Two credits. FLATHER, MARTENIS.

121. STEAM ENGINE DESIGN. Calculations and working drawings for a high speed automatic steam engine. Theoretical diagrams and determination of details. Prerequisite: Mechanical Engineering 130. Three credits. FLATHER.

123. GAS ENGINE DESIGN. Calculations and working drawings for a single cylinder stationery gas engine. Theoretical diagrams and details of parts. Prerequisite: Mechanical Engineering 119. Three credits. FLATHER.

124. ADVANCED MACHINE DESIGN. Original design, including machinery for changing size and form, cranes, pumping and transmission machinery and engineering appliances. Lectures, problems, and drawing-room practice. Prerequisite: Mechanical Engineering 117. Three credits. FLATHER.

125. TOOL DESIGN. Designs of tools for manufacturing inter-changeable parts; jigs and milling fixtures. Three credits. FLATHER.

126. TOOL DESIGN. Same as course 125. FLATHER.

127. POWER PLANT DESIGN. Problems, designs and estimates for power plants, central stations, and factory equipment. Selection of motive powers, relative advantages of steam and producer gas plants, choice of engines and boilers; pumps, shafting, piping, and accessories. Prerequisite: Mechanical Engineering 130, 131. Three credits. FLATHER.

128. POWER PLANT DESIGN. Same as course 127. FLATHER.

130. STEAM BOILERS AND ENGINES. Construction of steam boilers, settings, furnaces and stokers, smoke prevention, chimneys, evaporation. Mechanics of steam engine; slide valve; Zeuner diagram, Corliss and other valves; governors; indicator cards; compounding. Four credits. FLATHER.

131. MEASUREMENT OF POWER. A study of the methods employed in measuring power. Dynamometers. Pony brakes; power required to drive machine tools and shafting. Selection of motors for industrial plants. Prerequisite: Mathematics 152. Two credits. FLATHER.

132. COMPRESSED AIR AND REFRIGERATING MACHINERY. Air compressors and motors, and the transmission of power by compressed air. Principles of refrigeration. Various types of refrigerating machines, refrigerants, and applications to ice-making, cold stor-

age, cooling of air, liquids and solids. Lectures and recitations. Three credits. MARTENIS.

137. RAILWAY TECHNOLOGY. The object of this course is to familiarize the student with the practical details of construction of locomotives, and consists in part of a systematic course of visits to the various railroad shops in the vicinity; lectures and recitations. Two credits. MARTENIS, MARTIN.

139. LOCOMOTIVE CONSTRUCTION. Lectures, reading, and recitations on design and construction of locomotives, supplementing course 137. Prerequisite: Mechanical Engineering 137. Two credits. MARTENIS.

140. RAILWAY DESIGN. This course treats (a) of link and valve motions; continuation of Course 139 with special applications of Stephenson and Walschaert gears; (b) of locomotives and car details; (c) of locomotive boiler; (d) of assembled parts. Prerequisite; Mechanical Engineering 137. Three credits. FLATHER.

PRIMARILY FOR GRADUATE STUDENTS

201-202. SEMINAR. FLATHER, MARTENIS.

MEDICINE

(Including General Medicine and Nervous and Mental Diseases.)

Professors CHRISTOPHER GRAHAM, ARTHUR S. HAMILTON, THOMAS B. HARTZELL, HENRY S. PLUMMER, LEONARD G. ROWNTREE, S. MARX WHITE; Associate Professors HERBERT Z. GIFFIN, WALTER D. SHELDON, HENRY L. ULRICH; Assistant Professors GEORGE B. EUSTERMAN, ARCHIBALD H. LOGAN, ROBERT D. MUSSEY.

The graduate work in the department of medicine is designed to prepare students for practice of the specialty of internal medicine, research in the problems of general medicine, and for the specialty of nervous and mental diseases, as the case may be.

For the description of courses offered, see special bulletin of Graduate Work in Medicine.

METALLOGRAPHY

Assistant Professor SAMUEL L. HOYT.

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

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

153-154. METALLOGRAPHY. Theory of metallic alloys. Metallographic technique. Properties of metals and alloys. Metallography of

iron and steel and commercial alloys. Technical metallography. Three lectures, four laboratory hours a week; both semesters. Prerequisites: Chemistry 12, Physics 1 and 2. Five credits. HOYT.

160. METALLOGRAPHY FOR CHEMICAL STUDENTS. The preparation of metallic alloys; their microscopical and thermal analysis. Steel and other commercial alloys with particular reference to chemical metallurgy. Corrosion of steel and non-ferrous alloys. Metallography applied to analytical chemistry. Prerequisites: Chemistry 12, Physics 1-2. Three credits. HOYT.

163-164. ADVANCED METALLOGRAPHY. Technical and scientific research. The study of railway materials, automobile steels, tool steels, special alloys, etc. Special problems in metallography with outside reading. Seminar work on the recent advances in metallography. Hours to be arranged. Prerequisite: Metallurgy 154. Credits to be arranged. HOYT.

OBSTETRICS AND GYNECOLOGY

Professor JENNINGS C. LITZENBERG.

For courses of study offered, see special bulletin of Graduate Work in Medicine.

OPHTHALMOLOGY AND OTO-LARYNGOLOGY

Professor FRANK C. TODD; Associate Professors CARL FISHER, JUSTUS MATTHEWS, WILLIAM R. MURRAY; Assistant Professors FRANK E. BURCH, GORDON B. NEW.

For courses of study offered, see special bulletin of Graduate Work in Medicine.

PATHOLOGY, BACTERIOLOGY, AND PUBLIC HEALTH

Professors HAROLD E. ROBERTSON, EDWARD G. ROSENOW, LOUIS B. WILSON; Associate Professors ELEXIOUS T. BELL, WINFORD P. LARSON, WILLIAM C. MACCARTY, ARTHUR H. SANFORD; Assistant Professor WAYNE W. BISSELL.

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

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

Students who elect their major work in bacteriology must present credits of general bacteriology or its equivalent.

For courses of study offered, see special bulletin of Graduate Work in Medicine.

PEDIATRICS

Professor JULIUS P. SEDGWICK.

The graduate work of the Department of Pediatrics is arranged with the intention:

(a) to prepare students to become competent pediatrists;

(b) to put them in position to attack original pediatric problems;

(c) to make them competent teachers in the subject.

For courses of study offered, see special bulletin of Graduate Work in Medicine.

PHARMACOLOGY AND THERAPEUTICS

Professor ARTHUR D. HIRSCHFELDER; Associate Professor EDGAR D. BROWN.

For courses of study offered, see special bulletin of Graduate Work in Medicine.

PHILOSOPHY

Professors NORMAN WILDE, DAVID F. SWENSON; Assistant Professor RUPERT C. LODGE.

Prerequisites.—For a major, twelve credits including three in logic and three in psychology; for a minor, six credits of work in the department are prerequisites.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

100. CRITICAL IDEALISM. A systematic introduction to present-day philosophical construction. Six credits prerequisite. Three credits. LODGE.

117. ADVANCED ETHICS. A study of the main types of ethical theory. Six credits prerequisite. Three credits. WILDE.

121-122. HISTORY OF PHILOSOPHY. Outline of the history of thought from the Greeks to Kant. Intended as a cultural course, as well as a preparation for the study of special periods. First semester, ancient philosophy; second semester, modern. Six credits prerequisite. Six credits. WILDE.

124. THE PHILOSOPHY OF THE NINETEENTH CENTURY. Continues course 122. Modern currents of thought from the Idealism of Fichte and Hegel, to the philosophy of evolution, pragmatism and the new realism. Prerequisites: Nine credits including six in philosophy. Three credits. LODGE.

125. THE PHILOSOPHY OF PLATO. The reading and discussion of the principal dialogues with a view to understanding the problem and method of Greek philosophy as illustrated in the writings of Plato. Prerequisites: Nine credits including six in philosophy. Three credits. LODGE.

127. ANCIENT PHILOSOPHICAL THEORIES OF THE STATE. Introduction to the philosophical theory of the state in Greek and medieval thought. Special attention is paid to the theories of Plato and Aristotle. Six credits in Philosophy or Political Science prerequisite. Three credits. LODGE.

136. SCANDINAVIAN PHILOSOPHY. The philosophical thought of the Nineteenth century in Scandinavian countries, including a comparative study of Boström and Kierkegaard. Reading knowledge of Scandinavian required. Nine credits prerequisite. Three credits. SWENSON.

138. ADVANCED LOGIC. Different topics from year to year, including the organization of the sciences, the presuppositions of knowledge, recent mathematical and symbolic logic, and the pragmatic theory of logic. Prerequisites: Six credits including Philosophy 2. Three credits. SWENSON.

141-142. SEMINAR IN PHILOSOPHY. Individual investigation in philosophy. Studies in either ancient or modern philosophy and ethics; critical and constructive studies of logic, metaphysics, or ethics. Character of work and general topic for year ascertained by consultation with department. Prerequisites: Twelve credits in Philosophy. Six credits. WILDE.

PHYSICS

Professors HENRY A. ERIKSON, ANTHONY ZELENY; Associate Professor LOUIS W. MCKEEHAN; Assistant Professor JOHN T. TATE.

Prerequisites.—For major work, Mathematics 11 and 51 and fourteen credits in Physics beginning with 1, 7 or 21. For minor work, the fourteen credits in Physics just mentioned.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

121-122. DYNAMICS. Some problems essential for advanced physics and chemistry. Prerequisites: Physics 2 or 8 or 22 and Mathematics 51. Six credits. TATE.

155. SPECTROMETRY. Measurements involving the use of prism spectroscopes, plane transmission and reflection gratings, concave grating, and the interferometers. Prerequisites: Physics 52 and 82. Three credits. ERIKSON.

161. ELECTRICITY AND MAGNETISM. The phenomena accompanying the passage of electricity through solids, liquids, and gases. One lecture

two recitations, and one two-hour laboratory period a week. Prerequisites: Physics 2 and 4, or 8 and 10, or 22. Mathematics 51. Four credits. ZELENY.

162. ELECTRICAL MEASUREMENTS. Devoted mainly to the study of potentiometer methods, capacity, inductance, and magnetic induction. One recitation and two two-hour laboratory periods a week. Prerequisites: Physics 2, 8, or 161. Three credits. ZELENY.

166. ELECTRICAL MEASUREMENTS OF PRECISION. Precision measurements of electro-motive force, current, resistance, capacity, inductance, and magnetic flux. Use of apparatus of highest precision. Special problems. Three two-hour laboratory periods a week. Prerequisite: Physics 162 or 163. Three credits. ZELENY.

177. RADIOACTIVITY. Lectures, experimental and descriptive; the various theories and methods of investigation. Detailed study of the radioactive elements. Prerequisite: Eight credits in Physics. Mathematics 11. Three credits. MCKEEHAN.

178. RADIOACTIVITY MEASUREMENTS. Laboratory technique in radioactivity. Prerequisite: Physics 177. Three credits. MCKEEHAN.

181. ADVANCED PHYSICAL MEASUREMENTS. Individual work in the laboratory on topics specially chosen to serve best the needs and capacity of each student; intended to introduce him to some of the more intricate physical measurements. Prerequisites: Physics 82 or 155, or 166, or 178. Three credits. ERIKSON, ZELENY, MCKEEHAN, TATE.

182. ADVANCED PHYSICAL MEASUREMENTS. Continuation of Course 181. Three credits.

191a,b. ELEMENTARY PHYSICAL INVESTIGATION. The experimental or theoretical study of physical phenomena, the nature or laws of which are not yet understood. Prerequisites: Physics 82, or 155 or 166 or 178. Three credits. ERIKSON, ZELENY, MCKEEHAN, TATE.

192a,b. ELEMENTARY PHYSICAL INVESTIGATION. Continuation of course 191. Three credits.

COURSES PRIMARILY FOR GRADUATE STUDENTS

221-222. ADVANCED ANALYTICAL MECHANICS. Dynamics and statics of particles and rigid bodies. Elasticity and hydromechanics. TATE.

247. THE KINETIC THEORY OF GASES. The development and comparison of the principles of statistical mechanics and thermo-dynamics as applied to gases. TATE.

248. THERMAL RADIATION AND QUANTUM THEORY. The properties of black radiation; laws of Kirchhoff, Stefan and Wien. Equipartition of energy and its bearing on thermal radiation; Planck's quan-

tum hypothesis and radiation law. Other applications of quantum theory. TATE.

249. TEMPERATURE AND HEAT MEASUREMENTS. Precision measurements with liquid and gas thermometers, thermoelectric and resistance thermometers, and radiation pyrometers; self-recording instruments. Modern methods employed in the measurement of the thermal constants at all temperatures. Lectures, laboratory work. (Not offered in 1917-18.) ZELENY.

251. ADVANCED OPTICS. ERIKSON.

261-262. MATHEMATICAL THEORY OF ELECTRICITY AND MAGNETISM. A comprehensive study of the modern Maxwell-Lorentz theory. (Not offered in 1917-18.)

272. DISCHARGE OF ELECTRICITY THROUGH GASES. Conductivity imparted to gases by X-rays, ultra-violet light, radioactive substances, glowing metals; discharge of electricity from points in vacuum tubes; spark and arc discharges; methods of measuring velocity of ions. MCKEEHAN.

273. MEASUREMENTS IN THE DISCHARGE OF ELECTRICITY THROUGH GASES. (Not offered in 1817-18.) MCKEEHAN.

276. ELECTRON THEORY. (Not offered in 1917-18.) ERIKSON.

293-294. RESEARCH IN ELECTROKINETICS. Experimental investigations. This course may be continued through any desired number of years. ZELENY.

295-296. RESEARCH IN IONIZATION. Experimental investigations. This course may be continued through any desired number of years. MCKEEHAN.

297-298. RESEARCH IN RADIOACTIVITY. Experimental investigations. This course may be continued through any desired number of years. MCKEEHAN.

PHYSIOLOGY AND PHYSIOLOGIC CHEMISTRY

Professors ELIAS P. LYON; Associate Professors RICHARD O. BEARD, JESSE F. MCCLENDON, FREDERICK H. SCOTT; Assistant Professors EDWARD C. KENDALL, FRANCIS B. KINGSBURY, CHAUNCEY J. V. PETTIBONE.

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

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

For a minor or major in physiologic chemistry, general and organic chemistry, twelve credits, and prerequisites, and physical chemistry is desirable.

In addition, each student majoring in physiology or physiologic chemistry must have had the general courses, Physiology 102, 103, 104, or the equivalent.

For courses of study offered, see special bulletin of Graduate Work in Medicine.

PLANT PATHOLOGY AND BOTANY

Professor EDWARD M. FREEMAN; Associate Professor ELVIN C. STAKMAN.

Prerequisites.—The minimum requirement is (a) three years (eighteen credits) in botany, one year (six credits) of which shall be mycology; (b) general bacteriology one half year (three credits) or some equivalent; (c) one year (six credits) in pathology—preferably two years (twelve credits).

103. BACTERIAL DISEASES. MORPHOLOGY, classification, and physiology of phytopathogenic bacteria; general phenomena of bacterial infection and host reaction; detailed study of plant diseases caused by bacteria and filterable viruses. Required for specializing in pathology or entomology. Prerequisites: course 1 and Pathology 58. Three credits. STAKMAN.

104. PRINCIPLES OF PATHOLOGY. Comparative biology of plant pathogens; pathological plant anatomy, parasitism, biologic specialization, resistance and immunity. Required for specializing in pathology or entomology. Prerequisites: course 1 and Pathology 58. Three credits. STAKMAN.

201-202. GRADUATE PATHOLOGY. Open to graduates who have had two years of general botany and Pathology 1, 101, 102 and Pathology 4, or its equivalent. A special historical study of the botanical basis of plant pathology. Special problems. For minor or major. Six credits. FREEMAN, STAKMAN.

203-204. SPECIAL PROBLEMS IN GRADUATE PATHOLOGY. Special assignment of work in laboratory and field problems in pathological research. Arrange. FREEMAN, STAKMAN.

POLITICAL SCIENCE

Professors WILLIAM A. SCHAPER, CEPHAS D. ALLIN, JEREMIAH S. YOUNG.

Prerequisites.—For major work, twelve credits; for minor work, six credits in the subject.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101. AMERICAN CONSTITUTIONAL LAW. Constitutional law, its origin

and nature; American constitutions, how made and amended; the courts and the development of the Constitution; Federal and State relations; the territories, their acquisition and government; citizenship. Six credits prerequisite. Three credits. SCHAPER.

102. MODERN POLITICAL THOUGHT. Nature and purpose of the modern state; sovereignty; the growth of democracy; the decline of individualism; the increase of governmental activities; great contributions to political thought from Hobbes, Locke, and Rousseau to the present time. Six credits prerequisite. Three credits. SCHAPER.

104. POLITICAL PARTIES. (Not offered in 1917-18.)

105. COMPARATIVE ADMINISTRATION. Administration as a science; its origin and development; analysis of administrative systems of United States, England, France, and Germany, with special reference to the law of officers, merit system, and special administrative tribunals. Six credits prerequisite. Three credits. YOUNG.

106. LEGISLATIVE POWER AND METHODS. Source and scope of the legislative power; methods used by legislative bodies; current public questions; formulation and defense of legislative bills. Six credits prerequisite. Three credits. YOUNG.

108. THE POLICE POWER. The nature and scope of the police power; the public welfare, including safety, order, morals, and protection against business fraud and oppression; the fundamental rights under the police power. Three credits. YOUNG.

109. DIPLOMACY. The growth of international relations; the mode of conducting foreign affairs; diplomatic and consular service; the framing, interpretation and termination of treaties and compacts. Prerequisites: six credits or Political Science 1 and History 156. Three credits. ALLIN.

110. INTERNATIONAL LAW. Nature, sources, and sanction of international law; the status of nations, the rules of peace, neutrality, and war, and the arbitration movement. Prerequisites: Political Science 1 and 3, or 109. Three credits. ALLIN.

112. COMPARATIVE FEDERAL GOVERNMENT. Ancient and modern federal unions, especially the constitutions of the United States, Switzerland, Canada, and Australia, the South African Union and the proposals for Imperial federation. Six credits prerequisite. Three credits. (Not given in 1917-18.)

114. THE GOVERNMENT AND POLITICS OF THE BRITISH EMPIRE. The origin, nature, and operation of the British constitution, political parties and principles in Great Britain and the Colonies. Six credits prerequisite, or Political Science 1 and History 7. Three credits. ALLIN.

201-202. SEMINAR IN POLITICAL SCIENCE. Research in the field of Political Science. The discussion of current problems in politics and administration. Six credits. SCHAPER, ALLIN, YOUNG.

PSYCHOLOGY

Professor ROBERT M. YERKES; Associate Professor HERBERT WOODROW; Assistant Professors JOSEPH PETERSON, HENRY T. MOORE.

Prerequisites.—For either major or minor work, twelve credits. Six of these may be in starred courses in either philosophy or educational psychology.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101a or 101b. EXPERIMENTAL PSYCHOLOGY. Training course in mental measurements. Prerequisite: Psychology 1-2. Three credits. WOODROW.

103-104. COMPARATIVE AND GENETIC PSYCHOLOGY. Mental evolution and development. The application of the comparative method to conscious behavior. Prerequisite: Psychology 1-2. Six credits. YERKES and LASHLEY.

105. MENTAL RETARDATION. A study of retarded mental development, its causes and treatment. Once a week. Prerequisite: Psychology 1-2. Two credits. WOODROW.

107. SOCIAL PSYCHOLOGY. A study of the mental interactions of individuals in society with especial reference to the instinctive emotional basis of human association. Prerequisite: Psychology 1-2. Three credits. MOORE.

108. APPLIED PSYCHOLOGY. A survey of the applications of psychology to law, medicine, salesmanship, advertising, and vocational guidance. Lectures, recitations, group tests. Prerequisite: Psychology 1-2. Three credits. MOORE.

110. ABNORMAL PSYCHOLOGY. Unusual and pathological phenomena; the subconscious, dreams, suggestibility, mental disorders, secondary personalities. Prerequisite: Psychology 1-2. Three credits. PETERSON.

111. HISTORY OF PSYCHOLOGY. An historical and critical examination of leading psychological conceptions. Nine credits prerequisite. Three credits. PETERSON.

115-116. SEMINAR IN EXPERIMENTAL AND PHYSIOLOGICAL PSYCHOLOGY. Twelve credits prerequisite. Six credits. WOODROW and PETERSON.

117-118. SEMINAR IN COMPARATIVE AND GENETIC PSYCHOLOGY. Twelve credits prerequisite. Six credits. YERKES and LASHLEY.

RHETORIC

Professor JOSEPH M. THOMAS; Assistant Professors DANIEL FORD, CHARLES NICHOLS, SIDNEY F. PATTISON, ANNA H. PHELAN, CHARLES E. SKINNER.

Prerequisites.—For major work, not less than eighteen credits in Rhetoric and twelve credits in English. For minor work, not less than a minor in Rhetoric.

In cases where the nature of the work to be undertaken by candidates for the Master's degree warrants it, Greek or Latin may be substituted for French or German.

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

102. VERSIFICATION. The nature of poetry and a detailed analysis of English meters and of the various English verse forms. The theory accompanied by criticism of current poetry, and practice in writing verse. Prerequisites: Rhetoric 1-2, 11-12 or 15-16. Three credits. NICHOLS.

103-104. STUDIES IN STRUCTURE AND STYLE. Theory of structure and style; rhetorical analysis of standard English prose; themes based on personal observation, current reading, and investigation; preparation of essays with particular classes of readers in view. Prerequisites: Rhetoric 1-2, 11-12 or 15-16. Six credits. FORD.

107. IMITATIVE WRITING. The principles of structure, diction, and style, which underlie the work of leading English writers; application of these principles in both imitative and original compositions. Prerequisites: Rhetoric 1-2, 11-12 or 15-16. Three credits. THOMAS.

110. SHORT-STORY WRITING. The technique of the short story accompanied by constructive work in story-writing. Prerequisites: Rhetoric 1-2, 11-12 or 15-16. Three credits. THOMAS.

111-112. ESSAY WRITING. Practice in didactic, biographical, critical, informal essays. Two essays a semester. Individual aid given to students in gathering material, planning each paper, and criticism of each essay. Analysis of modern essays. Prerequisites: Rhetoric 1-2, 11-12 or 15-16. Six credits. PATTISON.

115-116. DRAMATIC TECHNIQUE. The principles of plotting, characterization, climax, dialogue, and the making of scenarios. The writing of three plays; a dramatization of a short story, an original one-act play, and a three-act play. Required readings, laboratory work in the theater, criticisms of local productions. Open to those who have completed course 11-12, and who are taking or have taken English 59-60 or 113-114. Six credits. SKINNER.

119-120. SEMINAR IN WRITING. For a limited number of advanced students who write with facility, and who desire personal criticism

and direction. Criticism of manuscripts submitted for inspection, with lectures upon the fundamental principles of English composition. Open with special permission to seniors and graduate students who have completed courses 1-2, 11-12 or 15-16, and at least one other course. Required of Honors Course students. Four credits. THOMAS.

PRIMARILY FOR GRADUATE STUDENTS

201-202. SEMINAR IN RHETORIC. (Graduate seminar but open to seniors taking the Honors Course.) Lectures, discussions, and reports on special problems of rhetorical theory. The subject for 1917-18: A study of critical theory beginning with Plato and Aristotle, and laying emphasis on the more important English and French writers. Prerequisites: courses 1-2, 11-12 or 15-16, and at least one other course. For those who are specializing in Rhetoric and Composition. Six credits. THOMAS.

ROENTGENOLOGY

Professor RUSSEL D. CARMAN; Assistant Professor ALEXANDER B. MOORE

For courses of study offered, see special bulletin of Graduate Work in Medicine.

ROMANCE LANGUAGES

Professors EVERETT WARD OLMSTED, COLBERT SEARLES, IRVILLE C. LECOMPTE; Assistant Professors FRANCIS B. BARTON, RUTH S. PHELPS, EDWARD H. SIRICH.

Prerequisites.—For major or minor work, Survey of French Literature; at least two courses in conversation and composition; and at least two century courses. Candidates for Master's degree must also have a reading knowledge of at least one other modern language. Candidates for the Doctor's degree must have had at least two years' work in Latin, and a reading knowledge of a second Romance language and of German.

101-102. FRENCH LITERATURE, EIGHTEENTH CENTURY. Reading and discussions based upon texts and collateral reading. Prerequisite: Romance Languages 5-6 or equivalent. Six credits. SEARLES.

103-104. FRENCH LITERATURE. SEVENTEENTH CENTURY. Reading and discussions based upon texts and collateral reading. Prerequisites: course 5-6 or equivalent. Six credits. OLMSTED.

105-106. FRENCH LITERATURE, SIXTEENTH CENTURY. Prerequisites: courses 101-102, 103-104 or equivalent. Six credits. SIRICH.

107-108. FRENCH ORAL DICTION. Dissertations orales sur des sujets variés. Prerequisite: course 61-62 or equivalent. Four credits. LECOMPTE.

109-110. FRENCH SYNTAX AND COMPOSITION. Special studies in characteristic problems of French syntax. Prerequisite: course 63-64 or equivalent. Two credits. LECOMPTE.

111-112. LECTURES IN FRENCH. Prerequisites: courses 5-6, 61-62 or equivalent. Four credits. (Not given in 1917-18.)

113-114. FRENCH LITERATURE. Classicism. Literary studies of the classic French monuments. Prerequisite: course 103-104 or equivalent. Four credits. SEARLES.

115-116. FRENCH LYRIC POETRY. Prerequisite: course 103-104 or equivalent. Four credits. (Not given in 1917-18.) SEARLES.

117-118. FRENCH DRAMATIC LITERATURE. Prerequisite: course 103-104 or equivalent. Four credits. OLMSTED.

131-132. ADVANCED SPANISH CONVERSATION. Prerequisite: course 41-42 or equivalent. Two credits. HENRIQUEZ.

133-134. ADVANCED SPANISH COMPOSITION. Prerequisite: course 43-44 or equivalent. Four credits. HENRIQUEZ.

135-136. SPANISH NOVEL. A study of the development of Spanish fiction from the picaresque novel to that of the present day. Prerequisite: course 39-40 or equivalent. Four credits. (Not given in 1917-18.) OLMSTED.

141-142. SPANISH LECTURES. Prerequisites: courses 41-42, 43-44. Four credits. HENRIQUEZ.

151-152. DANTE, PETRARCH, BOCCACCIO. An introduction to the works of these authors; reading in class, lectures, reports, and collateral reading. Prerequisites: courses 51-52 and 53-54 or equivalent. Four credits. PHELPS.

153-154. DANTE IN ENGLISH. Two credits. PHELPS.

161-162. TEACHERS' COURSE. Two credits. BARTON et al.

PRIMARILY FOR GRADUATE STUDENTS

201-202. OLD FRENCH PHILOLOGY. Three hours per week devoted to French Philology. LECOMPTE.

203-204. OLD FRENCH LITERATURE. (Not given in 1917-18.)

205-206. FRENCH SEMINAR. SEARLES.

221-222. OLD SPANISH PHILOLOGY. (Not given in 1917-18.)

223-224. OLD SPANISH LITERATURE. One hour per week. HENRIQUEZ.

231-232. SPANISH SEMINAR. OLMSTED.

SCANDINAVIAN

Professors GISLE BOTHNE, ANDREW A. STOMBERG.

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

COURSES FOR UNDERGRADUATE AND GRADUATE STUDENTS

101-102. MODERN NORWEGIAN LITERATURE. Norwegian literature from 1814 to the present day. Prerequisites: Scandinavian 1-2 and 3-4. Six credits. BOTHNE.

103. EARLIER NORWEGIAN LITERATURE. History of Literature. Sagas, Norwegian and Danish folk-songs, Holberg, Oplysuingstiden. Prerequisite: Scandinavian 101-102. Three credits. BOTHNE.

104. IBSEN. Lectures, reading, and interpretation. Prerequisite: Scandinavian 101-102. Two credits. BOTHNE.

107-108. SWEDISH LITERATURE. History of Swedish literature from 1719 to the present time. History of the literature and study of modern authors, including Selma Lagerlöf, Geijerstam, Strindberg. Prerequisite: Scandinavian 5 and 6. Six credits. STOMBERG.

109. STRINDBERG. Lectures, reading and interpretation. Two credits. STOMBERG.

112. MODERN DANISH LITERATURE. From Oehlenschläger to the present time. Three credits. BOTHNE.

113-114. OLD NORSE (ICELANDIC). Grammar and reading. Gunnlaugs Saga Ormstungu. Four credits. BOTHNE.

PRIMARILY FOR GRADUATE STUDENTS

201-202. SEMINAR IN HISTORY OF SCANDINAVIAN LANGUAGES. BOTHNE.

203-204. SEMINAR IN OLD NORSE. The Elder Edda. BOTHNE.

209-210. SEMINAR IN MODERN SWEDISH LANGUAGE AND LITERATURE. The course is based upon Schuck and Warburg's Illustrated Svensk Litteraturhistoria and includes a study of special authors. STOMBERG.

215-216. SEMINAR IN NORWEGIAN LITERATURE. The various phases of the cultural development of Modern Norway are discussed. The complete works of Björnson or Ibsen are especially studied. BOTHNE.

SOCIOLOGY AND ANTHROPOLOGY

Professors ALBERT E. JENKS, ARTHUR J. TODD.

Prerequisites.—For major work, 18 credits, for minor work, 12 credits in the department.

102. SOCIAL THEORY. The foundations of sociology; the leading American, English, French, and German writers and their methods of approach to the science and the leading results they have secured. Textbook, readings, lectures, essay. Prerequisites: Sociology 1 or 3, 9 or 10, and one other course. Three credits. TODD.

104. STATE CARE OF DEPENDENTS, DEFECTIVES, AND DELINQUENTS IN MINNESOTA. Organization, machinery, and function of such institutions as the state hospitals, asylums, training schools, prison, schools for the feeble-minded, the blind, and the deaf. Lectures and readings. Prerequisites: Sociology 1 or 3, 9 or 10, and one other course. Two credits. TODD and Specialists from the Board of Control and institutions studied.

106. TREATMENT OF THE DELINQUENT CLASSES. The causes of crime; nature of the criminal; criminal procedure; methods of treatment (prisons, reformatories, parole, probation); the juvenile offender; juvenile courts; preventive methods. Three credits. TODD.

108. THE PHILIPPINE PEOPLE. Comparative study of the four large ethnic and cultural groups of people in the Philippine Islands; policy of the insular civil government as it affects American home interests in the Orient. Lectures, readings, and essay. Prerequisites: Sociology 1 and one other course. Three credits. JENKS.

110. PHYSICAL ANTHROPOLOGY. Theory of evolution as applied to natural and cultural man; theory of eugenics and its application. Prerequisites: course 1, and Animal Biology 1-2, and one other course in Sociology and Anthropology Three credits. JENKS.

112. THE AMERICAN NEGRO. The negro in Africa; development of the American negro; present characteristics, conditions, developing tendencies, and probable future of the American negro. Lectures, readings, and essay. Prerequisites: Sociology 1 and two other courses. Three credits. JENKS.

113. THE AMERICAN PEOPLE. Dominant characteristics of the diverse foreign peoples now in the United States; their modification in America; the importance of these peoples to the American nation. Lectures, readings and essay. Prerequisites: Sociology 1 and two other courses. Three credits. JENKS.

114. THE AMERICAN PEOPLE (Continued). Essential and unique historical Americanisms, and their value and virility for the future; facts and forces of amalgamation and assimilation in America; America's ethnic problems. Lectures, readings, and essay. Prerequisites: Sociology 1, 113, and one other course. Three credits. JENKS.

117. SOCIAL PSYCHOLOGY. An introduction to the study of the reciprocal influence of minds in society upon one another. Prerequisites:

course 3 and one other course, and course 1-2 or 5 in the department of Psychology. Three credits. PETERSON.

119. THE FAMILY. The evolution of the family; its various forms and their relation to other social institutions; the service of the family in social evolution; contemporary problems of the family (standards of living, birth rate, feminism, etc.) Three credits. TODD.

120. SOCIAL PROGRESS. An analysis of fundamental social institutions in their relation to human progress. TODD.

123. PROBLEMS IN ANTHROPOLOGY. An advanced course of method and independent research. Three credits. JENKS.

201-202. RESEARCH IN SOCIOLOGY. An advanced course of methods and independent research. Two hours. TODD.

204. SEMINAR IN ANTHROPOLOGY. Individually directed research. One, two, or three hours. JENKS.

SOILS

Professor FREDERICK J. ALWAY; Instructor PAUL R. MCMILLER.

Prerequisites.—For major work, at least two years of work in chemistry, including both quantitative analysis and organic chemistry, and one year of work in general physics. Those students who have not had courses in the elements of geology and mineralogy will be expected to take Geology 1 and 21 during their first year of graduate work. A reading knowledge of French or German is required for the Master's degree. In certain cases where some other modern foreign language would be more valuable in connection with the thesis it may be substituted.

101a,b. MECHANICAL ANALYSIS OF SOILS. A laboratory course on the methods of mechanical analysis. Two afternoons a week. Two credits. MCMILLER.

102. CHEMICAL ANALYSIS OF SOILS. A laboratory course on the quantitative determination of the most important soil constituents. Three credits.

104. SOIL CHEMISTRY. A laboratory course on the chemical examination of soils including peat and alkali soils. A more advanced course than 103. Five credits.

105-106. SPECIAL SOIL PROBLEMS. Individual work in laboratory, greenhouse, or field upon some special problem in soil physics or soil management. Open to graduates, but only to such undergraduates as have demonstrated their special fitness for such work. *Arrangements must be made in advance.* The problems selected are simpler than those dealt with in 201 and 202. Three to five credits, according to work. ALWAY.

201-202. RESEARCH IN SOILS. The investigation in the field, in the laboratory, or in both, of soil problems. The particular problem which a student may select will depend upon his previous training in agronomy, botany, chemistry, geology, and physics. Credit according to work. ALWAY.

203-204. SEMINAR IN SOILS. Review of current literature; presentation and discussion of papers on research; study of methods of investigation of soils. Once a week. Required of graduate students. No credit. ALWAY.

205-206. CLASSIFICATION OF SOILS. A study of the various systems of classification which have been proposed. Individual work with assigned readings and conferences. Open only to those graduates in the department who have a reading acquaintance with French and German. Three credits. ALWAY.

SURGERY

(Including General Surgery, Experimental Surgery, Orthopedic and Genito-Urinary Divisions.)

Professors WILLIAM F. BRAASCH, ARTHUR J. GILLETTE, CHARLES H. MAYO, JAMES E. MOORE; Associate Professors J. FRANK CORBETT, MELVIN S. HENDERSON, EDWARD S. JUDD, ARTHUR A. LAW; Assistant Professors EMIL S. GEIST, FRANK C. MANN, SAMUEL ROBINSON, WALTER E. SISTRUNK, ARTHUR C. STRACHAUER.

Dr. William J. Mayo, being a regent of the University, is not a member of the instructional staff. His services in instruction and consultation, however, are available.

For courses of study offered, see special bulletin of Graduate Work in Medicine.

VETERINARY MEDICINE

Professor MYRON H. REYNOLDS.

Prerequisites.—For major work, twelve credits; for minor work, six credits in the department.

201-202. PROBLEMS IN ANIMAL SANITATION. Losses to animal husbandry from disease. Causes and prevention of such losses. Organization of sanitary control work. REYNOLDS.

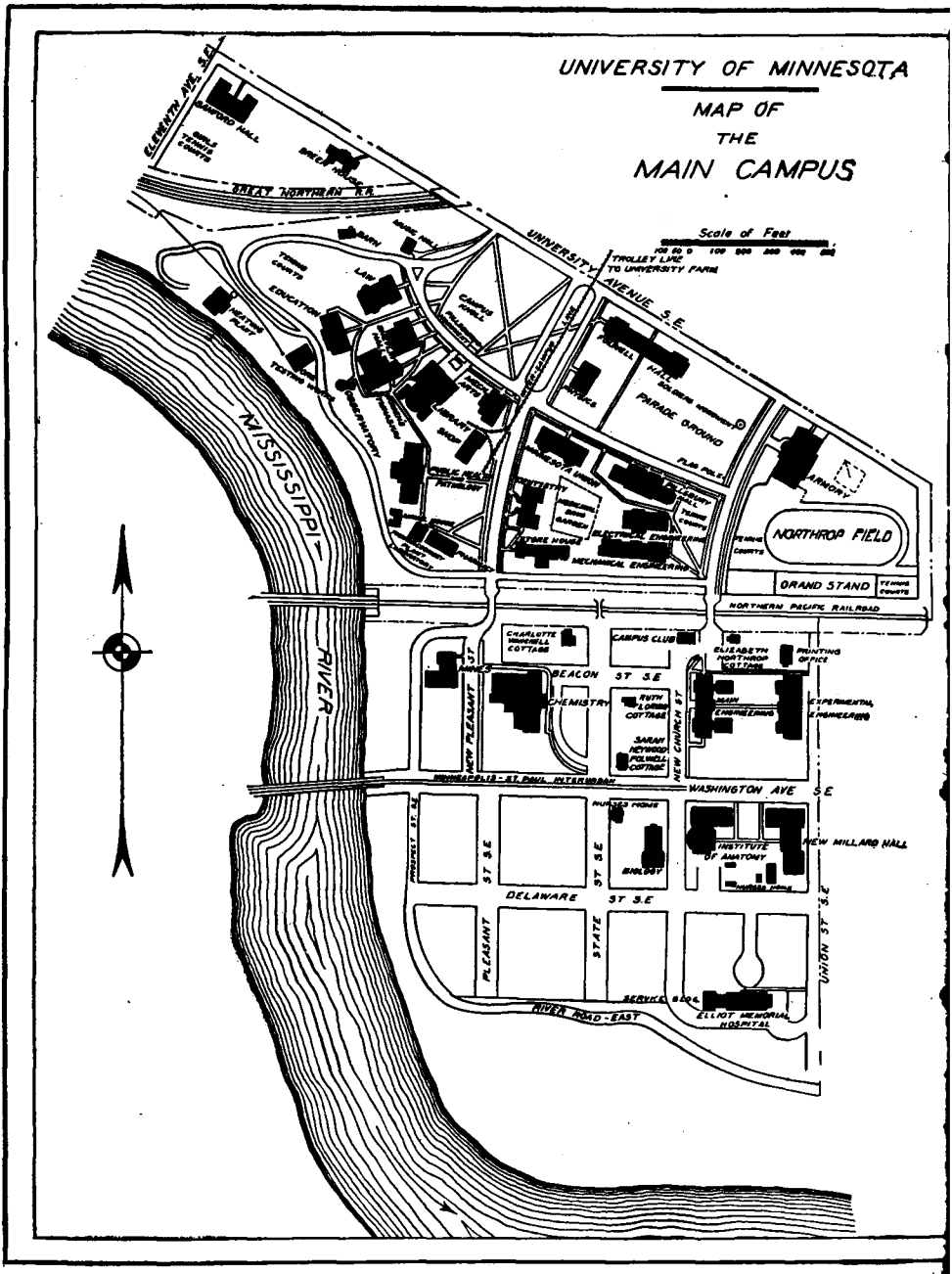
203-204. PROBLEMS IN PHYSIOLOGIC AND HISTOLOGIC FEATURES OF ANIMAL NUTRITION. Includes especially juices involved in the processes of nutrition. PALMER.

The Bulletin *of the* University *of* Minnesota

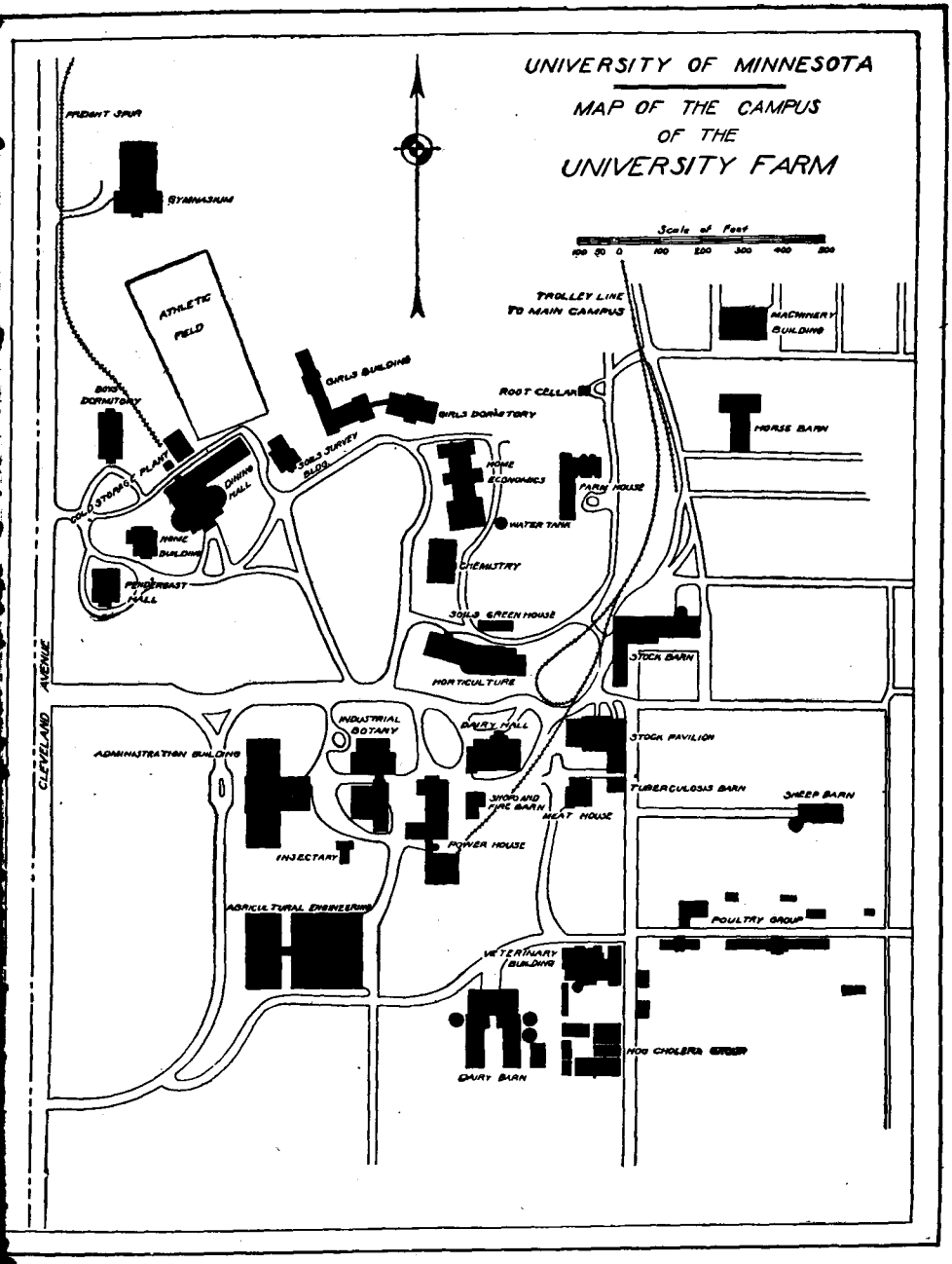
The College of Forestry Announcement for the Year 1917-1918

Catalog Series No. 15
Vol. XX No. 29 July 26 1917

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



Area of Main Campus, 108.5 acres



Area of University Farm, 422.56 acres

1917

JULY

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

AUGUST

..	..	..	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
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

..	..	..	..	..	..	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	..	..	..	..	..

1918

JANUARY

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

FEBRUARY

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

MARCH

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

APRIL

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

MAY

..	..	..	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	..	..	..	..	..	..

JULY

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

AUGUST

..	..	..	..	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	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

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	..	..	..	..
..	..	..	..	..	..	..

UNIVERSITY CALENDAR

COLLEGE OF FORESTRY

1917-1918

1917			
September	26	Wednesday	Registration closes except for new students
October	2-9	Week	Entrance examinations, registration of new students and payment of fees
October	10	Wednesday	First semester begins
October	18	Thursday	Senate meeting, 4:00 p.m.
November	28	Wednesday	Thanksgiving recess begins 9:00 p.m.
December	3	Monday	Thanksgiving recess ends 8:00 p.m.
December	3-8	Week	Second semester condition examinations
December	20	Thursday	Senate meeting, 4:00 p.m.
December	21	Friday	Christmas vacation begins 9:00 p.m.
1918			
January	2	Wednesday	Christmas vacation ends 8:00 a.m. Senior field work begins.
February	4	Monday	Second semester registration closes except for new students
February	11	Monday	Final examinations begin
February	12	Tuesday	Lincoln's Birthday; a holiday
February	16	Saturday	Registration and payment of fees for second semester closes at 12:00 m.
February	18	Monday	Second semester begins. Senior field work closes
February	21	Thursday	Senate meeting, 4:00 p.m.
February	22	Friday	Washington's Birthday; a holiday
March	28	Thursday	Easter recess begins 9:00 p.m.
April	1	Monday	Easter recess ends 8:00 a.m.
April	1-6	Week	First semester condition examinations
May	3	Friday	Junior work at Itasca Park begins
May	16	Thursday	Senate meeting, 4:00 p.m.
May	30	Thursday	Memorial Day; a holiday
June	8	Saturday	Final examinations begin 2:00 p.m.
June	15	Saturday	Second semester closes
June	16	Sunday	Baccalaureate service
June	17	Monday	Senior Class Day exercises
June	19	Wednesday	Alumni Day

June	20	Thursday	Forty-sixth Annual Commencement
June	21	Friday	Summer vacation begins
June	26	Wednesday	Freshman work at Itasca Park begins
August	17	Saturday	Freshman work at Itasca Park closes
August	31	Saturday	Junior work at Itasca Park closes

The University year for 1918-19 probably will begin Tuesday, September 17. Classes will begin September 25.

THE COLLEGE OF FORESTRY

FACULTY

MARION LEROY BURTON, Ph.D., D.D., LL.D., President
1005 S. E. 5th St., Minneapolis
CYRUS NORTHROP, LL.D., President Emeritus
519 10th Ave. S. E., Minneapolis
....., Dean
EDWARD M. FREEMAN, Ph.D., Assistant Dean 2196 Carter Ave., St. Paul
EDWARD G. CHEYNEY, B.A., Director, College of Forestry
2163 Carter Ave., St. Paul
RODNEY M. WEST, B.A., Secretary 2141 Doswell Ave., St. Paul
JOHN H. ALLISON, Ph.B., M.F., Professor of Forestry
2118 Knapp St., St. Paul
EDWARD G. CHEYNEY, B.A., Professor of Forestry
2163 Carter Ave., St. Paul
WILLIAM H. KENETY, M.S., Assistant Professor of Forestry
Forest Experiment Station, Cloquet, Minn.
JOHN P. WENTLING, M.A., Associate Professor of Forestry
2195 Doswell Ave., St. Paul
GILBERT H. WIGGIN, B.S.F., Instructor in Forestry
Forest Experiment Station, Cloquet, Minn.
WILLIAM T. COX, B.S. in For., State Forester, Special Lecturer
1540 Lincoln Ave., St. Paul
JULIUS V. HOFMAN, M.F., Ph.D., Special Lecturer on Sylviculture
2089 Carter Ave., St. Paul
DILLON P. TIERNEY, M.F., Assistant State Forester, Special Lecturer
State Capitol, St. Paul

MEMBERS OF OTHER FACULTIES GIVING INSTRUCTION IN THE COLLEGE OF FORESTRY

HERBERT F. BERGMAN, B.S., Assistant Professor of Botany
805 S. E. 7th St., Minneapolis
JOSEPHINE T. BERRY, M.A., Professor of Nutrition
2176 Scudder Ave., St. Paul
ROY G. BLAKEY, Ph.D., Assistant Professor of Economics
112 S. E. Church St., Minneapolis
WILFRED G. BRIERLEY, M.S., Assistant Professor of Horticulture
2128 Knapp St., St. Paul
OSCAR C. BURKHARD, Ph.D., Assistant Professor of German
719 East River Road, Minneapolis
FREDERIC K. BUTTERS, B.S., B.A., Assistant Professor of Botany
815 S. 7th St., Minneapolis

LeRoy Cady, B.S. in Agr., Associate Professor of Horticulture
2121 Doswell Ave., St. Paul

Louis J. Cooke, M.D., Medical Examiner and Director of Physical Education for Men 909 S. E. 6th St., Minneapolis

Balbino Dávalos, LL.D., Professorial Lecturer in Romance Languages
Belmont Hotel, Minneapolis

Ira H. Derby, Ph.D., Assistant Professor of Chemistry
2157 Commonwealth Ave., St. Paul

Hal Downey, Ph.D., Associate Professor of Animal Biology
802 S. E. 4th St., Minneapolis

E. Dana Durand, Ph.D., Professor of Economics
629 S. E. 5th St., Minneapolis

J. Franklin Ebersole, M.A., Assistant Professor of Economics
630 S. E. 7th St., Minneapolis

William H. Emmons, Ph.D., Professor of Geology
1225 S. E. 7th St., Minneapolis

George B. Frankforter, Ph.D., Professor of Chemistry
525 East River Road, Minneapolis

Edward M. Freeman, Ph.D., Professor of Plant Pathology and Botany
2196 Carter Ave., St. Paul

Jules Frelin, B.A., Assistant Professor of Romance Languages
310 12th Ave. S. E., Minneapolis

John H. Gray, Ph.D., Professor of Economics
412 S. E. Walnut St., Minneapolis

Pedro Henríquez Ureña, Bachiller en Ciencias y Letras, Abogado, Professorial Lecturer of Spanish in Romance Languages
321 14th Ave. S. E., Minneapolis

Ned L. Huff, M.A., Assistant Professor of Botany
1219 S. E. 7th St., Minneapolis

Samuel Kroesch, Ph.D., Assistant Professor of German
327 S. E. Ontario St., Minneapolis

Robert C. Lansing, M.A., Assistant Professor of Rhetoric
2237 Knapp St., St. Paul

Walter R. Meyers, Ph.D., Assistant Professor of German
608 S. E. Oak St., Minneapolis

Thomas W. Mitchell, Ph.D., Assistant Professor of Business Administration 2349 Bourne Ave., St. Paul

Owen R. Meredith, First Lieutenant, U. S. Infantry, Assistant Professor of Military Science and Tactics
504 University Ave. S. E., Minneapolis

Paul H. Morin, B.S., B.A., LL.B., Docteur de l'Université de Paris, Professorial Lecturer in Romance Languages
Maryland Hotel, Minneapolis

George W. Moses, Major, U. S. Cavalry, Professor of Military Science and Tactics 1308 S. E. 5th St., Minneapolis

Henry F. Nachtrieb, B.S., Professor of Animal Biology
905 S. E. 6th St., Minneapolis

EVERETT WARD OLMSTED, Ph.D., Professor of Romance Languages
2727 Lake of Isles Blvd., Minneapolis
RUTH S. PHELPS, M.A., Assistant Professor of French
East Sanford Hall, Minneapolis
CHESSLEY J. POSEY, M.S., Assistant Professor of Geography
124 S. E. State St., Minneapolis
THOMAS S. ROBERTS, M.D., Professor of Ornithology
2303 Pleasant Ave., Minneapolis
HARRY B. ROE, B.S., Assistant Professor of Mathematics
1485 Hythe St., St. Paul
CARL OTTO ROSENDAHL, Ph.D., Professor of Botany
2191 Commonwealth Ave., St. Paul
ARTHUR G. RUGGLES, M.A., Associate Professor of Entomology
1465 Raymond Ave., St. Paul
WILLIAM A. SCHAPER, Ph.D., Professor of Political Science
625 S. E. Fulton St., Minneapolis
COLBERT SEARLES, Ph.D., Professor of Romance Languages
1941 Fremont Ave. S., Minneapolis
CARL SCHLENKER, B.A., Professor of German
514 11th Ave. S. E., Minneapolis
CHARLES F. SIDENER, B.S., Professor of Chemistry
1320 S. E. 5th St., Minneapolis
ELVIN C. STAKMAN, Ph.D., Associate Professor of Plant Pathology
2138 Knapp St., St. Paul
JOHN T. STEWART, C.E., Professor of Agricultural Engineering
2223 Knapp St., St. Paul
THEODORE B. TAYLOR, Captain, U. S. Cavalry, Associate Professor of Military Science and Tactics 1301 S. E. 5th St., Minneapolis
JOSEPHINE TILDEN, M.S., Professor of Botany
2235 Como Ave. W., St. Paul
FREDERICK L. WASHBURN, M.A., Professor of Entomology
1112 S. E. 6th St., Minneapolis
JAMES B. WOOLNOUGH, Captain, U. S. Infantry, Associate Professor of Military Science and Tactics 721 10th Ave. S. E., Minneapolis
JEREMIAH S. YOUNG, Ph.D., Professor of Political Science
1120 S. E. 6th St., Minneapolis

GEORGE D. ALLEN, M.A., Instructor in Animal Biology
1203 S. E. 7th St., Minneapolis
HARRY E. ATWOOD, M.A., Instructor in Romance Languages
1317 S. E. 6th St., Minneapolis
ROSS A. BAKER, Ph.D., Instructor in Chemistry
130 E. 18th St., Minneapolis
GEORGE S. BARNUM, M.A., Instructor in Romance Languages
210 12th Ave. S. E., Minneapolis
FRANCIS B. BARTON, Docteur de l'Université de Paris, Instructor in French
507 S. E. Oak St., Minneapolis

BESSIE E. BEMIS, B.S., Instructor in Foods and Cookery
Woman's Hall, University Farm
NELSON F. COBURN, M.A., Instructor in Spanish
617 14th Ave. S. E., Minneapolis
ESTELLE COOK, Instructor in Rhetoric 1361 Cleveland Ave., St. Paul
WILLIAM S. COOPER, Ph.D., Instructor in Botany
1523 W. Lake St., Minneapolis
LLOYD M. CROSGRAVE, M.A., Instructor in Economics
510 S. E. Ontario St., Minneapolis
WILLIAM W. CUMBERLAND, Ph.D., Instructor in Economics
941 14th Ave. S. E., Minneapolis
JAMES DAVIES, Ph.D., Instructor in German 3230 3rd Ave. S., Minneapolis
WILLIAM K. FOSTER, LL.M., Assistant Director of Gymnasium
652 S. E. Erie St., Minneapolis
ISAAC W. GEIGER, Ph.D., Instructor in Chemistry
15 Barton Ave. S. E., Minneapolis
J. THEODORE GEISSENDOERFER, Ph.D., Instructor in German
967 14th Ave. S. E., Minneapolis
GEORGE G. GLICK, B.A., Instructor in Rhetoric
1361 Cleveland Ave., St. Paul
ARTHUR R. GRAVES, Ph.D., Instructor in German
407 S. E. 4th St., Minneapolis
ALBERT C. HODGE, Ph.B., Instructor in Economics
615 9th Ave. S. E., Minneapolis
ALBERT C. JAMES, B.A., M.B.D., Instructor in Economics
Maryland Hotel, Minneapolis
A. WALFRED JOHNSTON, M.A., Instructor in Geology
803 University Ave. S. E., Minneapolis
ALLEN D. JOHNSTON, Instructor in Blacksmithing 2111 Knapp St., St. Paul
ALFRED E. KOENIG, M.A., Instructor in German
602 S. E. 7th St., Minneapolis
ROBERT J. MCFALL, Ph.D., Instructor in Economics
124 S. E. State St., Minneapolis
D. C. MITCHELL, B.S. in C.E., Instructor in Physical Education for Men
1395 Chelmsford St., St. Paul
RUTH MOHL, M.A., Instructor in Rhetoric 1269 Como Blvd., St. Paul
WILLIS J. PLUMMER, Sobresaliente in Spanish Literature, Instructor in Spanish 1329 S. E. 6th St., Minneapolis
ADOLPH R. RINGOEN, M.A., Instructor in Animal Biology
1203 S. E. 7th St., Minneapolis
BERT ROSE, Instructor in Band 710 S. E. 7th St., Minneapolis
CARL L. SCHUMANN, Ph.D., Instructor in Chemistry
317 17th Ave. S. E., Minneapolis
EDWARD H. SIRICH, Ph.D., Instructor in French
321 14th Ave. S. E., Minneapolis
HAROLD W. SOULE, M.A., Instructor in German
1208 S. E. 4th St., Minneapolis

WOLDEMAR M. STERNBERG, B.S. in Chem. Eng., Instructor in Chemistry
510 S. E. Ontario St., Minneapolis
STERLING TEMPLE, Ph.D., Instructor in Chemistry
1758 Blair St., St. Paul
H. LEE WARD, Ph.D., Instructor in Chemistry
425 S. E. Walnut St., Minneapolis
JOHN C. WEST, JR., B.S., Instructor in Physical Education for Men
411 17th Ave. S. E., Minneapolis
HALL B. WHITE, B.S. in Agr., Instructor in Carpentry
1426 Raymond Ave., St. Paul
LLOYD R. WHITSON, E.M., Instructor in Mechanical Drawing
2375 Bourne Ave., St. Paul
RICHARD WISCHKAEMPER, M.A., Instructor in German
977 14th Ave. S. E., Minneapolis
EDWIN H. ZEYDEL, M.A., Instructor in German
1312 S. E. 7th St., Minneapolis

DONALD FOLSOM, Ph.D., Assistant in Botany
1110 S. E. 5th St., Minneapolis
LOUISE G. FRARY, M.A., Teaching Fellow in German
3108 Garfield Ave., Minneapolis
FRANCES L. LONG, Ph.D., Assistant in Botany
112 S. E. State St., Minneapolis
BOTTOLF M. OHNSTAD, Assistant in Physical Education for Men
3320 46th Ave. S., Minneapolis
FRANK ROBOTKA, B.S.A., Assistant in Accounting
1437 Cleveland Ave., St. Paul
ARNOLD W. SHUTTER, M.A., Teaching Fellow in German
2215 Irving Ave. S., Minneapolis
HARVEY STALLARD, Ph.D., Assistant in Botany
805 S. E. 7th St., Minneapolis

FACULTY COMMITTEES

1917-18

Executive.—Dean, Secretary, Heads of Divisions
Enrollment.—WEST, MOWRY, BIESTER, WENTLING, BENDER, PIERCE
Curriculum and Catalog.—CHEYNEY, WENTLING, ALLISON
Students' Work.—FREEMAN, WEST, BERRY, CHEYNEY, NICHOLSON, RUGGLES
Student Organizations.—LANSING, WEIGLEY, CHEYNEY, WELLER, FREEMAN
Faculty Business.—CHEYNEY, MOORE, TRILLING, KILDEE
Appointment.—STORM, BERRY, GEHRAND, ARNY

GENERAL INFORMATION

ADMISSION

Credentials.—All students upon entering for the first time shall submit their credentials to the Enrollment Committee.

Admission is either by certificate or by examination. Candidates must have completed the equivalent of a four-year high school course and must present:

1. Four units of English; or three units of English and four units of a foreign language, or three units of English and two units in each of two foreign languages.
2. One unit of algebra and one unit of plane geometry.
3. Enough additional work to make in all fifteen units, of which not more than four may be in subjects not listed in the admission groups.

Graduates of the School of Agriculture of the University of Minnesota who have completed the two summers of supervised work offered in the School course, one additional School year, and one additional summer's work, or the equivalent thereof, will be admitted to the College of Forestry.

For details of admission requirements see the Bulletin of General Information.

All students desiring to enter the Forestry courses are urged to present physics and chemistry for entrance credits.

FEES

Incidental semester fee	
Residents of Minnesota	$20.00
Non-residents	40.00
Deposit (for the year)	5.00
Military deposit (freshmen or sophomores, on first registering) subject to change to meet contract price of uniform	18.00
Gymnasium suit deposit (all freshmen)	4.25
Men's Union (per semester)	1.00
Itasca Park fee: freshman year	3.00
junior year	5.00
Special fees	
Examination for removal of condition	1.00
Examination for credit (after the first semester in residence)	5.00
Special examination	5.00
Change of registration	2.50

Late registration.—Old students must indicate their registration not later than two weeks before the day set for classes to begin. All students must complete their registration (including payment of fees) before the day set for classes to begin. Penalty for delay in either indicating or completing registration, one dollar. An additional twenty-five cents is charged for each day of delay after the last day set for the completion of registration, and a similar charge for each day of delay after the last day set for payment of fees.

Important.—The regulations require that no student shall be allowed to register after the semester opens except by special committee action.

REQUIREMENTS FOR GRADUATION AND DEGREE

After the completion of the prescribed course of study, including all of the required work and the requisite amount of elective work equivalent to 157 credit hours, (155½ credit hours for those graduating in 1918), candidates will be recommended for graduation with the degree of Bachelor of Science. The diploma will indicate that the candidate completed the work for his degree in the College of Forestry and his major line of work will be designated.

FACULTY REGULATIONS

The regulations of the Faculty are published in a separate booklet which will be issued at the time of registration. Students are held responsible for compliance with all of these regulations.

COURSES OF STUDY

There are at the present time three specialized branches of work open to forestry students. The curricula for the freshman year are the same, and for the sophomore year nearly the same for all three branches. By the end of the first year the student should be able to decide which of the three prescribed specialized courses he intends to follow for the remaining three years. These courses are distinct, and a change after the sophomore year can not be made without loss of credits.

It is important that the line of specialization be selected with great care, since the student's interest in and aptitude for his work is of prime importance. The choice should not be made without first consulting with some member of the faculty.

1. Technical Forestry Course. This course has for its object a thoro training in the management of growing forests. Particular emphasis is given to the training for experimental and research work. It includes all the technical forestry courses, together with such allied courses as may aid in their application.

2. Commercial Lumbering. This course is a preparation for the lumber business. It includes such technical forestry courses as are needed in the handling of timber crops and a very thoro series of courses in economics and business methods.

3. Wood Pulp and Distillation. This course is intended to prepare men to serve the industries which utilize wood pulp and all the products of wood other than lumber. It includes the necessary technical forestry courses and a complete series of work in chemistry and the technology of wood.

EXPLANATION OF COURSE NUMBERS

Odd numbers indicate first-semester courses; even numbers, second semester courses. A combination of the two (e.g., 5-6) indicates courses continuing through the year. In the case of courses repeated the second semester, the suffix *a* indicates first semester; the suffix *b*, second semester.

All undergraduate courses are numbered from 1 to 100. All courses open to undergraduates and graduates are numbered from 101 to 200.

Numbers following the descriptive name of a course indicate the number of credit hours.

One credit hour is equivalent to (1) one lecture or recitation period requiring two hours of preparation, (2) two periods of laboratory work requiring one hour of preparation, or (3) three periods of laboratory work with no preparation, each week for one semester.

GROUP A

General Requirements for All Courses of Study

FRESHMAN YEAR

First Semester

*Agr. Eng. 1a, Higher Algebra, 3
Bot. 1a, General Botany, 3
**Rhet. 1a, Rhetoric, 3
For. 1, General Forestry, 3
†Chem. 33, General Chemistry and Qualitative Analysis, 5
or
Chem. 3a, Advanced General Chemistry and Qualitative Analysis, 3
and
‡Econ. 2a, Industries and Commerce of U. S., 3
Phys. Educ. 1, Personal Hygiene
Phys. Educ. 3a, Gymnasium
Military Drill
††Freshman Lectures

Second Semester

Agr. Eng. 2b, Plane Trigonometry, 3
Bot. 2, Structural Botany, 3
Rhet. 2, Rhetoric, 3
For. 2, Dendrology, 2
Hort. 56, Plant Propagation, 1
Chem. 4b, Advanced General Chemistry and Qualitative Analysis, 3
Elective, 3
Military Drill
Itasca Park, June and July
Freshman Woods Work, 8

SOPHOMORE YEAR

First Semester

Agr. Eng. 3a, Mechanical Drawing, 3
Rhet. 11a, Argumentation, 3
An. Biol. 3, General Zoology, 3
For. 5, Dendrology, 3
Econ. 3a, Principles of Economics, 3
Military Drill
Special requirements from Group B, 3

Second Semester

Agr. Eng. 12, Forest Engineering, 3
Rhet. 22b, Public Speaking, 3
An. Biol. 4, General Zoology, 3
Pl. Path. and Bot. 10, Forest Pathology, 3
Military Drill
Special requirements from Group B, 6

JUNIOR YEAR

First Semester

For. 31, Sylviculture, 3
Econ. Zool. 5, Forest Entomology, 3
For. 37, Wood Technology, 3
Special requirements from Group B, 9

Second Semester

For. 32, Sylviculture, 2
For. 22, Forest Mensuration, 2
For. 38, Wood Technology, 2
Special requirements from Group B, 6
Itasca Park, April-September
For. 34, Sylviculture, 4
For. 14, Mensuration, 4
Agr. Eng. 20, Forest Engineering, 5

* Not required of those who present Higher Algebra for admission.

† Required of those who do not present high school chemistry (1 unit) for admission. An additional credit must be completed before graduation.

‡ Econ. 2 must be taken the first year.

** Special attention is called to rules on delayed credit and to regulations for students with insufficient preparation in English on pages 34-35.

†† A course of lectures intended primarily to familiarize the new student with the college, college customs and methods of procedure is required of all freshmen.

SENIOR YEAR

First Semester

Pol. Sci. 51, Business Law, 2
For. 17, Forest Management, 3
For. 15, Lumbering, 6
For. 35, Wood Preservation, 1
Econ. 15, Forest Economics and Conservation, 2
Public Health Lectures
Special requirements from Group B, 4

Second Semester

For. 18, Forest Management, 2
For. 10, Forest Protection, 2
Special requirements from Group B, 14
Lumbering Report, required not later than the close of the semester in order to validate credits in Course 15

GROUP B

Special Requirements in the Different Courses of Study

Students are expected to supplement Group A, as indicated, from one line of specialization exclusively.

Year and Semester	Technical Forestry	Commercial Lumbering	Wood Pulp and Distillation Products
Sophomore First Sem.	*Geol. 1, Geology, 3	Econ. 35, Accounting Principles, 3	Chem. 35, Organic Chemistry, 3
Sophomore Second Sem.	*Elective, 6	Pol. Sci. 1b, American Government, 3 Econ. 36, Accounting Principles, 3	Chem. 36, Organic Chemistry, 3 Econ. 43b, Banking, 3
Junior First Sem.	Geol. 29, Physiography, 3 Bot. 101, Applied Ecology, 3 Hort. 71, Landscape Gardening, 3	Econ. 161, Labor Problems, 3 or Econ. 191, Public Finance, 3 Econ. 37, Marketing of Products, 3 Econ. 145, Corporations, 3	Chem. 11, Quantitative Analysis, 4 Chem. 121, Physical Chemistry, 2 For. 103, Uses of Wood, 3
Junior Second Sem.	Agr. Eng. 6, Forest Mechanics, 2 Bot. 102, Applied Ecology, 2 H. E. 24, Camp Cookery. 2	Agr. Eng. 6, Forest Mechanics, 2 Econ. 34, Business Management, 2 H. E. 24, Camp Cookery. 2	Chem. 12, Quantitative Analysis, 4 Chem. 122, Physical Chemistry, 2
Senior First Sem.	For. 23, Forest By-Products, 2 Elective, 2	For. 23, Forest By-Products, 2 Econ. 43a, Banking, 2	For. 23, Forest By-Products, 1 Chem. 155, Wood Chemistry, 3
Senior Second Sem.	For. 30, Forest Seminar, 4 For. 24, Lumber Manufacturing, 2 For. 104, Experimental Sylviculture, 3 For. 26, Forest Working Plans, 5	For. 24, Lumber Manufacturing, 2 For. 20, Logging Plans, 3 Econ. 38, Advertising, Salesmanship, 3 Econ. 122, Commercial Policies, 3 Econ. 146, Public Utilities, 3	Chem. 156, Technology of Paper Pulp, 3 For. 16, Thesis, 7 Agr. Eng. 6, Forest Mechanics, 2 Elective, 2

* If it is desired to elect beginning modern language, Economics 3 and Geology 1 may be postponed until later in the course.

DEPARTMENTAL STATEMENTS

For explanation of course numbers and credits see page 14.

FORESTRY

Professors EDWARD G. CHENEY, JOHN H. ALLISON; Associate Professor JOHN P. WENTLING; Assistant Professor WILLIAM H. KENETY; Instructor GILBERT H. WIGGIN; Special Lecturers WILLIAM T. COX, JULIUS V. HOFMANN, DILLON P. TIERNEY.

COURSES

Introductory Courses

No.	Title	Credits	Offered to	Prereq. courses
1.	General Forestry	3	Fr.	None
2.	Dendrology	2	Fr., soph.	Bot. 1
5.	Dendrology	3	Fr., soph.	2
†6.	Elementary Sylviculture	4	Fr.	Bot. 2
10.	Forest Protection	2	Jr., sr.	5
†12.	Elementary Mensuration	4	Fr.	None
†14.	Forest Mensuration	4	Jr.	5
15.	Lumbering	6††	Sr.	1, 5
16.	Thesis	7	Sr.	37-38, Chem. 155
‡17.	Forest Management	3	Sr.	14, 15, 34
18.	Forest Management	2	Sr.	17
20.	Logging Plans	3	Jr., sr.	15
22.	Forest Mensuration	2‡‡	Jr.	5
‡23.	Forest By-Products	2**	Jr., sr.	None
24.	Lumber Manufacturing	2	Jr., sr.	1, 37-38
26.	Forest Working Plans	5	Sr.	1, 17
30.	Forest Seminar	4	Sr.	17
31.	Sylviculture	3	Jr.	1, 5, Bot. 2
32.	Sylviculture	2	Jr.	31
†34.	Sylviculture	4	Jr.	32
*35.	Wood Preservation	1	Jr.	37-38
37-38.	Wood Technology	5§	Soph., jr., sr.	Bot. 1 yr.

Advanced Courses

101.	Advanced Dendrology	3	Jr., sr.	5, Bot. 6 cr.
103.	Uses of Wood	3	Jr., sr.	37-38
104.	Experimental Sylviculture	3	Sr.	34

* This course continues only six weeks, 3 hours per week.
† Given in summer at Itasca.
‡ These courses are concluded at the beginning of the Christmas vacation.
§ Both semesters must be completed before credit is given.
** One credit given for completion of half the course.
†† Credit not allowed until lumbering report is submitted.
‡‡ Course 14 must be completed before credit is given.

INTRODUCTORY COURSES

1. GENERAL FORESTRY. A brief history of the development of forestry in Europe and America; its bearing on the forestry problems of the United States; description of the United States forests. Lectures and collateral reading. CHEYNEY.

2. DENDROLOGY. Comprehensive study of the forest trees of the United States; their classification, characteristics, and range, with special attention to prominent and constant characteristics. Lectures, assigned reading, special papers, field work. WENTLING.

5. DENDROLOGY. Continuation of Course 2. WENTLING.

6. ELEMENTARY SYLVICULTURE. Largely field work designed to give the student a working knowledge of the forest. Includes dendrological study of the species found in the north woods and the general principles of underlying reconnaissance. WENTLING.

10. FOREST PROTECTION. Practical measures for the protection of forests from fires, trespass, and grazing. State and Federal forest-fire and trespass laws. Insects and fungi are taken care of in special courses. ALLISON.

12. ELEMENTARY MENSURATION. Largely field work. Includes elementary work in timber cruising, valuation surveys, stem analysis, and the study of the measurements of stand, volume, and yield. ALLISON.

14. FOREST MENSURATION. Field work in the measurement of logs, the cruising of timber, and the collection of data for growth studies. Lectures and reading. ALLISON.

15. LUMBERING. Designed to give the student a clear, balanced view of the lumber industry, especially logging. A month's work in a lumber camp in the senior year with a full report is required. CHEYNEY.

16. THESIS. A comprehensive study of an assigned problem for the laboratory or the manufacturing field. The preliminary work to be done in the first ten weeks, with full time intensive study for the remainder of the semester. ALLISON.

17. FOREST MANAGEMENT. Policy of forest owners; principles of governing all forest management; forest valuation; the calculation of soil rent, forest rent, and the value of growing stock; the values of even and uneven-aged stands. Working plans. ALLISON.

18. FOREST MANAGEMENT. Continuation of Course 17. ALLISON.

20. LOGGING PLANS. A study of the data essential to the preparation of a logging plan, a plan for a definite operation. The organization of crews and companies. CHEYNEY.

22. FOREST MENSURATION. The fundamental principles underlying mensuration. Special attention is given to log rules, cubic contents of trees, volume tables, growth of trees, and yield tables. ALLISON.

23. FOREST BY-PRODUCTS. A special study of forest products other than timber. Cellulose for paper, sugar, tanning materials, turpentine, tar, oil, resin, waxes, gum, creosote, wood alcohol, acetic acid, and acetone. ALLISON.

24. LUMBER MANUFACTURING. A study of sawmills and sawmill machinery, and other processes in the primary manufacture of wood, the general principles and the purpose of grading lumber. A brief study of the lumber market. CHEYNEY.

26. FOREST WORKING PLANS. The principles of working plans. Each class will be required to work out a complete plan including surveys, sylviculture plans, estimates, field tables, maps and systems of management. ALLISON.

30. SEMINAR. This is not a class for the prosecution of original research, but for the purpose of systematically reviewing the whole field of forestry and studying the concrete application of the different branches. CHEYNEY, WENTLING, ALLISON.

31. SYLVICULTURE. The fundamentals forming the basis of sylviculture with special attention to the sylvics of the important tree species. Lectures, reading, and required papers. WENTLING.

32. SYLVICULTURE. A general presentation of the systems of natural regeneration of wood lands; also of methods of artificial regeneration and a general discussion of the whole field of seeding and planting. Lectures, reading, and laboratory. WENTLING.

34. PRACTICAL SYLVICULTURE. Nursery practice and field planting. Field investigations and planting plans. Seed collecting, extracting, and storing. Daily nursery and field work. WENTLING.

35. WOOD PRESERVATION. Lectures and collateral reading upon the history, development, and methods of wood preservation. Different systems now in use and preservatives used. ALLISON.

37-38. WOOD TECHNOLOGY. A comprehensive study of the important woods used in the United States; their structure, classification, identification, properties, and uses. Lectures, papers, and laboratory. WENTLING.

ADVANCED COURSES

101. ADVANCED DENDROLOGY. A continuation of Courses 2 and 5 with special studies in classification and distribution. WENTLING.

103. USES OF WOOD. A thoro study of the woods used by the various wood-using industries. Woods for special uses, fancy woods, cabinet woods, wood substitutes. Not offered in 1917-18. CHEYNEY, WENTLING.

104. EXPERIMENTAL SYLVICULTURE. The fundamental principles of sylviculture which are broadly applicable; methods used at forest experiment stations in solving problems in forestration, management, protection, and mensuration. A comprehensive thesis on some specific problem is required. KENETY.

COURSES IN OTHER SCHOOLS AND COLLEGES

The following courses are offered to students in the College of Forestry by departments of other schools and colleges of the University. For complete lists and descriptions of courses offered by these departments, see the bulletins of the several schools and colleges.

AGRICULTURAL ENGINEERING

COLLEGE OF AGRICULTURE

Professor JOHN T. STEWART; Assistant Professor HARRY B. ROE; Instructors ALLEN D. JOHNSTON, HALL B. WHITE, LLOYD R. WHITSON.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
1a,b.	Higher Algebra	3	Fr.	None
2a,b.	Plane Trigonometry	3	Fr.	Higher Algebra
3a,b.	Mechanical Drawing	3	Soph.	None
6.	Forest Mechanics	2	Jr.	None
12.	Forest Engineering	3	Soph.	2 and 3
*20.	Forest Engineering	5	Jr.	12

For additional courses see the bulletin of the College of Agriculture.

* Given at Itasca.

INTRODUCTORY COURSES

1a,b. HIGHER ALGEBRA. Special attention is given to practical problems, the methods of computation, and a foundation for Plane Trigonometry. ROE.

2a,b. PLANE TRIGONOMETRY. Theory and use of logarithms and a study of the functions of Plane Trigonometry with numerous practical applications. ROE.

3a,b. MECHANICAL DRAWING. Lectures on drawing, exercises in the use of drawing instruments, lettering, and water colors. The making of working drawings with their practical value. WHITSON.

6. FOREST MECHANICS. Blacksmithing: practice work in the handling of forge and anvil; the bending, shaping, and welding of steel. Carpentry; practice work in the use and care of tools used in lumbering. JOHNSTON, WHITE.

12. FOREST ENGINEERING. Methods of making original land surveys, study of topographic symbols, and the elements of topographic drawing. General principles of surveying. STEWART.

20. FOREST ENGINEERING. Field practice and mensuration, surveying, and topography. STEWART.

ANIMAL BIOLOGY

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Professors HENRY F. NACHTRIEB, THOMAS S. ROBERTS; Associate Professor HAL DOWNEY; Instructors GEORGE D. ALLEN, ADOLPH RINGOEN.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
3-4.	General Zoology	6*	All	None
28.	Ornithology	3	Soph., jr., sr.	3-4

For additional courses see the bulletin of the College of Science, Literature, and the Arts.

* Both semesters must be completed before credit is given.

INTRODUCTORY COURSES

3-4. GENERAL ZOOLOGY. A survey of the animal kingdom emphasizing the principles of development and structure in relation to function and habit, heredity and evolution and animals of economic importance. Lectures, quizzes, and laboratory. NACHTRIEB, ALLEN, RINGOEN.

28. ORNITHOLOGY. The study of the structure, classification and habits; special reference to birds of Minnesota. Considerable time devoted to field study. Bird or field-glasses and handbook required. Laboratory, lectures, quizzes. Class limited to 10. ROBERTS.

BOTANY

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Professors ....., CARL OTTO ROSENDAHL, JOSEPHINE E. TILDEN; Assistant Professors HERBERT F. BERGMAN, FREDERIC K. BUTTERS, NED L. HUFF; Instructor WILLIAM S. COOPER; Assistants DONALD FOLSOM, FRANCES L. LONG, HARVEY STALLARD.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
1a,b.	General Botany	3	All	None
2.	Structural Botany	3	All	1 or 3
3a,b.	Evolution of Plants	3	All	1 or equiv.
4.	Field and Garden Botany	3	All	1 or 3
	Intermediate Courses			
5-6.	Plant Morphology	3 or 6	Soph., jr., sr.	6 cred.; see statement
7-8.	Taxonomy	3 or 6	Soph., jr., sr.	6 cred.; see statement
9-10.	Physiology and Ecology	3 or 6	Soph., jr., sr.	6 cred.
	Advanced Courses			
101-102.	Applied Ecology	3 or 6	Jr., sr.	12 cred.

For additional courses see the bulletin of the College of Science, Literature, and the Arts.

INTRODUCTORY COURSES

1a,b. General Botany. A study of the external form and organs of flowering plants, root, stem, leaf, fruit, and seed and of their relations to each other, together with simple greenhouse experiments to illustrate the various functions. ....., Butters, Huff, Bergman, Cooper, Folsom, Long, Stallard.

2. Structural Botany. A study of the microscopic structure of flowering plants, the cell, tissues, and tissue systems, as seen in the root, stem, leaf, etc. Butters, Huff, Stallard.

3a,b. Evolution of Plants. A comparative study of selected types of plants, illustrating the evolution of land plants from the simplest forms. Butters, Huff.

4. Field and Garden Botany. Greenhouse, garden, and field study of the form, behavior, naming, and relationships of flowering plants, together with individual problems in the pollination, reproduction, and propagation of common flower types. ....., Bergman, Folsom, Long, Stallard.

INTERMEDIATE COURSES

Either semester of the following courses open to students with the proper requisites.

5-6. Plant Morphology. A comparative study of the form, structure, and life history of typical algae, fungi, liverworts, mosses, ferns, and seed plants. Course 6 (but not 5) open to those who have taken Course 3. Butters.

7-8. Taxonomy. A general study of the classification and relationships of flowering plants. Laboratory and field practice in the determination of species, together with lectures and quizzes. Course 8 (but not 7) open to those who have taken Course 4. Rosendahl.

9-10. Physiology and Ecology. Greenhouse and field study of physical factors and plant responses, absorption, transport, water loss, nutrition, growth, fertilization, reproduction, and adaptation; field study of habitat, migration, competition, invasion, and succession. ....., Cooper.

ADVANCED COURSES

101-102. Applied Ecology. A study of the physiological and the ecological principles and methods involved in the production of field, garden, and forest crops. Either semester open to students who have had introductory botany and physiology and ecology. .....

CHEMISTRY

SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

Professors GEORGE B. FRANKFORTER, CHARLES F. SIDENER; Assistant Professor IRA H. DERBY; Instructors ROSS A. BAKER, ISAAC W. GEIGER, CARL L. SCHUMANN, WOLDEMAR M. STERNBERG, STERLING TEMPLE, H. LEE WARD.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
3a,b-4a,b.	Adv. General Chem. and Qual. Analysis	6†	Fr., soph., jr.	Ent. cred. in Chem.
11-12.	Quantitative Analysis	8†	Soph., jr., sr.	3-4
33.	General Chem. and Qual. Anal.	5‡	Fr., soph., jr.	None
35-36.	Organic Chemistry	8†*	Jr., sr.	3-4
	Advanced Courses			
121-122.	Physical Chemistry	4†	Jr., sr.	35-36
123-124.	Physico-Chemical Laboratory	2†	Jr., sr.	See statement
155.	Wood Chemistry	3	Jr., sr.	35-36
156.	Technology of Paper Pulp	3	Jr., sr.	155

For additional courses see the bulletin of the School of Chemistry.

* Forestry students are allowed 6 credits for completion of three-fourths of the course.

† Both semesters must be completed before credit is given for the first semester.

‡ Course 4b must be completed before credit is given.

INTRODUCTORY COURSES

3a,b-4a,b. ADVANCED GENERAL CHEMISTRY AND QUALITATIVE ANALYSIS. Lectures, recitations, and laboratory work. General descriptive chemistry, including the fundamental theories and laws, and qualitative analysis. FRANKFORTER, BAKER, WARD.

11-12. QUANTITATIVE ANALYSIS. General discussion of quantitative methods, with laboratory work in gravimetric analysis, first semester, followed by a discussion of standard solutions and the necessary stoichiometric calculations, with laboratory work in volumetric analysis, second semester. SIDENER, STERNBERG, GEIGER.

33. GENERAL CHEMISTRY AND QUALITATIVE ANALYSIS. Designed for those who have had no high school chemistry; in preparation for Course 4b. See statement under 3a,b-4a,b. FRANKFORTER, BAKER.

35-36. ORGANIC CHEMISTRY. This course includes the aliphatic and the aromatic series with the preparation of the more important compounds. FRANKFORTER, SCHUMANN.

ADVANCED COURSES

121-122. PHYSICAL CHEMISTRY. A consideration of the theories and laws, phenomena, and processes which form the basis of chemical science.

Charts, models, and experiments are employed to supplement and illustrate the discussions. DERBY.

123-124. PHYSICO-CHEMICAL LABORATORY PRACTICE. Open only to students pursuing Course 121-122 or who have had it or its equivalent. Physico-chemical methods and measurements. DERBY.

155. WOOD CHEMISTRY. The course includes a general survey of the chemistry of the carbohydrate group, special attention being given to the resins, the terpenes, cellulose, and lignocellulose. FRANKFORTER.

156. TECHNOLOGY OF PAPER PULP. Preparation of the various wood products, as pure cellulose, commercial wood, and paper. Special attention will also be given factory control of these processes. TEMPLE.

ECONOMICS

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Professors JOHN H. GRAY, E. DANA DURAND; Assistant Professors ROY G. BLAKEY, J. FRANKLIN EBERSOLE, THOMAS W. MITCHELL; Instructors LLOYD M. CROSGRAVE, WILLIAM W. CUMBERLAND, ALBERT C. HODGE, ALBERT C. JAMES, ROBERT J. MCFALL; Assistant FRANK ROBOTKA.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
2a,b.	Industries and Commerce of U. S..	3	All	None
3a,b.	Principles of Economics.....	3†	Soph., jr., sr.	2
4a,b.	Economic Problems	3	Soph., jr., sr.	3
9.	Industrial History since 1750.....	3	All	3
15.	Forest Econ. and Conservation....	3†	Jr., sr.	3
18.	Problems in Agricultural Econ.....	3	Soph., jr., sr.	3
34.	Business Management	3†	Soph., jr., sr.	3
35-36.	Accounting Principles	6‡	Soph., jr., sr.	None
37.	Marketing of Products	3	Jr., sr.	3
39.	Advertising, Salesmanship	3	Soph., jr., sr.	3
43a,b.	Banking	3†	Soph., jr., sr.	3
	Advanced Courses			
122.	Commercial Policies	3	Soph., jr., sr.	3
135.	Accounting for Marketing Enterprises	3	Jr., sr.	19
145.	Corporations	3	Jr., sr.	3
146.	Public Utilities	3	Jr., sr.	3, 145
147.	Labor Problems	3	Jr., sr.	3
191.	Public Finance	3	Jr., sr.	6 cred. incl. 3
192.	State and Local Taxation.....	3	Jr., sr.	191

For additional courses see the bulletin of the College of Science, Literature, and the Arts.

† Seniors in forestry taking these courses discontinue them at the Christmas vacation and are allowed 2 credits on each 3 credit course.

‡ Both semesters must be completed before credit is given for the first semester.

INTRODUCTORY COURSES

2a,b. INDUSTRIES AND COMMERCE OF THE UNITED STATES. Agricultural, mining, and manufacturing industries, internal and foreign commerce. Industries and commerce of the several sections of the country. Leading individual industries: geographical distribution, methods of reorganization, production, and marketing, and relationships to one another. MCFALL.

3a,b. PRINCIPLES OF ECONOMICS. Fundamentals of economic theory with special reference to agriculture. CUMBERLAND.

4a,b. ECONOMIC PROBLEMS. A survey of the fundamentals in the problems of labor, social insurance, socialism, government ownership, corporations, trusts, monopolies, transportation, banking, protection, free trade, public revenues and expenditures. BLAKEY.

9. INDUSTRIAL HISTORY SINCE 1750. Economic effects of inventions, wars, political changes, increased supply of precious metals, improved transportation, and modifications of business organization; chief emphasis on Great Britain. GRAY.

15. FOREST ECONOMICS AND CONSERVATION. Development of forest policies; relation of forests to other industries; effects of transportation rates and taxation; general problem of the conservation of natural resources. Lectures, assigned readings, and reports. MCFALL.

18. PROBLEMS IN AGRICULTURAL ECONOMICS. The practical economic problems which confront the farmer as a producer, consumer, and citizen; land settlement; size of farms; intensity of cultivation; tenancy; credit; marketing; coöperation; taxation; protective duties; foreign markets; money and prices; transportation. DURAND.

34. BUSINESS MANAGEMENT. The principles of efficiency in business operation and forms of organization to apply them; the typical departments of a business: their functions, office organization, and administration. Textbook, assigned readings, and lectures. MITCHELL, HODGE.

35-36. PRINCIPLES OF ACCOUNTING. The purpose and principles of account classification; capital and revenue; accruals; valuation; depreciation; preparation and interpretation of balance sheets, income accounts, and other statements; corporation accounts. A laboratory course with supplementary lectures. MITCHELL, HODGE.

37. MARKETING OF PRODUCTS. Merchandising problems of manufacturers, wholesalers, and retailers; distributing systems and market organization; price policies; sales management. JAMES.

39. ADVERTISING, SALESMANSHIP, AND COMMERCIAL CREDIT. Functions and principles of advertising; advertising media; planning and executing

an advertising campaign. Principles of personal salesmanship. Problems of the credit department. JAMES.

43a,b. PRINCIPLES AND PRACTICE OF BANKING. Contemporary banking institutions, both national and state; their incorporation, organization, administration; reserves, note issues, clearing houses, domestic and foreign exchange; the banking systems of foreign countries; and the Federal Reserve Banks of the United States. EBERSOLE.

ADVANCED COURSES

122. COMMERCIAL POLICIES. Theory of international commerce; free trade, reciprocity, and protection, with special emphasis on the tariff history and policy of the United States; commercial treaties and foreign politics. Lectures, assigned readings, and reports. BLAKEY.

135. ACCOUNTING FOR MARKETING ENTERPRISES. Principles of business practice and accounting for coöperative and other establishments and organizations engaged in marketing of farm products, such as elevators, creameries, livestock shipping concerns, etc. Text-book lectures and practice work. ROBOTKA.

145. THE MODERN BUSINESS CORPORATION. The organizing, financing, and managing of corporations; the position of the corporation before the law; methods of accounting; the relation of the government to the corporation; the question of trusts in its various phases. GRAY.

146. PUBLIC UTILITIES. Economic and legal basis of classification, consideration of relative advantages of public ownership and of public regulation. Central regulation compared with municipal regulation. Basis of rates; relative rates; rates and service. Theories of valuation. GRAY.

161. LABOR PROBLEMS. Modern labor problems; woman and child labor, industrial education, unemployment, poverty, industrial hygiene, welfare work, profit sharing, coöperation, labor unions, strikes, boycotts, conciliation, arbitration; economic causes and effects of immigration. Discussions, investigations of local conditions. CROSGRAVE.

191. PUBLIC FINANCE. Public expenditures; public debt; budgetary legislation; tax systems. BLAKEY.

192. STATE AND LOCAL TAXATION. Problems of state and local taxation. Historic survey of various taxes and examination of present procedure in taxing different kinds of property; tax reforms. Particular attention given to conditions in Minnesota. BLAKEY.

ECONOMIC ZOOLOGY

COLLEGE OF AGRICULTURE

Professor FREDERICK L. WASHBURN; Associate Professor ARTHUR G. RUGGLES.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
5.	Forest Entomology	3	Jr.	An. Biol. 3-4
12.	Forest Zoology	2	Jr.	An. Biol. 3-4

For additional courses see the bulletin of the College of Agriculture.

INTRODUCTORY COURSES

5. FOREST ENTOMOLOGY. A special study is made of insects affecting shade and forest trees, and the best means of controlling them. RUGGLES.

12 FOREST ZOOLOGY. A study of forest animals. Relations of game and other birds, and of various four-footed animals to forest protection; habits, range, usefulness, or the contrary; fur-farming; also a discussion of fish culture. WASHBURN.

GEOLOGY

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Professor WILLIAM H. EMMONS; Assistant Professor CHESSLEY J. POSEY; Instructor A. WALFRED JOHNSTON.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
1.	Geology	3	Soph., jr., sr.	None
29.	General Physiography	3	Soph., jr., sr.	None

For additional courses see the bulletin of the College of Science, Literature, and the Arts.

INTRODUCTORY COURSES

1. GENERAL GEOLOGY. A synoptical treatment of materials of the earth and of geologic processes. Physiographic, dynamic, and structural geology, with a brief introduction to historical geology. Lectures, laboratory work, field excursions, map study, and conferences. EMMONS, JOHNSTON.

29. GENERAL PHYSIOGRAPHY. Principles of earth sculpture; physiographic changes in progress, and agencies causing them; hydrography and oceanography; planetary relations; climatology; field excursions. POSEY.

GERMAN

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Professor CARL SCHLENKER; Assistant Professors OSCAR C. BURKHARD, SAMUEL KROESCH, WALTER R. MYERS; Instructors JAMES DAVIES, LYNWOOD G. DOWNS, J. THEODORE GEISSENDOERFER, ARTHUR R.

GRAVES, ALFRED E. KOENIG, HAROLD W. SOULE, RICHARD WISCHKAEMPER, EDWIN H. ZEYDEL; Teaching Fellows LOUISE G. FRARY, ARNOLD W. SHUTTER.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
1a,b.	Beginning	6	All	None
3a,b.	Intermediate	6	All	1
5-6.	Prose and Poetry	6*	All	2 yrs. preparatory
7-8.	Drama	6*	All	5-6 or 4 yrs. prep.
11-12.	Rapid Reading	6*	All	3a or 3b
21-22.	Scientific Intermediate	6*	All	3a or 2 yrs. prep. or equiv.
23-24.	Scientific Advanced	6*	All	22, 5-6, or 4 yrs. preparatory

For additional courses see the bulletin of the College of Science, Literature, and the Arts.

* Both semesters must be completed before credit is given for the first semester.

INTRODUCTORY COURSES

1a,b. BEGINNING. Double course given each semester as a six-hour course. Pronunciation, grammar, conversation, and composition; selected reading in easy prose and verse. KROESCH, MYERS, DAVIES, DOWNS, GRAVES, KOENIG, SOULE, ZEYDEL, SHUTTER.

2a,b. INTERMEDIATE. Double course given each semester as six-hour course. Selected texts in modern narrative and descriptive prose; selected lyrics and ballads; a drama of Lessing, Goethe, or Schiller. Assigned readings of texts outside of class. KROESCH, MYERS, DAVIES, DOWNS, GRAVES, KOENIG, SOULE, ZEYDEL, SHUTTER.

5-6. PROSE AND POETRY. Geography, history, and legend. Review of German grammar throughout the year. BURKHARD, DOWNS, GEISSENDOERFER, GRAVES, WISCHKAEMPER, FRARY.

7-8. DRAMA. First semester: classic drama; plays of Lessing, Goethe, Schiller. Second semester: modern drama; plays of Hebbel, Sudermann, Hauptmann and others. Assigned readings and reports throughout the year. SCHLENKER, BURKHARD, KROESCH, DAVIES.

11-12. RAPID READING. First semester: narrative prose; Hauff, Storm, Sudermann; Goethe's *Hermann und Dorothea.* Second semester: plays of Lessing, Goethe, Schiller, Hebbel. Assigned readings and reports. DAVIES, GRAVES, KOENIG, SOULE.

21-22. SCIENTIFIC INTERMEDIATE. This course aims to give students a reading knowledge of German for use in scientific studies. Not open to those who have obtained credit for either Course 3-4 or 5-6. GEISSENDOERFER, GRAVES, WISCHKAEMPER.

23-24. SCIENTIFIC ADVANCED. Reading of monographs and periodicals. Not open to those who have obtained credit for Course 7-8. WISCHKAEMPER.

HOME ECONOMICS

Professor JOSEPHINE T. BERRY; Instructor BESSIE E. BEMIS.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Course			
24.	Camp Cookery	3*	All	None

For additional courses see the bulletin of the College of Agriculture, courses in Home Economics.

* Two credits will be allowed for the completion of two-thirds of the course.

INTRODUCTORY COURSE

24. CAMP COOKERY. This course is designed to give prospective foresters, engineers, and others a knowledge of the simpler cookery processes; and of such adaptations as are practicable in the several types of out-of-doors camps. BEMIS.

HORTICULTURE

COLLEGE OF AGRICULTURE

Associate Professor LEROY CADY; Assistant Professor WILFRID G. BRIERLEY (Chairman).

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
56.	Plant Propagation	1	Soph., jr., sr.	None
71.	Landscape Gardening	3	Jr., sr.	None

For additional courses see the bulletin of the College of Agriculture.

INTRODUCTORY COURSES

56. PLANT PROPAGATION. Methods of propagation of plants by seeds, cuttings, layers, grafting, and budding. The principles of greenhouse management, transplanting, watering, and ventilation. Lectures, reference reading, field, and laboratory work. CADY.

71. LANDSCAPE GARDENING. A general course in the practice and principles of landscape gardening as applied to the home and community. Lectures and field trips to parks and private grounds. CADY.

MILITARY SCIENCE AND TACTICS

Professor GEORGE W. MOSES (Commandant); Associate Professors THEODORE B. TAYLOR, JAMES B. WOOLNOUGH; Assistant Professor OWEN R. MEREDITH; Band Instructor BERT ROSE.

REQUIRED WORK

All physically fit male students are required to take military training during the first two undergraduate years of their course unless they have secured such training at an approved institution endorsed by the Military Department. When this course is entered upon it must be carried to completion as a prerequisite for graduation. No credits are allowed for this work.

ELECTIVE WORK

(a) All juniors and seniors who have completed two years of drill may register for the course required by General Orders No. 49 War Department for members of the Reserve Officers' Training Corps. Such students sign a written agreement to continue in this corps for the remainder of the college course; the completion of this work is a prerequisite to promotion. Any student who for satisfcaotry reasons is permitted to withdraw from this course must reimburse the War Department for all moneys received.

Juniors and seniors who take the course required by General Orders No. 49, which includes two camps of four weeks each, will receive an allowance of thirty cents per day for subsistence while pursuing the course and will have all expenses paid to and from the encampments. They also are eligible for appointment as temporary second lieutenants in the Infantry branch of the Regular Army for six months with a salary of one hundred dollars per month upon graduation and commission in the Reserve Corps. The Reserve Corps furnishes officers for Citizens' Training Camps in time of peace and commission in the United States Volunteers in time of war, such officers having preference for commissions in the volunteers immediately below experienced officers in the federal service.

The course includes three hours a week of drill and three of study in the Military Department and also includes recommended courses offered by the respective colleges which have a direct bearing on the work of the Corps, such as Military History and International Law in the Liberal Arts College. The work carries three credits in each semester in the Military Department, and six additional credits in Military History and International Law.

(b) Any student having completed the two years of required Military Training may continue the work for credit in the third and fourth years. Credit for such work is allowed in practically all of the colleges of the University, the maximum being three credits a year.

PHYSICAL EDUCATION

FOR MEN

Director Louis J. Cooke; Assistant Director William K. Foster; Instructors D. C. Mitchell, John C. West; Assistant Bottolf M. Ohnstad.

The purpose of the department is to provide all men of the University opportunity for exercise in order to maintain and build up their

general health. It also provides special training for the correction of physical defects and functional derangements.

A physical examination is required of all new matriculants, and of all others using the department privileges, at the beginning of the year, and as often during their college course as their physical condition may indicate. Students taking the required work in physical education are examined also at the close of the year. A study of these records shows a marked improvement in the standard of health of the average student during his college course.

The gymnasium, swimming pool, and baths are open to all students of the University, who are free to use the apparatus and to pursue a course in physical training under the supervision of the director and his assistants.

Those students, taking the required course in physical education, who can not swim, must make a reasonable effort, as determined by the department, to pass the swimming and life-saving requirements, and will be assigned special hours for instruction.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
1.	Personal Hygiene	None	Fr.	None
*3a,b.	Gymnasium	None	Fr.	None
5-6.	Intermediate Gymnastics	None	Fr.	None
7-8.	Advanced Leaders	2†	Soph., jr., sr.	1, 3-4, 5-6
9-10.	Corrective Gymnastics	None	All	None
11-12.	Wrestling	None	Soph., jr., sr.	None
13-14.	Advanced Gymnastics	None	Soph., jr., sr.	None
15-16.	Intermediate Swimming	None	All	None
17-18.	Advanced Swimming	None	All	15-16

* Given at the University Farm.

† Both semesters must be completed before credit is given for the first semester.

1. PERSONAL HYGIENE. Two hours per week; first six weeks of first semester. Examination at close of course. COOKE.

A special lecture on sex hygiene is given sometime during the first ten days of the autumn semester, with required attendance on the part of all freshmen.

3a,b. GYMNASTICS. Two hours a week, last twelve weeks of first semester or first twelve weeks of second semester. Required qualifications in swimming, life-saving, bar-vaulting, jumping, sprinting, running, and on heavy apparatus. MITCHELL.

5-5 INTERMEDIATE GYMNASTICS. Elective for freshmen showing exceptional ability in elementary apparatus work. FOSTER, WEST.

7-8. CLASS LEADERS (ADVANCED). Three hours a week. FOSTER, WEST.

9-10. CORRECTIVE GYMNASTICS. Three hours a week. Special individual courses for students physically defective. OHNSTAD.

11-12. WRESTLING. Course in competitive wrestling. Most promising candidates chosen to represent Minnesota at the Western Intercollegiate Gymnastic and Wrestling Meet. (Optional.) FOSTER, OHNSTAD.

13-14. ADVANCED GYMNASTICS. Same as Course 11 and 12 except that it is in gymnastics instead of wrestling. Includes course in ground tumbling, horizontal bar, parallel bars, side horse, and flying rings. FOSTER, WEST.

15-16, 17-18. SWIMMING, INTERMEDIATE AND ADVANCED. Life saving, efficiency swimming, and fancy diving. Instruction is given in rescuing and restoring the apparently drowned and other useful swimming accomplishments. FOSTER, OHNSTAD.

PLANT PATHOLOGY AND BOTANY

COLLEGE OF AGRICULTURE

Professor EDWARD M. FREEMAN; Associate Professor ELVIN C. STAKMAN.

General statement.—For specialization in this department, see bulletin of College of Agriculture.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Course			
10.	Forest Pathology	3	Soph.	Bot. 1 yr.

For additional courses see the bulletin of the College of Agriculture.

INTRODUCTORY COURSE

10. FOREST PATHOLOGY. Elementary study of plant diseases due to fungi, bacteria, and slime-molds; life histories and preventive methods. Lectures, laboratory, and reference. FREEMAN, STAKMAN.

POLITICAL SCIENCE

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Professors WILLIAM A. SCHAPER, JEREMIAH S. YOUNG.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
1a,b.	American Government	3	Soph., jr., sr.	None
5.	European Municipal Administration	3	Soph., jr., sr.	None
6.	American Municipal Administration	3	Soph., jr., sr.	1
7a,b.	State and Local Government	3	Soph., jr., sr.	1
*28.	Business Law	3	Jr., sr.	1 or Econ. 6 cred.
51.	Business Law, Part I	3	Jr., sr.	1 or Econ. 6 cred.
52.	Business Law, Part II	3	Jr., sr.	51

For additional courses see the bulletin of the College of Science, Literature, and the Arts.

* Given at the University Farm.

INTRODUCTORY COURSES

1a,b. AMERICAN GOVERNMENT. Organization and actual workings of the national government; nature and origin of the American governmental system. SCHAPER, YOUNG.

5. EUROPEAN MUNICIPAL ADMINISTRATION. A study of French, German, Austrian, and English cities; the forms of government, parties, and elections; achievements in finance, police, sanitation, city planning, and other public services undertaken. SCHAPER.

6. AMERICAN MUNICIPAL ADMINISTRATION. A study of the organization and chief functions of American cities; their growth, relation to the state, forms of charters, inefficiency, and corruption, reform measures; and the administration of finance, police, health, and other activities. SCHAPER.

7a,b. STATE AND LOCAL GOVERNMENT. Comparison of American state governments, especially Minnesota; relation of states to the United States and to local units of government; recent experiments such as initiative and referendum, the recall and primaries; social and economic legislation. YOUNG.

28. BUSINESS LAW. A course in Business Law (arranged for students in Agriculture), including contracts, agency, mortgages, conveyances, and negotiable instruments. .....

51. BUSINESS LAW, PART I. The principles of law governing ordinary business transactions, including the general law of contracts, sales, mortgages, bankruptcy, and agency. YOUNG.

52. BUSINESS LAW, PART II. The law of partnerships, corporations, and negotiable instruments. YOUNG.

RHETORIC

Assistant Professor ROBERT C. LANSING; Instructors ESTELLE COOK, GEORGE G. GLICK, RUTH MOHL.

General statement.—Rhetoric credits will not be granted officially until the close of the first semester of the senior year.

At least one quiz paper will be selected at random each semester from other than rhetoric classes and read by the staff of the Rhetoric section. In addition any instructor may nominate to the committee and submit papers for any junior or senior who in his opinion requires special consideration.

The Rhetoric section may require upper-class students to take, without credit, additional courses in rhetoric in order to validate their freshman and sophomore rhetoric credits.

Until June, 1918, students registered previous to September, 1915, may be required to take a supplementary three-credit course in rhetoric

in place of three of the elective credits required for the degree.

Students whose work in Rhetoric 1 shows at any time an inadequate knowledge of the conventions of English will be required to drop the course and enter Rhet. 3. These students will be required to complete fifteen credit hours of work in rhetoric.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
1a,b.	Rhetoric	3	Fr.	None
2a,b.	Rhetoric	3	Fr.	1
3a,b.	Elementary Rhetoric	3	Fr.	None
11a,b.	Argumentation	3	Soph., jr.	2
22a,b.	Public Speaking	3	Soph., jr.	11
24a,b.	Adv. Public Speaking	3	Soph., jr., sr.	22 or 25
25a,b.	Fundamentals of Vocal Expression	2	Soph., jr., sr.	2

INTRODUCTORY COURSES

1a,b. RHETORIC. Note taking, thesis writing, oral and written exposition, sentence and paragraph structure, analysis of prose models, book reviews. LANSING, GLICK, MOHL.

2a,b. RHETORIC. Description, narration, diction, argumentation, oral composition, book reviews. LANSING, GLICK, MOHL.

3a,b. ELEMENTARY RHETORIC. Elementary grammatical and rhetorical principles. MOHL.

11a,b. ARGUMENTATION. Evidence, reasoning, briefing, debating. LANSING, GLICK, MOHL.

22a,b. PUBLIC SPEAKING. A study of the fundamentals of effective public speech and practice in organizing and delivering short occasional addresses. GLICK.

24a,b. ADVANCED PUBLIC SPEAKING. The preparation and delivery of the informal lecture. A study of the rules of order and practice in conducting assemblies. GLICK.

25a,b. FUNDAMENTALS OF VOCAL EXPRESSION. The study and practice of the fundamental principles of voice production, articulation, gesture, platform deportment, and expression. COOK.

ROMANCE LANGUAGES

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Professors EVERETT WARD OLMSTED, COLBERT SEARLES; Assistant Professors JULES T. FRELIN, RUTH S. PHELPS; Professorial Lecturers BALBINO DÁVALOS, PEDRO HENRÍQUEZ UREÑA, PAUL H. MORIN; Instructors HARRY E. ATWOOD, GEORGE S. BARNUM, FRANCIS B. BARTON, NELSON F. COBURN, WILLIS J. PLUMMER, EDWARD H. SIRICH.

COURSES

No.	Title	Credits	Offered to	Prereq. courses
	Introductory Courses			
1a,b.	Beginning French	6	All	None
2a.	Beginning French	3	All	Prep. French 1 yr.
3a,b.	Intermediate French	6	All	1 or equiv.
4.	Survey of French Literature	6	All	1 or equiv.
5-6.	Survey of French Literature	6	All	3 or equiv.
7-8.	Elemen. French Conversation	2	All	3 or equiv.
9-10.	Elemen. French Composition	1	All	3 or equiv.
31a,b.	Beginning Spanish	6	All	None
33-34.	Beginning Spanish	6	All	None
35a,b.	Intermediate Spanish	6	All	31 or equiv.
37-38.	Intermediate Spanish	6	All	31 or equiv.
39-40.	Spanish Literature of the Nineteenth Century	6	All	35 or equiv.
41-42.	Elementary Spanish Conversation	2	All	35 or equiv.
43-44.	Elementary Spanish Composition	2	All	35 or equiv.

For additional courses see the bulletin of the College of Science, Literature, and the Arts.

INTRODUCTORY COURSES

1a,b. BEGINNING FRENCH. Pronunciation, grammar, drill, oral exercises, and translation. SEARLES, FRELIN, ATWOOD, BARNUM, BARTON, COBURN, SIRICH.

2a. BEGINNING FRENCH. For those who have completed one year of preparatory French. BARTON.

3a,b. INTERMEDIATE FRENCH. Review of grammar, composition, conversation, and reading, representative authors of the Nineteenth Century. FRELIN, ATWOOD, BARNUM.

4. SURVEY OF FRENCH LITERATURE. Double course. Same as 5-6. BARTON.

5-6. GENERAL SURVEY OF FRENCH LITERATURE. Lectures, recitations, and assigned readings. Designed to cover the whole period in historical outline, and to prepare for a more minute study of special periods. Selections from representative authors. PHELPS, ATWOOD, SIRICH.

7-8. ELEMENTARY FRENCH CONVERSATION. Small amount of outside preparation will be required. The section meeting at nine o'clock on Monday, Wednesday, and Friday is limited to students taking course 5-6 and is based on the work of that course. FRELIN, BARTON, SIRICH.

9-10. ELEMENTARY FRENCH COMPOSITION. FRELIN, BARTON.

31a,b. BEGINNING SPANISH. Pronunciation, grammar drill, oral exercises, and translation. HENRÍQUEZ, PLUMMER, BARNUM.

33-34. BEGINNING SPANISH. This course is the same as course 31 except that it is a year-course. OLMSTED, COBURN, PLUMMER.

35a,b. INTERMEDIATE SPANISH. Review of grammar, composition, conversation, and reading. HENRÍQUEZ, PLUMMER.

37-38. INTERMEDIATE SPANISH. This course is the same as course 35a,b, except that it is a year-course. HENRÍQUEZ, COBURN.

39-40. SPANISH LITERATURE OF THE NINETEENTH CENTURY. Lectures, recitations, and assigned readings. HENRÍQUEZ.

41-42. ELEMENTARY SPANISH CONVERSATION. A small amount of outside preparatión required. The life and customs of modern Spain; accompanied by illustrative material. PLUMMER.

43-44. ELEMENTARY SPANISH COMPOSITION. Special attention given to social and commercial correspondence. PLUMMER.

INDEX

The Bulletin *of the* University *of* Minnesota

The School of Agriculture Announcement for the Year 1917-1918

Catalog Series No. 16

Vol. XX No. 17 May 18 1917

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

1917

JULY

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

AUGUST

..	..	..	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
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

..	..	..	..	..	..	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	..	..	..	..	..

1918

JANUARY

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

FEBRUARY

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

MARCH

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

APRIL

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

MAY

..	..	..	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	..	..	..	..	..	..

JULY

Su	Mo	Tu	W	Th	Fr	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	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

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

CALENDAR

SCHOOL OF AGRICULTURE

1917-1918

1917			
October	29	Monday	First term begins; entrance examinations, registration, payment of fees
October	30	Tuesday	Regular class work begins
November	29	Thursday	Thanksgiving day; a holiday
December	21	Friday	First term closes; Christmas vacation begins 9:00 p.m.
1918			
January	7	Monday	Second term begins; entrance examinations, registration, payment of fees
January	8	Tuesday	Regular class work begins
February	12	Tuesday	Lincoln's Birthday; a holiday
February	22	Friday	Washington's Birthday; a holiday
March	23	Saturday	Second term closes
March	26	Tuesday	Alumni day
March	27	Wednesday	Twenty-ninth Annual Commencement

SCHOOL OF AGRICULTURE

FACULTY

*George Edgar Vincent, Ph.D., LL.D., President
1005 5th St. S. E., Minneapolis
†Marion LeRoy Burton, D.D., Ph.D., LL.D., President
1005 5th St. S. E., Minneapolis
Cyrus Northrop, LL.D., President Emeritus
519 10th Ave. S. E., Minneapolis
Albert F. Woods, M.A., D.Agr., Dean 1199 Raymond Ave., St. Paul
Edward M. Freeman, Ph.D., Assistant Dean 2196 Carter Ave., St. Paul
Dexter D. Mayne, Principal 1403 Cleveland Ave., St. Paul
Rodney M. West, B.A., Secretary 2141 Doswell Ave., St. Paul
Bessie E. Bemis, B.S., Instructor in charge of Girl's Dormitory
University Farm, St. Paul
Anna Laue, R.N., Head Nurse St. Joseph's Hospital, St. Paul
Harriett W. Sewall, B.A., Librarian 958 Eustis St., St. Paul
Arne W. Aamodt, Horticulture 857 Albemarle St., St. Paul
Frederick J. Alway, Ph.D., Chief of Division of Soils
1386 Grantham Ave., St. Paul
Arthur L. Anderson, B.S., Veterinary Science
1489 Raymond Ave., St. Paul
Philip A. Anderson, B.S., Stock Judging 1206 5th St. S. E., Minneapolis
Robert C. Ashby, M.S., Animal Husbandry 1423 Chelmsford St., St. Paul
Louis B. Bassett, Farm Machinery 2095 Dudley Ave., St. Paul
Alva H. Benton, M.S., Farm Management 2282 Carter Ave., St. Paul
Josephine T. Berry, M.A., Chief of Division of Home Economics
2176 Scudder Ave., St. Paul
Andrew Boss, Chief of Division of Agronomy and Farm Management
1443 Raymond Ave., St. Paul
Fannie C. Boutelle, Rhetoric 1416 7th St. S. E., Minneapolis
Wilfrid G. Brierley, M.S. in Hort., Chairman of Division of Horticulture 2128 Knapp St., St. Paul
Clara M. Brown, B.A., Textiles and Clothing 2120 Como Ave., St. Paul
LeRoy Cady, B.S. in Agr., Horticulture 2121 Doswell Ave., St. Paul
Edward G. Cheyney, B.A., Chief of Division of Forestry
2163 Carter Ave., St. Paul
Ernest B. Cleworth, Mechanics Laboratory 1507 Raymond Ave., St. Paul
Estelle Cook, Rhetoric, Supervisor of Literary Societies
1361 Cleveland Ave., St. Paul
Eugene C. Crane, M.E.M., Concrete 4277 Sheridan Ave. S., Minneapolis
Robert C. Dahlberg, B.S., Seed Testing 1521 Branston Ave., St. Paul
Franc P. Daniels, B.S., Horticulture
2112 Kenwood Parkway, Minneapolis

* Term of office ends June 30, 1917.
† Term of office begins July 1, 1917.

GRACE E. DENNY, B.S., Physical Training, Social Training
1837 Carroll Ave., St. Paul
EVERETT H. DOHERTY, B.S., Chemistry 315 15th Ave. S. E., Minneapolis
JEAN MUIR DORSEY, B.S., Home Management 2132 Carter Ave., St. Paul
JAMES M. DREW, Practicums 1307 Chelmsford St., St. Paul
E. DANA DURAND, Ph.D., Chief of Division of Agricultural Economics
629 5th St. S. E., Minneapolis
ADDISON L. EWING, M.S., Physics 1465 Raymond Ave., St. Paul
HALLY J. FISHER, R.N., Home Nursing University Farm, St. Paul
LLOYD V. FRANCE, M.S. in Agr., Bee Culture 2309 Priscilla St., St. Paul
EDWARD M. FREEMAN, Ph.D., Chief of Division of Plant Pathology and Botany 2196 Carter Ave., St. Paul
CARL W. GAY, D.V.M., B.S.A., Chairman of Animal Industry Group and Division of Animal Husbandry 1386 Chelmsford St., St. Paul
GUSTAV W. GEHRAND, Dairy Husbandry 946 15th Ave. S. E., Minneapolis
LILLIAN HANSEN, Swimming 3401 Pleasant Ave., Minneapolis
EDWIN O. HANSON, Dairy Husbandry 1427 Hythe St., St. Paul
ELIZABETH HAUSE, B.A., Rhetoric 2174 Commonwealth Ave., St. Paul
ROBERT E. HODGSON, B.S., Farm Crops 1400 Raymond Ave., St. Paul
GODFREY R. HOERNER, B.S., Plant Pathology 1155 Raymond Ave., St. Paul
LEROY C. HOLM, Gymnasium University Farm, St. Paul
CHARLES W. HOWARD, B.A., M.S., Economic Zoology
1019 15th Ave. S. E., Minneapolis
FRANCIS JAGER, Chief of Division of Bee Culture
Vendome Hotel, Minneapolis
PEDER L. JOHNSRUD, Mathematics 1492 Como Ave. W., St. Paul
ALLEN D. JOHNSTON, Blacksmithing 2111 Knapp St., St. Paul
HENRY H. KILDEE, M.S.A., Chairman of Division of Dairy Husbandry
1280 Raymond Ave., St. Paul
DWIGHT J. LANE, Poultry Husbandry R. R. 2, Hopkins
ROBERT C. LANSING, M.A., Chief of Section of Rhetoric
2237 Knapp St., St. Paul
GEORGINA L. LOMMEN, Normal Department 1502 St. Anthony Ave., St. Paul
OLIVE B. MACCOMBER, Textiles and Clothing
1393 Cleveland Ave., St. Paul
MABEL MCDOWELL, B.S., Foods and Management
2638 Bryant Ave. S., Minneapolis
SOLVEIG MAGELSSEN, M.A., English 725 7th St. S. E., Minneapolis
ALDEN W. MALCOMSON, B.S., Animal Husbandry
2089 Carter Ave., St. Paul
SIMON MARCOVITCH, B.S., Economic Zoology 1465 Raymond Ave., St. Paul
D. C. MITCHELL, B.Sc. in C.E., Director of Gymnasium
1395 Chelmsford St., St. Paul
JOSEPH S. MONTGOMERY, B.S. in Agr., Animal Husbandry
1403 Chelmsford St., St. Paul
MARTHA B. MOORHEAD, M.D., Hygiene 914 2nd Ave. S., Minneapolis
GEORGE W. MOSES, Major, 16th U. S. Cavalry, Commandant, Military Science and Tactics 1308 5th St. S. E., Minneapolis
JASON L. MOWRY, Mechanics 2342 Bourne Ave., St. Paul
GEORGE H. NESOM, B.S., Soils 2104 Scudder Ave., St. Paul

PETER J. OLSON, M.S., Farm Crops 1298 Raymond Ave. W., St. Paul
WIELAND L. OSWALD, Agricultural Botany 2274 Carter Ave., St. Paul
CHARLES C. PALMER, D.V.M., Physiology and Veterinary Science 1452 Raymond Ave., St. Paul
THOMAS G. PATERSON, B.S. in Agr., Animal Husbandry 1343 Cleveland Ave., St. Paul
ROLLIN M. PEASE, B.A., Music 210 S. Victoria St., St. Paul
H. FERNE PECK, B.A., Agricultural Botany 1453 Hythe St., St. Paul
ABE PEPINSKY, Band and Orchestra 968 Marshall Ave., St. Paul
MYRON H. REYNOLDS, M.D., D.V.M., Chairman of Division of Veterinary Science 2145 Knapp St., St. Paul
WALTER F. RHINOW, Brigade Adjutant and Assistant Commandant 1022 16th Ave. S. E., Minneapolis
ARTHUR G. RUGGLES, M.A., Economic Zoology 1465 Raymond Ave., St. Paul
ARTHUR C. SMITH, B.S., Chairman of Division of Poultry Husbandry 2271 Commonwealth Ave., St. Paul
JOHN T. STEWART, C.E., Chief of Division of Agricultural Engineering 2223 Knapp St., St. Paul
ASHLEY V. STORM, M.A., Chief of Division of Agricultural Education 1827 4th St. S. E., Minneapolis
ROSCOE W. THATCHER, M.A., Chief of Division of Agricultural Biochemistry 1415 Chelmsford St., St. Paul
JAMES B. TORRANCE, Farm Motors 3744 Portland Ave., Minneapolis
OLIVE TUTTLE, B.S., Textiles and Clothing 2134 Knapp St., St. Paul
ELIZABETH VERMILYE, B.A., Foods and Management 2116 Knapp St., St. Paul
JOHN J. VIETS, B.S., Animal Husbandry 2089 Carter Ave., St. Paul
BERT A. WALLACE, History, Mathematics 425 12th Ave. S. E., Minneapolis
FREDERICK L. WASHBURN, M.A., Chairman of Division of Economic Zoology 1112 6th St. S. E., Minneapolis
ROBERT M. WASHBURN, B.Agr., M.S.A., Dairy Husbandry 2122 Knapp St., St. Paul
MILDRED WEIGLEY, Foods and Management 2176 Scudder Ave., St. Paul
JOHN P. WENTLING, M.A., Forestry 2195 Doswell Ave., St. Paul
HALL B. WHITE, B.S. in Agr., Carpentry 1426 Raymond Ave., St. Paul
LLOYD R. WHITSON, E.M., Drawing 2375 Bourne Ave., St. Paul
JOHN J. WILLAMAN, M.S., Agricultural Chemistry 2091 Buford Ave., St. Paul
BENJAMIN A. WINKLEMAN, Penmanship, Spelling 622 East 16th St., Minneapolis

COMMITTEES

Executive—The Dean, Secretary, and Chiefs of Divisions
Curriculum—CADY, BROWN, DREW, BENDER, WHITE
Entertainment—MAYNE, BOUTELLE, BOSS
Students' Work and Eligibility—BASSETT, WILLAMAN, COOK, VERMILYE, PALMER, ASHBY
Rules—R. M. WASHBURN, BENTON, JOHNSRUD
Enrollment—LUSK, MOORE, BROWN, EWING

GENERAL INFORMATION

The School of Agriculture is located on University Farm, St. Paul, Minnesota, about midway between the business portions of the cities of St. Paul and Minneapolis. The School is a part of the Department of Agriculture of the University of Minnesota, and is governed by the Board of Regents.

HOW TO GET TO THE SCHOOL

Check all baggage to Minneapolis or St. Paul, and bring checks to the School.

A charge of twenty-five cents is made by the School for transporting trunks at the opening of the school year. A charge of not more than twenty-five cents is made for the return of the baggage at the close of school, provided it is ready to go on the days assigned.

Monday and Tuesday, October 29 and 30, members of the Y. M. C. A. wearing lettered badges will be at the Union Station in St. Paul, and at the Great Northern, Milwaukee, Soo, and St. Louis Stations in Minneapolis, to meet and direct new students. Take the Como-Harriet or Como-Hopkins car from either St. Paul or Minneapolis, and get off at Doswell Avenue. The dormitories are about a half mile from the car line. Students with a large amount of hand baggage are advised to change to the Inter-Campus Special at Eustis Avenue. This car goes direct to the School, but does not run before 8 a.m., after 6 p.m., or on Sunday.

TIME OF OPENING AND CLOSING

The School of Agriculture will open Monday, October 29,* 1917, and close March 27, 1918. The fall term will close at 4:30 p.m., Friday, December 21, and the winter term will begin Monday, January 7, 1918.

Instruction begins promptly at the opening of each term. Students should be present the first day and remain until the close of the term.

PURPOSE

The School of Agriculture was organized in 1888. Its object is to give a practical education to young men and women. It offers a 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. The School course does not aim to prepare students for college.

ADMISSION

Students should correspond with the Secretary, University Farm, St. Paul, Minnesota, prior to coming to the institution, to make the necessary preliminary arrangements for registration.

* On account of the large acreage in farm crops this season and the scarcity of farm labor, the School of Agriculture will not open until October 29. This will enable students to remain on the farms during the month of October to aid in harvesting crops.

All male students are required to have had six months' farm practice before entrance.

No student under seventeen years of age will be admitted. Exceptions to this rule may be made in the case of applicants who have completed one full year of high-school work. Similar exception may be made when no high school is immediately available to the applicant.

Students who have completed eighth-grade work, or its equivalent, in the common schools, and who are seventeen years of age or older, are admitted without examination. Each applicant for admission should send to the Secretary for a certificate of admission which when properly filled out by former teacher or superintendent and returned to the Secretary will be accepted in place of entrance examinations. Diplomas should not be sent.

Applicants whose home schools do not afford complete instruction in the common branches may be admitted with not more than two conditions which must be removed according to instructions given the student upon admission.

Students from city or grade schools must present a dismissal card from the last school attended; they will not be admitted before finishing eighth-grade work, or until their former school records have been passed upon. These records must be presented at least three weeks prior to the opening of the School.

Students will be accepted from approved high schools and be given credit toward graduation from the School of Agriculture as follows:

	Boys	Girls
Minimum number of credit hours		
High School graduate	48	40
Non-graduate—per unit	3	2½
Agriculture—per unit	15	2½
Maximum number of credit hours	96	80

High-school courses equivalent to courses offered in the School of Agriculture will receive the same credit as that offered in the School. The first year's work in sewing, cooking, and freehand drawing will be allowed the same credit as that offered in the School. Additional credit in these subjects will be allowed only on the approval of the Home Economics Division. The apparent difference between the credit allowed boys and that allowed girls for high school work is due to the difference in credits required for graduation from the School of Agriculture (boys, 144 credit hours; girls, 120 credit hours). Relatively the credit allowed is the same in both cases.

COURSE OF STUDY

The course of study offered covers a wide range of subjects and is largely industrial in character; but provision is made for some instruction in English and Mathematics and other academic subjects. The course is briefly outlined on pages 17 to 20. Instruction is given in the workshop, laboratories, barns, and fields, as well as in the classroom. 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, and farm machinery, are taken by the young men, while the young women pursue home economics in two groups,—foods and management, and textiles and clothing. 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 eighty per cent of its graduates continue agricultural pursuits.

Mature students who can not complete the course will be permitted to arrange a special program.

The schools of agriculture connected with the University are doing the kind of work provided for by the Smith-Hughes Act. Such adjustments of old courses and additions of new courses will be made as may be necessary to satisfy the requirements established by the Federal Board and the State Board, to be appointed under that act, as soon as those requirements are made public.

RULES AND REGULATIONS

Registration

1. No student will be allowed to register after the second week of the term except by permission of the Students' Work Committee.

2. Irregular and special students will be governed by the same rules and will be required to carry the same amount of work as regular students except when excused by the Students' Work Committee.

3. Students who wish to carry three credit hours more or less than the required amount of work must obtain permission from the Students' Work Committee.

Cancellation of Registration

4. No student may drop a subject for which he is registered without the permission of the Students' Work Committee.

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

Delinquent Students

6. The Students' Work Committee may at any time require delinquent students to cancel a portion of their work.

7. A report of the work of all doubtful and below grade students is sent to the Secretary's Office at the end of each month.

8. No student will be permitted to graduate who has an unremoved incomplete, condition, or failure.

Absences

9. No student will be admitted without a pass from the Principal's Office into any class from which he has been absent.

Classification

10. In order to be classified as a junior, a student must have not to

exceed twelve credit hours less than the required number for the freshman year.

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

12. The following table shows the basis for classification for the school year of 1917-18:

	Boys	Girls
Freshman	— 35	— 27
Junior	36— 89	28— 73
Senior	90—144	74—120

Marking System

13. The passing mark is 65 on the scale of 100.

14. All grades are submitted to the Secretary's Office as A, B, C, D, E, F, or I, or in percentage.

15. The passing grades, A, B, C, and D have the following values:

D, 65-73 inclusive; C, 74-82 inclusive; B, 83-91 inclusive; A, 92-100 inclusive.

16. A grade of I (incomplete) represents that the required work of the course has not been completed and that the final mark has not been determined. An incomplete does not necessarily infer delinquent or below grade work.

17. An incomplete not removed by Saturday of the fourth week of the following term becomes a condition.

18. Extension of time for the removal of incompletes may be granted by the Students' Work Committee.

19. When a student fails to remove an incomplete within the specified time, or when his deficiency in a subject is such that it may be removed by an examination and such supplementary work (if any) as the department concerned may impose, his grade is reported as E (condition).

20. Conditions may be removed only during the eighth week of the term following that in which the condition was received.

21. When a student fails to remove a condition at the specified time or when his work in a subject is so seriously deficient as to require that the course be repeated in order to obtain credit therein, a grade of F (failure) is reported.

22. Courses for which failures are received must be repeated in class in preference to any advanced work.

Eligibility

23. Any student who has more than one below grade mark due to failure, condition, or below grade work of the current term, will not be allowed to participate in any of the following student activities without special permission from the Students' Work Committee:

(a) Inter-literary society debates; (b) inter-class debates; (c) class or literary society plays; (d) student publications as a board member; (e) athletic contests with other schools and colleges.

Student Organizations

24. *Registration of organizations.*—All student organizations making use of any of the School buildings must file a statement with the Secretary's Office giving the names of the president, secretary, and treasurer.

25. *Deposit of fees.*—All organizations collecting fees must deposit the fees with the department Cashier or a responsible Twin City Bank, and turn in their books at least once a term to be audited by the Auditing Committee.

26. No class will be allowed to become indebted to the out-going class to such an extent as to make it impossible for them to complete payment from the current funds of the class before the current commencement.

27. Lower class officers must report to the chairman of the Auditing Committee before the end of the first month of the school year, just what indebtedness they are proposing to incur toward the Senior Class and the Agrarian.

28. The Auditing Committee in conference with the Principal has power to limit such indebtedness.

29. *New organizations.*—Any group of students intending to form a new organization should first consult with the Chairmen of the Committees on Entertainment and Auditing.

30. No class party or public entertainment held on the campus for which members of the class shall be held bound in honor to contribute shall be given without previous permission of the Committee on Entertainment. The chairman will furnish application forms which should be filled and returned if possible two weeks before the date of the function.

HOME LIFE ON THE CAMPUS

The life of the students while attending the School of Agriculture is subject to supervision. The home life of each student is carefully guarded, and everything is done to promote a healthful and moral atmosphere. The use of tobacco and spirituous liquors of all kinds is strictly forbidden. No person will be admitted as a student who is known to have the cigarette habit. Any one not in accord with these restrictions and not willing to lend a hand toward promoting a strong moral growth should not come to the School of Agriculture.

STUDENTS IN DORMITORIES

The Principal of the School of Agriculture has charge of the boys in their dormitory and social life, and the Instructor in charge of the dormitory has charge of the girls in their dormitory and social life, under such regulations as may be approved by the Dean.

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

ASSEMBLY

On each school day, at 11:40 a.m., excepting Monday and Wednesday, the students meet in the assembly hall. 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 will include 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.

HOLIDAYS

On Thanksgiving Day no classes will be held, but school will continue as usual on the Friday and Saturday following.

Lincoln's birthday, February 12, and Washington's birthday, February 22, will be observed as holidays.

REQUIREMENTS FOR GRADUATION

The diploma of the School of Agriculture is granted on the completion of

1. The prescribed course of study, including all of the required work and enough elective work to make a total of 144 credit hours for boys and 120 credit hours for girls.
2. An honorable standing in deportment.
3. An essay of not less than one thousand words, upon a topic connected with agriculture or home economics, typewritten on paper of approved size for binding and filing in the library.
4. For young men, a practical experience in field work at the University Farm or elsewhere, as shall appear in reports received from responsible sources.

EXPENSES

The necessary expenses for the year do not exceed $125. This amount does not include the deposit made to cover the cost of the required military suit for the young men, traveling and personal expense.

Each student is required to pay for breakage of apparatus used in practical work.

The cost to the student for board is the actual cost of maintaining the table (including management). This has not exceeded $3 a week. Each term's board is paid in advance. No deduction in charge is made for any absence of less than five days. If students are compelled to be absent for that length of time, they are allowed half rates, if they make arrangements before leaving.

The buildings are all lighted by electric lights and warmed by steam. The sleeping rooms are each furnished with a bedstead, mattress, dressing bureau, chairs, and table.

Each student provides four sheets, one pair of blankets, one quilt, one bedspread, one pillow, three pillowcases, towels, napkins, comb and brushes, one glass tumbler, and one teaspoon.

All male students are required to provide themselves with the prescribed uniform, which consists of cadet gray blouse, trousers, and cap and is as neat and economical a dress as the student can obtain.

For the boys' gymnasium work a track suit and gymnasium shoes are required.

Each girl is required to provide two large aprons suitable for the protection of her clothing while working in the foods and cooking laboratory.

For the girls' gymnasium work a uniform suit is required. This should be obtained at the school.

Every girl should be provided with a kimono or bath-robe.

TABLE OF CHARGES

Registration fee for any part of the school year, residents of the state....	$5.00
Non-residents	10.00
Deposit as guaranty for the return of books and other material	5.00
Gymnasium fee. Required of every student. Per term	1.25
Post-office box. Required of those not rooming on the campus. Per term....	.20
Text book rental. For those not desiring to purchase their books. Per term..	1.25
Nurse fee. Required of all students rooming on the campus. Optional for others. Per term	1.50
Military uniform deposit. Required of all boys entering for the first time. (Not required at opening of spring term.) Subject to change to conform to contract price obtained from manufacturer	17.90
Board, $2.80 per week: First term	21.60
Second term	32.06
Room in dormitory: First term	8.00
Second term	12.00
Gymnasium suit—boys	2.50
Girls	3.25
Average cost drawing instruments, notebooks, stationery, and supplies per year	$10.00-12.00

DORMITORIES

Each student in attendance at the School who expects to return the following year and who desires to room in the dormitory will, before going home, make a deposit of $2 with the Cashier as evidence of good faith that he expects to return on the opening day of the following school year. Dormitory rooms will be assigned to new students in the order in which their applications are received. Each prospective student who desires to room in the dormitory will be required to send a deposit of $2, which will be returned in case the application is received after all dormitory rooms are spoken for.

In case of either a former student or a prospective student, this two-dollar deposit will be forfeited if the student does not appear for registration on the opening day of the school term, unless he has signified in writing to the Secretary at least ten days before the opening that he does not intend to return. All money orders or checks should be made payable to University of Minnesota, Department of Agriculture.

Applicants from outside of the state will be accommodated in the dormitories only when all applicants who are residents of Minnesota, and who desire rooms, have been provided for.

HOSPITAL FUND

The Hospital Fund will be expended under the general direction of the Sanitation Committee.

This fund insures, for those contributing to it, the care of regular nurses and such medicines and materials as the regular nurses may use.

It does not provide medical treatment by physician.

It does not provide hospital expenses of students rooming off the campus or away from the institution. Students rooming off the campus are not expected to contribute to this fund. They may, if they so desire, purchase hospital service cards for $1.50 a term which will entitle them to office consultation and treatment by the nurse and, if they live within reasonable distances from the grounds, may have the privilege of nurse calls at 50 cents a call, when nurses can be spared from regular duties on the grounds.

It does not provide for special nurses, if such be required by reason of serious or long-continued illness, except as provided for in the following rule:

"After usual and necessary running expenses connected with the Hospital Fund have been taken care of, any available balance may be used for paying special nurses or other extraordinary expenses. Any balance still due such special nurses shall be paid by students requiring such extra help and pro-rated according to the number of days attendance for each.

"A dispensary fee of 25 cents for each office service by nurses will be collected from those who have not contributed to the hospital fund."

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 junior class in the School of Agriculture." This fund is in charge of a committee consisting of the Dean, the Principal, the Instructor in charge of the girls' dormitory, and the President of the senior class.

THE LUDDEN TRUST

The late Honorable John D. Ludden, of St. Paul, gave the University of Minnesota $10,000, to be held, invested and reinvested 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 imposed 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 $400 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.

LECTURES AND ENTERTAINMENTS

During the school year, evening lectures and entertainments are given in the assembly hall. These entertainments are strictly high grade. They furnish a pleasant relaxation from school work, and serve as a mental stimulus.

ORGANIZATIONS AND PUBLICATIONS

Students' Debating Societies.—Students are urged to unite with one of the eleven literary societies of the School for both pleasure and profit. The work is under the supervision of one of the instructors in the Rhetoric Section. It affords training in parliamentary practice, public speaking, debating, and dramatic work.

Students' Christian Associations.—The Young Men's and Young Women's Christian Associations are voluntary organizations which have for their objects the maintenance of a positive moral and religious atmosphere and the development of complete Christian manhood and womanhood, physical, intellectual, social, and spiritual. These associations carry on various lines of activity. Employment and housing bureaus are maintained for the use of students. A general reception is given at the beginning of each semester. Each Sunday morning at 8:30 a song service is held followed directly by meetings of Bible, mission, and rural study groups, while in the afternoon at 5:30 a vesper service is conducted. Each Thursday evening at 6 o'clock the men gather for a fellowship meeting, and the women for a Y. W. C. A. meeting. The work is under the direction of a General Secretary and the supervision of a board of directors made up of professors, business men, and students. The associations are non-sectarian so that all students may find in them an opportunity for Christian activity and mutual helpfulness.

Agrarian.—The *Agrarian* is an annual published by the senior class of the School. The book gives an outline of all school and class activities; is fully illustrated and contains, in addition to brief articles and items of purely local interest, a number of contributions from students and faculty members, dealing with the various phases of agricultural education and with agricultural problems.

Minnesota Farm Review.—The Minnesota Farm Review is a weekly paper owned by the Alumni Association of the School of Agriculture,

and published under the general direction of a committee composed of representatives of the alumni, students, and faculty of the School and the College of Agriculture. The paper is intended to serve as a community publication, and as a medium by which former students of both the School and College shall be kept in touch with one another and also with the Department of Agriculture of the University. It also serves as a laboratory for students in rural and agricultural Journalism, and is edited by the staff of the Division of Publications and Journalism.

LIBRARY

The agricultural library is well equipped for supplying the needs of both undergraduate and graduate students. It contains over 20,000 volumes of general and technical literature, government reports, and 50,000 unbound pamphlets, bulletins, and reports. The general subject and author card index and the index of publications of the state experiment stations are always at the disposal of students, to aid them in locating the various sources of information which the library affords. There are complete sets of all the standard encyclopedias and dictionaries, and files of over 225 popular and technical magazines and periodicals.

The Librarian and her assistants are always ready and glad to give whatever assistance they can, both to those interested in special research work and to those doing regular reference work in connection with their classes. All those wishing to read or study are made welcome and are given whatever privileges the library can provide.

ZOOLOGICAL MUSEUM

The Zoological Museum is in the third story of the Administration Building, connecting with the entomology lecture room. It contains one of the finest collections of birds in the Northwest, a large series of mammals, shells, anatomical models, etc., all used in class instruction. One case is given up to models of injurious insects and a collection of spray pumps and nozzles, showing the various makes on the market. Another case is devoted to a beautiful series of Minnesota fishes, reptiles, and amphibians, and on two sides of the large room devoted to museum purposes are cases containing thousands of pinned insects. Friends of the institution who are inclined to donate zoological specimens may rest assured that they will be properly installed and given the best of care.

COURSES OF STUDY

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

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

BOYS

FRESHMAN YEAR

First Term

Business English, 3
Physiology, 3
Hygiene, 1
Cereal Crops, 4
Types and Breeds, 5
Arithmetic, 4
Gymnasium
Military Drill
Elective from the following, 4
  Vocal Music, 2
  †Instrumental Music, ½
  Beekeeping, 3

Second Term

English Classics, 3
Agricultural Botany, 3
Animal Biology, 3
Corn, 3
Chemistry, 5
Dairy Breeds, 3
Gymnasium
Military Drill
Elective from the following, 4
  Vocal Music, 2
  †Instrumental Music, ½
  Advanced Beekeeping, 3

First and Second Terms

Blacksmithing I, 4
Carpentry, 4
Farm Motors I, 4 (registration limited**)
Poultry, 3
Spelling and Penmanship, 1
‡Practicums, 1-3

JUNIOR YEAR

First Term

English Grammar, 3
Soil Fertility, 4
Principles of Feeding, 3
Gymnasium
Military Drill
Elective from the following or from freshman electives, 14
  Forage Crops, 4
  Farm Practices, 3
  Market Gardening, 3

Second Term

Composition I, 3
Agricultural Physics, 4
*Fruit and Garden Crops, 3
Gymnasium
Military Drill
Elective from the following or from freshman electives, 14
  Seed Testing, 2
  Plant Propagation, 3
  Vegetable Forcing, 3

* Those wishing the special horticultural courses in the elective groups may omit this course and elect three additional credits.

‡ Summer Work.—For description see special circular on Summer Practicums.

† A special fee will be charged for this course (See under Description of Courses). The same credit may be earned without fee by membership in the orchestra by those who are competent for the work.

** The number of students taking this course is limited by the equipment. Students will be enrolled for the course, up to the capacity of the sections, in the order in which they complete their registration.

Stock Judging I, 3
Algebra, 7
Geometry, 7
Industrial History, 5

Care and Marketing of Milk, 4
Algebra, 7
Geometry, 7
Industrial History, 5
Dairy Stock Feeding, 3
Feeding Market Stock, 4
Meats I, 2
Incubation and Brooding, 3
Mechanics Laboratory, 2
Blacksmithing II, 3

First and Second Terms

Dairy Stock Judging, 2
Dairy Barn Practice, 1-3
Drawing, 4
Parliamentary Law, 1

SENIOR YEAR

First Term

Composition II, 2
Farm Records and Accounts, 4
Gymnasium
Elective from the following or from junior or freshman electives, 18
- Farm Implements, 4
- Plant Diseases, 3
- Orchard Fruits, 3
- Landscape Gardening, 3
- Veterinary Medicine, 3
- Livestock Management, 3
- Stock Judging II, 2
- Advanced Dairy Stock Judging, 2
- Animal Parasites, 3
- Elementary Economics, 3

Second Term

§Composition II, 2
Civics, 3
Farm Management, 5
Elective from the following or from junior or freshman electives, 14
- Farm Forestry, 3
- Small Fruits, 3
- Floriculture, 3
- Insect Pests of Plants, 3
- Livestock Breeding, 3
- Veterinary Medicine, 3
- Dairy Manufacture, 4
- Advanced Study of Dairy Breeds, 2
- Stock Judging III, 2
- Meats II, 2
- Farm Motors II, 2 (registration limited**)
- Farm Lighting, Heating and Plumbing, 2
- Rural Sociology, 3
- Concrete Work, 2
- Advanced Farm Management, 3
- Commercial Potato Growing, 3
- Rural Economics, 3

First and Second Terms

Advanced Dairy Husbandry, 3
Drainage and Roads, 3
Public Speaking, 3

Adults desiring a special course should consult the Enrollment Committee.

§ Those excused from School courses in rhetoric are still required to write their theses under the supervision of an instructor in rhetoric.

** The number of students taking this course is limited by the equipment. Students will be enrolled for the course, up to the capacity of the sections, in the order in which they complete their registration.

GIRLS

FRESHMAN YEAR

First Term

Business English, 3
Biology, 4
Arithmetic, 4
Foods and Cookery I, 3
Drawing and Design I, 1
Garment Making, 2
Personal Hygiene
Physical Training
Elective from the following, 3
  Beekeeping, 3
  Domestic Dairying, 3
  Vocal Music, 2
  †Instrumental Music, ½

Second Term

English Classics, 3
Physiology and Public Health, 5
Foods and Cookery I, 3
Drawing and Design I, 1
Garment Making, 2
Social Training
Physical Training
Elective from the following, 6
  Advanced Beekeeping, 3
  Agricultural Botany, 5
  Field Agriculture, 3
  Vocal Music, 2
  †Instrumental Music, ½

First and Second Terms

Spelling and Penmanship, 1
Poultry, 3
*Practicums, 1-3

JUNIOR YEAR

First Term

English Grammar, 3
Foods and Cookery II, 3
Chemistry, 5
Drawing and Design II, 1
Elementary Dressmaking, 2
Home Nursing I, 2
Physical Training
Elective from the following or from freshman electives, 4
  The Family, 3
  Landscape Gardening, 3
  Algebra, 7
  Geometry, 7
  Industrial History, 5

Second Term

Composition I, 3
House Planning and Furnishing, 3
Civics, 3
Dressmaking I, 3
Drawing and Design II, 1
Physical Training
Elective from the following or from freshman electives, 7
  Vocal Music, 2
  Home Gardening, 4
  Incubation and Brooding, 3
  Algebra, 7
  Geometry, 7
  Industrial History, 5

First and Second Terms

*Practicums, 1-3
Parliamentary Law, 1
Drawing, 4

SENIOR YEAR

First Term

Composition II, 3
Home Management, 3

Second Term

‡Composition II, 3
Home Management, 3

* Summer Work.—For description, see special circular on Summer Practicums.

‡ Those excused from School courses in rhetoric are still required to write their theses under the supervision of an instructor in rhetoric.

† A special fee will be charged for this course (See under Description of Courses). The same credit may be earned without fee by membership in the orchestra by those who are competent for the work.

Textiles and Millinery, 3
Household Accounts, 2
Physical Training
Elective from the following or from freshman and junior electives, 9
Elementary Economics, 3
Landscape Gardening, 3

Dressmaking II, 3
Home Nursing II, 2
Elective from the following or from freshman and junior electives, 9
Farm Forestry, 3
Practicum, Cost of Clothing, 1
Fruit Growing, 3
Insect Pests of Plants, 3
Women in the Home and in Industry, 3
Rural Economics, 3
Floriculture, 3
Rural Sociology, 3

First and Second Terms

Household Physics, 5
Public Speaking, 3

NORMAL TRAINING COURSE FOR RURAL TEACHERS

A course in training for rural school teaching, similar to the courses now offered in the State high schools, is open to graduates of the School of Agriculture. The course is in charge of a special teacher, and covers a period of two summer sessions in the State Teachers' Training School held on the campus, and a year of eight months at the University Farm. Fees similar to those in the three-year School course are charged for the eight months' session. The course includes supervised teaching in rural schools, rural school methods, rural sociology, and such other professional and academic subject matter as will pre-eminently qualify the students for service in the rural schools of the State.

Seniors in the School of Agriculture who expect to take the normal training course for rural teachers are advised to select during the senior year in the School from the elective list a course in general agriculture suited to the needs of rural school pupils and such other subjects as suit these needs.

Students preparing to enter the course will pursue the Summer School credit courses in Arithmetic, English, Grammar and the review Penmanship, and the regular program for the department during the training year will be arranged as follows,—opening with the School of Agriculture in October:

First Term

Teaching Process
U. S. History and Civics
English
Reading—Material and Methods of Teaching
Primary Occupations
Music
Gymnasium
Observation and Teaching

Second Term

Country School Management and Country Life
Geography
Hygiene
English
Wood Work
Teaching

Provision will be made for general lessons in Drawing, Nature Study, School Luncheons, and Rope Work.

Work in the second summer session will be selected to meet the individual needs of members of the class.

ADMISSION TO THE COLLEGE OF AGRICULTURE

Graduates of the School of Agriculture of the University of Minnesota who have completed the two summers of supervised farm work offered in the School course, one additional School year, and one additional summer's work, or the equivalent thereof, will be admitted to the Colleges of Agriculture and Forestry.

DESCRIPTION OF COURSES

The capital letter A indicates non-collegiate course. Odd numbers indicate first term courses; even numbers, second term courses. A combination of the two (e.g., 5-6) indicates courses continuing through the year. In the case of courses repeated the second term, the suffix *a* indicates first term, the suffix *b*, second term.

AGRICULTURAL BIOCHEMISTRY

ROSCOE W. THATCHER, Chief; EVERETT H. DOHERTY, JOHN J. WILLAMAN.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1a,b.	Chemistry	5	Fr. boys	None
A3.	Chemistry	5	Jr. girls	None

A1a,b. CHEMISTRY. The fundamental principles of chemistry necessary for an understanding of common daily phenomena. The scope of agricultural chemistry and the help which the farmer may expect from the chemical laboratories of the State are outlined. WILLAMAN.

A3. CHEMISTRY. Planned to give an understanding of the general principles of chemistry which are of every-day importance. Particular attention is given to human foods, textiles, dyeing and cleansing agents. WILLAMAN.

AGRICULTURAL ENGINEERING

JOHN T. STEWART, Chief; ERNEST B. CLEWORTH, EUGENE C. CRANE, ADDISON L. EWING, ALLEN D. JOHNSTON, JASON L. MOWRY, JAMES B. TORRANCE, HALL B. WHITE, LLOYD R. WHITSON.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1a,b.	Blacksmithing I	4	All boys	None
A2.	Blacksmithing II	3	Jr., sr. boys	A1
A11a,b.	Farm Motors I	4	All boys	None
A12.	Farm Motors II	2	Sr. boys	A11, A43
A16.	Mechanics Laboratory	2	Jr., sr. boys	None
A18.	Farm Lighting, Heating, and Plumbing	2	Sr. boys	A16, A43
A20.	Concrete	2	Sr. boys	None
A21a,b.	Carpentry	4	All boys	None
A31a,b.	Drawing	4	Jr., sr.	None
A41a,b.	Household Physics	5	Sr. girls	None
A43a,b.	Agricultural Physics	4	Jr. boys	None
A51a,b.	Drainage and Roads	3	Sr. boys	None

A1a,b. BLACKSMITHING I. Instruction is given in the management of the forge, in bending, shaping, and welding iron, thus familiarizing

the student with the operations necessary for blacksmith repair work on the farm. JOHNSTON.

A2. BLACKSMITHING II. Instruction is given in bending, shaping, and welding steel, and tempering steel tools, thus familiarizing the student with the operations necessary for blacksmith steel work on the farm. JOHNSTON.

A11a,b. FARM MOTORS I. This course offers theory of, and practice in gasoline traction engines and automobiles. Text book required. Registration limited.* TORRANCE.

A12. FARM MOTORS II. This course offers theory of and practice in water, wind and electric motors and starters. Registration limited.* MOWRY.

A16. MECHANICS LABORATORY. Instruction and practice in rope splicing and halters, belt lacing, soldering, pipe fitting, and electric wiring. Actual work in the laboratory will be done in each of these lines. CLEWORTH.

A18. FARM LIGHTING, HEATING, AND PLUMBING. A study of theory installation and care of modern house equipment. MOWRY.

A20. CONCRETE. Properties of cement, selection of sand and gravel, methods of mixing. Use of concrete on the farm. CRANE.

A21a,b. CARPENTRY. The care and use of tools is taught by means of shop exercises. Each student is required to sharpen his own tools and is given instruction in painting, estimating building materials, and farm building construction. WHITE.

A31a,b. DRAWING. Prepares the student to make working drawings of broken parts of machinery, to design farm buildings, and to interpret plans and specifications. The latter part of the course is devoted to architectural design. WHITSON.

A41a,b. HOUSEHOLD PHYSICS. A study of household mechanics, air, and water pressure, heat and electricity. The economics of power, heat, light and electricity in the home are fully considered. EWING.

A43a,b. AGRICULTURAL PHYSICS. The questions considered in their relation to the farm are: matter and force, their nature; air and water pressure; mechanics, with especial reference to draft, heat, electricity; and protection from lightning. EWING.

A51a,b. DRAINAGE AND ROADS. Kinds and conditions of soils needing drainage; cost; effects on temperature and productiveness; how to secure and maintain a serviceable dirt road, its use as a foundation for a road of more enduring material. EWING.

* The number of students taking this course is limited by the equipment. Students will be enrolled for the course, up to the capacity of the sections, in the order in which they complete their registration.

AGRONOMY AND FARM MANAGEMENT

ANDREW BOSS, Chief; LOUIS B. BASSETT, ALVA H. BENTON, JAMES M. DREW, ROBERT E. HODGSON, PETER J. OLSON.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1a,b.	Cereal Crops	4	Fr. boys	None
A3a,b.	Corn	3	Fr. boys	None
A4.	Field Agriculture	3	All girls	None
A5.	Forage Crops	4	Jr. boys	None
A11.	Farm Implements	4	Sr. boys	None
A15.	Farm Practices	3	Jr., sr. boys	None
A21a,b.	Farm Records and Accounts	4	Sr. boys	None
A22a,b.	Farm Management	5	Sr. boys	A21, Dy.H.A1
A23.	Household Accounts	2	Sr. girls	None
A24.	Advanced Farm Management	3	Sr. boys	A21, A22

A1a,b. CEREAL CROPS. Studies of the cereal crops, including the history, culture, judging, and use of each. HODGSON.

A3a,b. CORN. A study of the history, culture, judging, and preservation of corn and corn products. OLSON.

A4. FIELD AGRICULTURE. The principles of soil formation and classification. Classes and varieties of the common cereal and forage crops, their history and culture, with emphasis on the use of each in the provision of food and clothing. HODGSON.

A5. FORAGE CROPS. A study of the classes and varieties of grass, legume, root, and forage crops; their history, culture, and adaptability. HODGSON.

A11. FARM IMPLEMENTS. Studies and discussions of the selection, operation, and care of farm machinery; also the cost, depreciation, efficiency, and adaptability of the various machines to the work to be accomplished. BASSETT.

A15. FARM PRACTICES. Field, barn and laboratory exercises in the practical everyday work of the farm. Designed especially for those who are deficient in farm experience. DREW.

A21a,b. FARM RECORDS AND ACCOUNTS. Lectures, recitations, and practice in keeping farm records. BENTON.

A22a,b. FARM MANAGEMENT. Farm management, dealing with types of farming, cropping systems, cost of producing farm crops, farm labor, marketing of farm produce, and the general business management of the farm. BENTON, BOSS, BASSETT.

A23. HOUSEHOLD ACCOUNTS. Practice in keeping household accounts for both city and country conditions, with lectures, recitations, and laboratory work on common business forms, as checks, promissory notes, and deeds. BENTON.

A24. ADVANCED FARM MANAGEMENT. A course covering a detailed study of the factors influencing farm profits, the maintenance of fertility, the cost of production and different systems of farm accounts. BENTON.

ANIMAL HUSBANDRY

CARL W. GAY, Chairman; PHILIP A. ANDERSON, ROBERT C. ASHBY, ALDEN MALCOMSON, JOSEPH S. MONTGOMERY, THOMAS G. PATERSON, JOHN J. VIETS.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1a,b.	Types and Breeds	5	Fr. boys	None
A3.	Stock Judging I	3	Jr., sr. boys	A1
A5.	Stock Judging II	2	Sr. boys	A3
A6.	Stock Judging III	2	Sr. boys	A3
A8.	Livestock Breeding	3	Sr. boys	None
A12.	Feeding Market Stock	4	Jr., sr. boys	Dy. Husb. A1
A13.	Livestock Management	3	Sr. boys	A12
A16.	Meats I	2	Jr., sr. boys	None
A18.	Meats II	2	Sr. boys	A16

A1a,b. TYPES AND BREEDS. This course is a study of the types and of the origin, history and development, breed characteristics and adaptability of the principal breeds of horses, beef cattle, sheep, and swine. ANDERSON, VIETS.

A3. STOCK JUDGING. Consists of judging horses, beef cattle, sheep, and swine from the market standpoint. VIETS, MALCOMSON.

A5. STOCK JUDGING II. Consists of judging pure bred sheep and swine from the breeding standpoint. ASHBY, MONTGOMERY.

A6. STOCK JUDGING III. Consists of judging pure bred horses and cattle from the breeding standpoint. ASHBY, MONTGOMERY.

A8. LIVESTOCK BREEDING. Principles that govern breeding and influences that affect heredity. Students become familiar with methods of keeping livestock records. GAY.

A12. FEEDING MARKET STOCK. A study of rations and economical methods of feeding hogs, beef cattle and sheep—both growing and fattening; also growing and working horses. Discussion of shelter requirements, feeding equipment and management under practical farm conditions. ASHBY, MALCOMSON.

A13. LIVESTOCK MANAGEMENT. The stock farm, methods of handling the breeding stud, herds, and flock, including marketing and showing of horses, cattle, sheep, and swine. GAY.

A16. MEATS. Lectures and demonstrations on dressing, cutting, and curing of meats. PATERSON, ANDERSON.

A18. MEATS. Practice work in dressing, cutting, and curing meats. ANDERSON.

BEE CULTURE

FRANCIS JAGER, Chief; LLOYD V. FRANCE.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1.	Beekeeping	3	All	None
A2.	Advanced Beekeeping	3	All	A1

A1. BEE KEEPING. Bees and their nature. The reason for keeping bees and how to manage them from a scientific and business point of view. The production of honey by the latest methods with the least labor and expense. JAGER.

A2. ADVANCED BEEKEEPING. Commercial production of comb and extracted honey; equipment and management of out-apiaries; grading and packing of honey; markets; accounting; queen breeding; anatomy; bee diseases and their treatment; cellars and wintering. JAGER.

DAIRY HUSBANDRY

HENRY H. KILDEE, Chairman; GUSTAV W. GEHRAND, EDWIN O. HANSON, ROBERT M. WASHBURN.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1a,b.	Principles of Feeding	3	Jr. boys	None
A2.	Dairy Stock Feeding	3	Jr., sr. boys	A1
A3a,b.	Dairy Breeds	3	Fr. boys	None
A5a,b.	Dairy Stock Judging	2	Jr., sr. boys	A3
A7.	Advanced Dairy Stock Judging	2	Sr. boys	A5
A8.	Advanced Study of Dairy Breeds	2	Sr. boys	A3, 5
A9a,b.	Dairy Barn Practice	1-3	Jr., sr. boys	See statement
A11a,b.	Advanced Dairy Husbandry	3	Sr. boys	A1, 2, 3, 5, 12
A12.	Care and Marketing of Milk	4	Jr., sr. boys	None
A14.	Dairy Manufacture	4	Sr. boys	A12
A15.	Domestic Dairying	3	All girls	None

A1a,b. PRINCIPLES OF FEEDING. The relation of plants to animal growth, animal body, digestive organs, metabolism. Food stuffs, roughages and concentrates, and their values in animal growth and production. GEHRAND.

A2. DAIRY STOCK FEEDING. A study of the dairy cow as to her needs for production; study of dairy stock food stuffs, roughages and concentrates; making rations for cows of various temperaments and production. GEHRAND.

A3a,b. DAIRY BREEDS. Study of Holstein, Guernsey, Jersey, Ayrshire, and other breeds of cattle kept for dairy purposes, with relation to their chief characteristics, adaptability and production.

A5a,b. DAIRY STOCK JUDGING. Study of dairy cattle of different breeds to determine their productive and breeding value. Practical experience in judging and placing the same. Agriculture College herd is used. .....

A7. ADVANCED DAIRY STOCK JUDGING. Study of dairy cattle with relation to type, production, and breeding. This subject includes pedigrees and Advanced Registry of the different breeds. KILDEE.

A8. ADVANCED STUDY OF THE DAIRY BREEDS. The origin, history, and characteristics of the important strains and families of the leading breeds of dairy cattle. Frequent visits are made to the noted dairy herds near the Twin Cities. KILDEE, GEHRAND.

A9a,b. DAIRY BARN PRACTICE. Actual practice in the taking care of, and in feeding and handling dairy stock. Only regular and systematic attendance upon practice will be credited. Instructor's approval a prerequisite for registration in this course. GEHRAND.

A11a,b. ADVANCED DAIRY HUSBANDRY. Relations of dairying to soil fertility, and the utilization of fodders and by-products. Practical feeding of dairy cow. Relation of feed to production. Feeding, management, and development of the calf intended for the dairy. GEHRAND

A12. CARE AND MARKETING OF MILK. Milk, its composition, properties, cleanly production and care. Principles of and practice in milk and cream standardization, pasteurizing, bottling, separating, and testing. Forms and methods of marketing. WASHBURN.

A14. DAIRY MANUFACTURE. Principles of and practice in cream ripening and butter-making. Calculation of yields and costs. Coöperative manufacture and marketing. Ice-cream making. Testing dairy products. WASHBURN.

A15. DOMESTIC DAIRYING. Composition and properties of milk. How to care for it in the home and the dairy. Principles of and practice in separating, testing, farm butter, cheese, and ice-cream making, and market milk. WASHBURN.

ECONOMIC ZOOLOGY

FREDERICK L. WASHBURN, Chairman; CHARLES W. HOWARD, SIMON MARCOVITCH, ARTHUR G. RUGGLES.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1a,b.	Animal Biology	3	Fr. boys	None
A3.	Biology	4	Fr. girls	None
A11.	Animal Parasites	3	Sr. boys	None
A16.	Insect Pests of Plants.....	3	Sr. boys	None

A1a,b. ANIMAL BIOLOGY. Study of general principles of animal life such as metabolism, respiration, digestion, growth, and reproduction. MARCOVITCH.

A3. BIOLOGY. An elementary course dealing with such topics as inheritance, reproduction, natural selection, nervous activity and metamorphosis—with special reference to the economic relations of birds, insects, and bacteria to mankind. MARCOVITCH.

A11. ANIMAL PARASITES. A study of life histories and methods of prevention and control of various external and internal parasites of domestic animals. HOWARD.

A16. INSECT PESTS OF PLANTS. A study of life cycles of insect pests injurious to cultivated plants and methods of combating them. RUGGLES.

FORESTRY

EDWARD G. CHEYNEY, Chief; JOHN P. WENTLING.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A2.	Farm Forestry	3	Sr.	None

A2. FORESTRY. A study of the place of the wood-lot in farm management; how the tree grows; the use of windbreaks, including species and methods of planting; the preservative treatment of fence posts; wood-lot products. CHEYNEY, WENTLING.

GYMNASIUM

D. C. MITCHELL, Director; LEROY C. HOLM.

The gymnasium work has for its object to better health conditions on the campus, and to make the farm boys more agile. The first part of the hour is given over to calisthenics with dumb-bells, wands, bar-bells, Indian clubs, and free arm movement; then light apparatus work on the parallel bars, side horse, buck, and the mats followed by some game or running on the track. Shower baths and a swimming pool are provided.

HOME ECONOMICS

JOSEPHINE T. BERRY, Chief; CLARA M. BROWN, JEAN MUIR DORSEY, HALLY J. FISHER, OLIVE B. MACCOMBER, MABEL MCDOWELL, MARTHA B. MOORHEAD, OLIVE TUTTLE, ELIZABETH VERMILYE, MILDRED WEIGLEY.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1-2.	Garment Making	4	Fr. girls	None
A3.	Elementary Dressmaking	2	Jr. girls	1-2

A4.	Dressmaking I	3	Jr. girls	3
A6.	Dressmaking II	3	Sr. girls	4
A7.	Textiles and Millinery	3	Sr. girls	1-2
A8.	Cost of Clothing Practicum	1	Sr. girls	1-2
A11-12.	Foods and Cookery I	6	Fr. girls	None
A13.	Foods and Cookery II	3	Jr. girls	11-12
A15-16.	Home Management	6	Sr. girls	13
A21-22.	Drawing and Design I	2	Fr. girls	None
A23-24.	Drawing and Design II	2	Jr. girls	21-22
A26.	House Planning and Furnishing.	3	Jr. girls	21-22
A31.	Personal Hygiene	..	Fr. girls	None
A33.	Home Nursing I	2	Jr. girls	None
A34.	Home Nursing II	2	Sr. girls	33
A41.	The Family	3	Jr. girls	None
A42.	Women in the Home and in Industry	3	Sr. girls	None

A1-2. GARMENT-MAKING. Qualities and prices of standard muslins; construction and care of the sewing machine; reading and alteration of commercial patterns; application of hand-sewing in the making of undergarments and simple waists; repair of clothing. MACCOMBER, TUTTLE.

A3. ELEMENTARY DRESSMAKING. A study of standard cotton and linen dress fabrics; of design in tailored dresses; of the processes involved in the construction of simple dresses; designing and making a washable dress. BROWN, MACCOMBER.

A4. DRESSMAKING I. The study of standard wool fabrics; design in simple tailored dresses; fitting of the dressform; the use of the dressform and the processes of construction involved in making a simple wool dress of tailored design. BROWN, MACCOMBER.

A6. DRESSMAKING II. The study of fabrics and design adapted to lingerie dresses; simple modelling on the dressform; design and construction of a lingerie dress. BROWN.

A7. TEXTILES AND MILLINERY. (a) Standard fabrics and textile fibers; tests for adulterations in fabrics; clothing in relation to health; the clothing budget. (b) Design and color harmony in hats; alteration of frames; making and trimming of simple hats. BROWN.

A8. COST OF CLOTHING PRACTICUM. The keeping of a classified account of expenditures for clothing during a year; a study of such accounts in relation to the clothing budget of the student and of the family. BROWN.

A11-12. FOODS AND COOKERY I. (a) Production, manufacture, and composition of typical foods, and their classification into food principles. (b) A study of fundamental science principles underlying the cookery of the carbohydrate foods, and their application. VERMILYE, DORSEY.

A13. FOODS AND COOKERY II. A continuation of Course 11-12, as applied to the study of proteins and fats; a study of fermentation and its application in bread-making and food preservation. MCDOWELL.

A15-16. HOME MANAGEMENT. Distribution of the family income; purchasing of supplies; planning and serving of meals, relation of cost to income; sanitary cleanliness and its application in the care of a house; importance of labor-saving devices. WEIGLEY, MCDOWELL, DORSEY.

A21-22. DRAWING AND DESIGN I. Principles of design and color harmony, with special emphasis upon design as expressed in clothing, house-furnishing, and articles in common use; the working out of designs for garments to be made in the Garment-Making Course. TUTTLE.

A23-24. DRAWING AND DESIGN II. This course teaches the principles developed in Course 21-22 by means of more advanced problems and illustrations; the working out of designs for dresses to be made in the Dressmaking Courses. TUTTLE.

A26. HOUSE PLANNING AND FURNISHING. Location of farm buildings; types of farm dwellings, sketches of floor plans for the farm home; plumbing; heating equipment; interior finish, wall and floor coverings, furniture, curtains, pictures; labor-saving equipment. WEIGLEY, MCDOWELL.

A31. PERSONAL HYGIENE. The course aims to inspire each pupil with a desire to reach and maintain the highest physical efficiency. Specific directions relating to the care of the body and simple rules for avoiding infection are given. MOORHEAD.

A33. HOME NURSING I. (a) Communicable diseases, means of prevention, control, disinfection. (b) Home nursing equipment and methods practicable in the household. MOORHEAD, FISHER.

A34. HOME NURSING II. (a) Hygienic requirements during infancy, childhood, womanhood, maternity. (b) Household emergencies; preparation for maternity; care of infants. MOORHEAD, FISHER.

A41. THE FAMILY. The family as an institution; its economic relation to industry, property, education, population; the standard of living in relation to the efficient home and family; the relation of the home to the State. .....

A42. WOMEN IN THE HOME AND IN INDUSTRY. A brief survey of the status of the homemaker and of women in industry; their duties and responsibilities in the home and in civic life; the proper conservation of mental, moral, and physical power. .....

HORTICULTURE

WILERED G. BRIERLEY, Chairman; ARNE W. AAMODT, LEROY CADY, FRANC P. DANIELS.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A2a,b.	Fruit and Garden Crops*	3	Jr. boys	None
A3.	Orchard Fruits	3	Sr. boys	None
A4.	Small Fruits	3	Sr. boys	A3
A6.	Fruit Growing	3	Sr. girls	None
A31.	Market Gardening	3	Jr., sr. boys	None
A32.	Vegetable Forcing	3	Jr., sr. boys	A31
A36.	Home Gardening	4	Jr., sr. girls	None
A38.	Commercial Potato Growing	3	Sr. boys	None
A50.	Floriculture	3	Sr.	None
A52.	Plant Propagation	3	Jr., sr. boys	None
A71.	Landscape Gardening	3	Sr.	None

* Those wishing the special horticultural courses in the elective groups will not take this course.

A2a,b. FRUIT AND GARDEN CROPS. The principles and methods of vegetable and fruit growing for home use. Location and planning of the orchard and garden. Planting, culture, harvesting, and storing of our important fruits and vegetables. Lecture and reference. DANIELS.

A3. ORCHARD FRUITS. The location, establishing, and handling of the commercial orchard and the harvesting and marketing of orchard fruits. Text and lectures. Laboratory work in grafting, pruning, and packing of apples. DANIELS.

A4. SMALL FRUITS. A study of the history, varieties, planting, culture, harvesting, marketing, and uses of the small fruits and grapes. Lectures and reference work. DANIELS.

A6. FRUIT GROWING. A general course dealing with the commercial growing of our important orchard and small fruits. A consideration of the sites, soils, and methods of planting, culture, and marketing essential to successful fruit production. DANIELS.

A31. MARKET GARDENING. A study of the growing of vegetable crops for market. Location, planting, and care of the commercial garden; marketing methods and a brief individual consideration of the important crops. Text and recitation. DANIELS.

A32. VEGETABLE FORCING. Lecture and laboratory study of the various types of glass structures and the production of our most important forcing crops. Laboratory practice in the greenhouse and frequent trips to commercial houses in the Twin Cities. DANIELS.

A36. HOME GARDENING. The planning, planting, and care of the home grounds. A study of the ornamental, fruit, and vegetable plants best adapted to home growing and the most satisfactory methods of handling each. Text, lectures, and laboratory. DANIELS.

A38. COMMERCIAL POTATO GROWING. Subjects covered are preparing the soil, planting, cultivating, harvesting, storing, classifying varieties, treating and selecting seed, exhibiting, judging, and scoring. Lectures, references, and laboratory. AAMODT.

A50. FLORICULTURE. The purpose of this course is to give the student a working knowledge of the culture and uses of house plants, annuals, and perennials. Lectures, reference reading, laboratory, and field trips. CADY.

A52. PLANT PROPAGATION. Methods of propagation of plants by seeds, cuttings, layers, grafting, and budding are studied. The principles of greenhouse management, transplanting, watering, and ventilation are studied. Lectures and laboratory. CADY.

A71. LANDSCAPE GARDENING. A general course in practice and principles of ornamental planting as applied to the home and community. A study of common trees, shrubs, and herbaceous perennials. Lectures, reference reading, and field trips. CADY.

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 equipment, and details an officer of the regular army to take charge of military science and tacitcs.

All male students of the freshman and junior classes, not physically unfit, are required to attend Military Drill. For the senior 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 batallion manoeuvres, 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 senior class; sergeants and corporals from the junior class.

PHYSICAL TRAINING

GRACE E. DENNY, Director; LILLIAN HANSEN.

The aim of this department is to maintain the health of the students; to give gymnastic exercise and deep breathing; to stimulate functional

activity and to give coördination and poise. The department offers opportunities for swimming in the gymnasium swimming pool, organized games, cross-country tramps, and skating.

All girls entering the school for the first time are required to take a physical examination. This examination is conducted by the Director of Health and Physical Education for Women, and a corps of doctors and nurses. It consists of an examination of the heart and lungs, nose and throat, spine and feet. Height and weight are measured, eyes and ears tested. Medical advice is given and recommendations for special exercises are made for students who would be benefited by them.

PLANT PATHOLOGY AND BOTANY

EDWARD M. FREEMAN, Chief; ROBERT C. DAHLBERG, GODFREY R. HOERNER, WIELAND L. OSWALD, H. FERNE PECK.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1a,b.	Agricultural Botany	3	Fr. boys	None
A2.	Seed Testing	2	Jr., sr. boys	None
A4.	Agricultural Botany	5	All girls	None
A11.	Plant Diseases	3	Sr. boys	None

A1a,b. AGRICULTURAL BOTANY. A practical study of the flowering plant is made; weeds, weed seeds, and seed testing are studied. Plant diseases are included in the course and the best preventive methods are discussed. OSWALD, PECK.

A2. SEED TESTING. Practical work in making purity and germination tests of crop, grass and vegetable seeds. Students will learn to identify weed seeds commonly found in crop seeds. Seed adulteration will also be studied. DAHLBERG.

A4. AGRICULTURAL BOTANY. The work is pursued according to the following outline: (1) the flowering plant; (2) economic plants; (3) moulds, yeast, mushrooms, and vegetable rots; (4) bacteria in dairy, foods, diseases of man. OSWALD, PECK.

A11. PLANT DISEASES. A short course laying emphasis on the recognition of the plant diseases common in Minnesota and the practical methods for combating those diseases. HOERNER.

POULTRY HUSBANDRY

ARTHUR C. SMITH, Chairman; DWIGHT J. LANE.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1a,b.	Poultry	3	All	None
A2.	Incubation and Brooding	3	Jr., sr.	1

A1a,b. POULTRY. Principles of general management, house construction, artificial incubation and brooding, feeding for egg production; common ailments and simple treatments. Practice in pen management and keeping accounts is required of all students. LANE.

A2. INCUBATION AND BROODING. A combination of study and practice of the best methods of incubation and brooding, natural or artificial, includes selection of breeders, eggs for incubation, feeding and care of chicks, how to avoid losses. SMITH.

PRACTICUMS

JAMES M. DREW, in charge, in coöperation with instructors in other divisions.

COURSES

Credit courses are offered for vacation or class work on a selected project. The work must be selected from a list of approved projects and must be done under the supervision of a practicums instructor or some one appointed by him.

Students electing to do summer work for credit should register for it by outlining definitely the proposed project and giving the name of the county agent or teacher of agriculture or home economics in the nearest high school who may be asked to help supervise the work. Directions for carrying out any particular project will be furnished upon application. Credit will be given according to the way the work is performed and the required records kept.

RHETORIC

ROBERT C. LANSING, Chief; FANNIE C. BOUTELLE, ESTELLE COOK, ELIZABETH HAUSE, SOLVEIG MAGELSSEN.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1a,b.	Business English	3	Fr.	None
A2a,b.	Classics	3	Fr.	None
A3.	English Grammar	3	Jr.	None
A4.	Composition I	3	Jr.	A3
A5-6.	Composition II	*6	Sr.	A4
A12a,b.	Public Speaking	3	Sr.	None

* Only four credits are required of boys.

A1a,b. BUSINESS ENGLISH. Practice in spelling, punctuation, note taking, and letter writing based on Mayne's *Modern Business English*. Oral composition. HAUSE.

A2a,b. ENGLISH CLASSICS. Reading and analysis of the works of Whittier, Scott, Irving, and Tennyson. HAUSE, COOK, MAGELSSEN.

A3. English Grammar. A study of principles and practice in them, with occasional composition. Magelssen, Hause, Boutelle.

A4. Composition I. Narration and description. The analysis of good prose models. Theme writing and speaking. Hause, Magelssen, Boutelle.

A5-6. Composition II. Exposition and argument. Gathering and outlining material. Methods of development and presentation. Debating. Thesis writing. Instruction and guidance in the writing of the senior thesis.* Cook, Magelssen, Boutelle.

A12a,b. Public Speaking. Drill in voice exercise, platform deportment, and memorized selections for expression. Also practice in extemporaneous speaking. Cook.

* Those excused from School courses in rhetoric are still required to write their theses under the supervision of an instructor in rhetoric.

SCHOOL (MISCELLANEOUS)

Dexter D. Mayne, Principal; Peder L. Johnsrud, Rollin M. Pease, Abe Pepinsky, Bert A. Wallace, Benjamin A. Winkleman.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1a,b.	Spelling and Penmanship...	1	All	None
A11a,b.	Arithmetic	4	Fr.	None
A13-14.	Algebra	14	All	None
A15-16.	Geometry	14	All	None
A21a,b-22a,b.	Vocal Music	4	All	None
A23-24.	Instrumental Music	1	All	See course description
A32a,b.	Parliamentary Law	1	Jr., sr.	None
A33.	Elementary Economics	3	Sr.	None
A34.	Civics	3	Jr., sr.	None
A36.	Rural Sociology	3	Sr.	None
A38.	Rural Economics	3	Sr.	None
*A39-40.	Industrial History	10	Jr., sr.	None

* Either term may be taken independently of the other.

A1a,b. Spelling and Penmanship. The basis for the work in penmanship is a standard muscular system. Students poor in penmanship should elect this course. A spelling text is used and drills on lists of commonly misspelled words are given. Winkleman.

A11a,b. Arithmetic. Drill for accuracy, speed in the simple processes of mathematics, and applications of principles to problems where measurements of material, extension, capacity are required. Assists in the mathematics of the technical courses in the School. Johnsrud.

A13-14. Algebra. The first term includes the fundamental operations, factoring, and fractions. The second term covers simultaneous equations, evolution, quadratics, and application of equations to the solution of practical problems. Wallace.

A15-16. GEOMETRY. The usual theorems and problems of plane geometry are completed with special attention given to their applications in mechanics and surveying. .....

A21a,b-22a,b. VOCAL MUSIC. Elementary sight singing, notation, staff, scale, clef, signature, time, rhythm, intervals, solfeggi; followed by elementary rote singing, historical outline, practical community singing. A special charge is made for private lessons. PEASE.

A23-24. INSTRUMENTAL MUSIC. A special fee of $10 a term is charged for this course (ten, thirty-minute lessons). The same credit is given, without fee, for work in the orchestra. Registration for this course must be approved by the instructor. PEPINSKY.

A32a,b. PARLIAMENTARY LAW. Instruction in principles of parliamentary law, how to organize a society, duties of officers, how to record proceedings, and how to conduct meetings. Students will be given practice under the direction of the instructor. MAYNE.

A33. ELEMENTARY ECONOMICS. Fundamental laws governing production, consumption, distribution, and exchange. Subjects of special interest to farmers, such as taxation, rural credit, coöperation and the growth of tenantry. The subject is given in lectures and assigned readings. MAYNE.

A34. CIVICS. Origin, necessity, nature, and various forms of government. The legislative, judicial, and executive departments and the functions of each. The relations of the state to the federal government. MAYNE.

A36. RURAL SOCIOLOGY. A practical course including a study of rural conditions, how to make a survey, the cause of present conditions and how they may be improved. Study of rural organizations, religions, and educational institutions. .....

A38. RURAL ECONOMICS. The general principles of economics as applied to the farmers' relationships, as a producer and as a consumer. Special topics considered. Marketing of farm products, coöperative societies, rural credits, taxation, farm labor, and tenantry. MAYNE, DURAND.

A39-40. INDUSTRIAL HISTORY. Sanford's "Story of Agriculture" supplemented by Moore's "Industrial History." Recitation and written summaries from the texts, special reports and outlines. Agricultural history is emphasized in this study of general industrial development in the United States. WALLACE.

SOILS

FREDERICK J. ALWAY, Chief; GEORGE H. NESOM.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1.	Soil Fertility	4	Jr. boys	None

A1. SOIL MANAGEMENT AND FERTILITY. Minnesota soils, their formation, composition, properties, and characteristics. Acidity, alkalinity, and remedies. Farm manures, green manures, commercial fertilizers. Field studies, laboratory demonstrations. Examination of home farm soils. NESOM.

VETERINARY SCIENCE

MYRON H. REYNOLDS, Chairman; ARTHUR L. ANDERSON, CHARLES C. PALMER.

COURSES

No.	Title	Credits	Offered to	Prereq. Courses
A1-2.	Veterinary Medicine	6	Sr. boys	None
A11a,b.	Physiology	3	Fr. boys	None
A12.	Physiology and Public Health	5	Fr. girls	None
A13a,b.	Hygiene	1	Fr. boys	None

A1-2. VETERINARY MEDICINE. Elementary anatomy, pathology, sanitation, and medicine. Clinical cases are provided for practical study. Specimens of diseased organs are demonstrated in classroom to acquaint the student with the various pathological changes. PALMER, REYNOLDS.

A11a,b. PHYSIOLOGY. This course consists of the study of the animal body and its functions. PALMER, ANDERSON.

A12. PHYSIOLOGY AND PUBLIC HEALTH. This course consists of the study of the human body and its functions. The general principles of public hygiene are included. PALMER, ANDERSON.

A13a,b. HYGIENE. This course consists of lectures on the care of the person, including baths, regulation of diet, rest and recreation, kinds of exercise, clothing and the effects of habit-forming drugs on the body. PALMER.

DEPARTMENT OF AGRICULTURE

OTHER SCHOOLS OF AGRICULTURE IN THE STATE

NORTHWEST SCHOOL OF AGRICULTURE, CROOKSTON

The Northwest School of Agriculture at Crookston is a branch of the University established especially to serve the northern section of the State in training boys and girls for the life on the farm. During the ten years of its existence, it has been built up extensively to meet a rapidly growing demand for the work it offers, till to-day its well equipped plant represents an investment of about one third of a million dollars. Besides the regular three year agricultural course for young men and two year home economics course for young women, there is a normal course fitting teachers for work in consolidated and other rural schools. A model school in connection with this department, offers practical training for teachers in managing a typical rural school.

There are also shorter courses of three months for students desiring intensive work in such special lines as dressmaking, home management, gas tractor and farm engineering, and livestock and farm husbandry.

The regular course begins in October and closes in March. The teachers' course begins in September and closes about June 1. Short courses begin about January first and close in March.

With a special faculty of experienced school men and women in addition to the regular school faculty, a teacher's training course is given for six weeks each summer beginning in June and closing about August first.

The Junior Short Course, a week for boys and girls from 12 to 18 years of age follows immediately after the close of the regular course.

For further information write addressing Superintendent of Northwest School of Agriculture, Crookston, Minn.

WEST CENTRAL SCHOOL OF AGRICULTURE, MORRIS

In 1910 the Morris Indian School was reorganized into the West Central School of Agriculture. Since that time the plant has been almost entirely rebuilt. This rebuilding, together with the necessity of organizing the courses and gathering a student body under very difficult circumstances, have caused a slower development of the institution than otherwise might have been obtained. During the last year or two, however, the school has been coming into its own, and a considerable improvement in the scope of the work is planned for the future.

Long courses in general agriculture, agricultural engineering, home economics, nursing, music, dressmaking, and teaching will be offered. Short courses for teachers, mature farmers, boys and girls, and farm women are being built up to meet the local demands.

Teachers' Training Session—Six weeks. The work given at this time is primarily for training rural school teachers, with emphasis upon the

professional side of the work. The instruction is given upon a credit basis so that teachers' examinations in properly completed subjects are not required.

Home Makers' Course—Six weeks. This course is given at the same time as the Teachers' Training Session. It is primarily for girls who wish to prepare themselves in home management lines.

Music Work—Individual instruction in piano and violin is also given during the Summer Session period.

Farmers' Short Course—This is the usual Farmers' Week, and is given annually the third week in February.

Junior Short Course—This is a short session for boys and girls, giving emphasis to contest work of various kinds. It comes the last week in March or the first week in April.

Mothers' Week—This is a rest and recreation period for farm women, usually given in June in connection with the Chautauqua.

For further information write to Superintendent of West Central School of Agriculture, Morris, Minn.

SHORT COURSES

BOYS' AND GIRLS' WEEK

One week during the last of March or the first of April is Boys' and Girls' Week at University Farm, St. Paul. The mornings are devoted to a study of some of the most interesting and important phases of agriculture. In the afternoon excursions are taken to points of interest in and about the Twin Cities. The cost to each student after arriving is about $3. Special efforts are made by all at University Farm to crowd this week full of pleasure and profit to the boys and girls. There is no educational requirement for admission. For detailed information, write to the Secretary, University Farm, St. Paul.

SHORT COURSE IN TRACTION ENGINEERING

The growing use of traction engines in general work has made it advisable to offer a special course in the use of power machinery as one of the short courses in the Department of Agriculture of the University of Minnesota.

The course is complete in itself, covering five weeks of study and practice in May and early June. The mornings are devoted to lectures and classroom work, and the afternoons to actual practice in the various departments under the supervision of the instructors of the Department.

Such a course offers an opportunity to the young man interested in mechanics, who has had some practical experience in the handling of engines, enabling him to acquire in a short time valuable training in the theory and practice of traction work. For detailed information, write to the Secretary, University Farm, St. Paul.

SUMMER SESSION AND STATE TEACHERS' TRAINING SCHOOL

During six weeks of the summer, beginning immediately after the

close of the regular University session in June, two short courses are offered at University Farm of interest to teachers and others. The regular summer session of the College of Agriculture offers regular college courses in agriculture and home economics, including courses in agronomy, farm management, soils, dairy and animal husbandry, agricultural chemistry, agricultural education, botany and plant pathology, horticulture, veterinary medicine, bees, entomology, and home economics. These courses give regular college credit upon their completion and the fulfilling of entrance requirements. At the same time and place the State Teachers' Training School offers courses in all of the teachers' certificate subjects and also special courses in agriculture, home economics, manual training, music, drawing, school management, and physical education, and similar subjects for teachers. For detailed information write to the Secretary, University Farm, St. Paul.

RURAL LIFE CONFERENCE

During or immediately following the Summer Session, there is held at University Farm, for one week, a conference of those who are interested in the social welfare of the people in the country. Ministers of country and village churches, Sunday school workers, leaders of farmers' clubs, teachers, and any others interested in such work are cordially invited to attend.

For special circular and detailed information write to the Secretary, University Farm, St. Paul.

DAIRY SCHOOL

A four weeks' course in creamery butter-making and factory cheese-making is offered each fall, beginning in November. The forenoons are spent in classrooms where lectures and talks are given by practical creamery men on all phases of the dairy business. The afternoons are spent in practical work. The only requirement for admission to the course is twelve months' experience in a creamery for the Creamery course, or six months' experience in a cheese factory for the Cheese course. Following the regular dairy school a one-week course in commercial ice-cream-making is offered. For detailed information write to the Secretary, University Farm, St. Paul.

FARMERS' AND HOME-MAKERS' WEEK

The week immediately following New Year's is devoted to the farmers and home-makers of the State in their annual conferences at the College of Agriculture, University Farm, St. Paul. Regular class work occupies a portion of each day, at which the most vital and recent agricultural knowledge is presented by the faculty of the College of Agriculture and others. Conferences are held from day to day of those having a special interest in some particular problem of agriculture. Many of the State agricultural associations hold their meetings during this week. An interesting and instructive evening program is furnished for each day.

Men of national agricultural reputation from Minnesota and other states participate in the programs. Lectures and demonstrations in farm crops, farm management, soils, dairy and animal husbandry, horticulture, farm engineering, poultry, bees, veterinary science, and home economics are given daily. There is no educational requirement for admission. For further information write to the Secretary, University Farm, St. Paul.

EDITORS' WEEK

A short course for newspaper publishers and job printers is given in February, just preceding the annual meeting of the Minnesota Editorial Association. The work is both practical and inspirational. The mornings and afternoons are spent in discussions of the problems of the newspaper office and the job plant, under the leadership of successful publishers and printers. The evenings are taken up with addresses by newspaper men of national reputation. The establishment of this course is in line with the policy of the Department of Agriculture of the University to build up strong courses in rural newspaper work in connection with its Division of Publications and Journalism.

For detailed information write to the Secretary, University Farm, St. Paul.

THE COLLEGE OF AGRICULTURE

The College of Agriculture provides a four-year course parallel with other colleges of the University. It opens in September and closes in June.

AGRICULTURE

Two groups of courses of study are offered:

1. General agricultural courses of study, in which students prepare for general agricultural pursuits, as farming, stock-raising, dairying, or teaching agriculture in secondary schools. Specialists who intend to prepare for experiment station or other research work along these lines will find it necessary to pursue graduate work. The following general agricultural courses of study are offered:

Agricultural Education
Agricultural Education—Manual Training
Agronomy and Farm Management
Animal Husbandry
Dairy Husbandry
Horticulture

2. Special agricultural science courses of study, in which students prepare for special purposes, usually scientific research. In all of these

courses graduate work is necessary for a thoro preparation. The following special agricultural science courses of study are offered:

Agricultural Biochemistry
Agricultural Economics
Entomology
Plant Pathology
Soils

HOME ECONOMICS

The courses in Home Economics are planned to meet the needs of three groups of young women:

1. Students electing to major in Home Economics as a type of General Arts education for women.

2. Students preparing for teaching in the general field of Home Economics.

3. Students preparing for teaching in the special field of Home Economics, viz., Textiles and Clothing.

THE COLLEGE OF FORESTRY

The College of Forestry offers a four-year course leading to the degree of Bachelor of Science. In addition to the work given at the University Farm, six months' work is given at Itasca State Park where a well equipped demonstration forest is available as a laboratory. The college also controls a Forest Experiment Station at Cloquet, which offers a good field for graduate students and original research. Provision is made for graduate work in all of the various lines of silviculture and utilization.

INQUIRIES

Anyone desiring further information in regard to these courses may apply to the Secretary, University Farm, St. Paul, Minnesota.

MINNESOTA FARMERS' INSTITUTES

Farmers' Institutes in Minnesota are under the direction of a board composed of three members of the Board of Regents, and the presidents of the State Dairymen's Association, Minnesota Horticultural Society, and Minnesota Agricultural Society. The direct supervision of institute work is given to a superintendent, chosen by this board, who has his offices at the School of Agriculture.

Institutes are held in rural schools, town halls, and in cities and villages wherever sufficient interest is shown to warrant. For information regarding institutes, and to secure dates, address the Secretary of the Farmers' Institute, University Farm, St. Paul, Minnesota.

FARMERS' CLUBS

Farmers' Clubs, as now organized in Minnesota, are local organizations of farmers. Each club usually represents a small territory, as a

rural school district or township. Membership in a farmers' club includes all members of the farm family. The Agricultural Extension Division aids in organizing these clubs and in helping them to continue effectively. Extension Bulletin No. 46 describes the work of these clubs and the methods of organization, and Extension Bulletin No. 56 gives a report of progress and suggested programs. Speakers are sent from the Extension Division and Institute force as often as practicable to help with the local program. A list of timely topics is sent by the Division to each club each month, and also blanks on which the clubs may report. Over eight hundred such clubs are organized in the State, and many more are needed. Students of the School of Agriculture can be very helpful in this work by acting as leaders in their local communities.

OFFICE OF PUBLICATIONS

The public receives the benefit of the work of the Department of Agriculture through numerous publications. The research work of the Experiment Station is recorded in a series of bulletins printed in editions of from 3,000 to 20,000 copies. A popular series known as the *Minnesota Farmers' Library* is issued for the Division of Agricultural Extension. Each edition is 75,000. Of this number about 55,000 are mailed at once to farmers and others interested in the distinctly practical phases of agriculture. Arrangements have been made also to supplement these series of the Experiment Station and the Extension Division with "Special" bulletins designed to convey information of practical value to persons likely to be particularly interested. The *University Farm Press News* is issued twenty-four times a year. It is made up of short rural and agricultural articles prepared primarily to be copied by the papers of Minnesota and adjoining states. The edition is 3,600 copies. A list of publications will be sent upon request.

THE AGRICULTURAL EXPERIMENT STATION

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 the useful and practical information on the subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications 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. Paul, and is one of the Divisions of the Department of Agriculture; 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. 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 coöperative tests and investigations with the United States Department of Agriculture and with farmers in various parts of the State. Experiments are conducted in the following lines of work: Agronomy, Farm Management, Agricultural Biochemistry, Soils, Entomology, Horticulture, Veterinary Science, Dairying, Animal Nutrition, Animal Husbandry, Poultry Husbandry, Plant Pathology, Agricultural Engineering, and Bee Culture.

NORTHWEST EXPERIMENT STATION

The Northwest Experiment Station was established at Crookston to give special consideration to local conditions in the northwestern part of the State. In coöperation with the federal government, an efficient system of drainage was installed and thereby its 450 acre tract was changed from the swamp of twenty years ago to the very productive farm of to-day. Through records thus obtained the station is the authoritative source of information concerning drainage in the Red River Valley. Extensive tests of varieties of grains are carried on and with its excellent equipment of grain cleaning and grain testing machinery the station has become a distributing agent of pure seed especially adapted to this section of the State. Extensive experiments are also conducted with a view of attaining the rotations, fertilizers, fruits, trees, and soil management most suitable for this region. A large herd of cattle has been built up and valuable work is done in promoting the livestock industry. Its extensive and well equipped poultry plant supplies farmers with good breeding stock. By distributing circulars, bulletins, and building plans and by answering inquiries through correspondence and personal visitation, the station is rendering the farmers valuable assistance in solving their special problems. Through the extension work, too, it is spreading its influence by conducting institutes and working with farmers' clubs.

NORTH CENTRAL EXPERIMENT STATION

The Legislature of 1895 provided for a second experiment farm to make possible a more thoro study of the agricultural conditions of the north central portions of the State. This farm was located at Grand Rapids, April 6, 1896, and lies two miles east of the village. It contains approximately three hundred and seventy-five acres of land, with the necessary farm equipment consisting of dwelling house, barns, machinery and livestock.

Experiments are under way to determine the best cropping systems and rotations for the various soil types of North Central Minnesota. A good herd of grade Guernsey cows is maintained and experiments and demonstrations in the feeding and management of livestock are conducted.

WEST CENTRAL EXPERIMENT STATION

The land at Morris has been almost entirely cleared from weeds and a complete drainage system has made possible the use of all of the land. During the last three years, the experimental work has been started and is now in splendid shape. Soil fertility work, variety tests, alfalfa experiments, and forestry plantings are in full progress and organized on a regular project basis. A general system of crop rotation is in operation for the main farm practice.

The farm buildings have been entirely reconstructed, and animal husbandry lines of work are also being put into proper shape.

SOUTHEAST DEMONSTRATION AND EXPERIMENT FARM

By Legislative Act in 1911, a fund was appropriated for the purchase of a Demonstration and Experiment Farm at Waseca. In 1912 two hundred and forty-six acres were obtained just southeast of the city. The farm is being developed along practical lines as a livestock farm. The value of good management is being demonstrated. The superintendent is coöperating with the farmers in the vicinity in the management of their farms and with the schools and other organized bodies in the development of the agriculture of that section of the State.

NORTHEAST DEMONSTRATION AND EXPERIMENT FARM

The State Legislature in 1911 authorized an appropriation for the purchase of a Demonstration and Experiment Farm at or near Duluth. Two hundred fifty-two acres have been acquired. Clearing operations were started in March, 1913. Since that time the farm has been developed as a combination dairy, poultry, and truck farm with the object of illustrating the methods and farm practices that are best adapted to northeastern Minnesota. Experiments are being carried on to determine the best types and varieties of crops for the region and to discover also the best methods of handling and caring for livestock in the timbered section of the State.

FRUIT-BREEDING FARM

The Fruit-Breeding Farm is located at Zumbra Heights Station about thirty miles west of Minneapolis on the Minneapolis & St. Louis Railroad. Its purchase was authorized by the Legislature of 1907 for the purpose of breeding and developing fruits adapted to Minnesota. It consists of nearly eighty acres of land in a good fruit district and is equipped with a greenhouse, storage cellar, barn, and two residences. Thousands of apples, plums, strawberries, and raspberries, are fruited each year and selections of desirable seedlings made for propagation and distribution. This farm furnishes excellent material for advanced work in horticultural plant breeding.

CLOQUET FOREST EXPERIMENT STATION

This station covers an area of twenty-six hundred and forty acres located four miles southwest of Cloquet, Minnesota, and is used by the College of Forestry as a forest experiment station for the investigation of the fundamental principles of forest growth and management. Among the important studies now being carried on at this station are those covering the effects of the various climatic and physical factors upon forest growth; the best methods of reforesting denuded areas due either to fires or logging; and the determination of the age at which white and Norway pine may be expected to yield the most valuable lumber.

This Station is also coöperating with the United States Forest Service, which is carrying on studies along similar lines in other parts of the country.

ITASCA STATE PARK

The Legislature of 1907 authorized, with the consent of the Forestry Board, the use of a part of Itasca State Park by the College of Forestry as a demonstration ground and experiment station. Experiments in reforestration are being carried on at this station. The summer headquarters of the College have also been established there.

DEMONSTRATION FARMS

This phase of agricultural extension work has been organized with the idea of bringing to those communities coöperating in the work some demonstrational features that will exemplify up-to-date truths of agricultural practices and research work. It consists at present of twenty or more coöperating farms that are owned, financed and operated by private parties, and to which the State furnishes supervision through the means of frequent visits of regularly employed representatives of the University. The work with these farms consists in a general reorganization and subsequent management along the lines of practical farm management as adapted to that particular community. This work concerns itself with every phase of the farm work and is intended to effect improvement in all enterprises of the farm. These farms are always open to public inspection and at stated times the general public is invited to visit the farm and attend public demonstrations.

COUNTY AGRICULTURAL AGENT WORK

The county agricultural agent work in Minnesota, in which the state and federal government and several counties are coöperating, was started September 1, 1912. This work is correlated with the other work of the University by having a practical agriculturist located in each of several counties to assist in general work in farm management and all lines pertaining to agriculture in the county. Each agent reports directly to the State Leader of County Agent Work who represents jointly the United

States Department of Agriculture and the Agricultural Extension Division of the University.

The County Agricultural Agent helps in organizing Farmers' Clubs, securing pure seed grains and good livestock; encourages the growing of clover and alfalfa where practical; assists in the planning of farmsteads and farm buildings, orchards, windbreaks, crop rotations, helps in the organization of buying and selling associations, and makes himself generally useful along all lines of agricultural development in his county.

The University of Minnesota

SCHOOL OF AGRICULTURE

NOTICE TO PROSPECTIVE STUDENTS

Please read the Bulletin carefully, noting the paragraphs headed "Information," "How to Get to the School," "Admission," "Home Life on the Campus," and "Expenses." If you plan to enter the school, send to the Secretary, University Farm, St. Paul, for an admission blank. Please do NOT send DIPLOMAS. In case you have had any work of HIGH SCHOOL grade be sure to have it recorded on the blank or send certificates covering the work done.

If you desire a room in the dormitory, send with your admission blank to the Secretary a money order or draft for $2 made payable to University of Minnesota, Department of Agriculture. In case your application is received after all space in the dormitories is spoken for, your money will be returned to you. In case you decide after making application that you can not enter the School, you should notify the Secretary as soon as possible. If this is done prior to ten days before the opening of school, the money which you sent to reserve a room will be returned to you, otherwise it will not. ROOMS WILL NOT BE HELD AFTER THE OPENING DAY OF THE TERM FOR THOSE WHO ARE NOT PRESENT TO CLAIM THEM.

New students should not depend upon obtaining work at the institution to pay expenses. The regular work of the course takes so much time that a student should not do any outside work unless compelled to by necessity. Practically all of the work at the institution for which pay is given is spoken for a year ahead, so none is left for new students. Any able-bodied student ought to be able to earn enough during the six months of vacation to pay his way through the school year.

Students who for any reason can not enter the School on the opening day or very soon thereafter should wait until the opening of the second term before coming.

The Bulletin *of the* University *of* Minnesota

Northwest School and Experiment Station
Crookston, Minnesota
Announcement for the Year 1917-1918

Catalog Series No. 17
Vol. XX No. 22 June 22 1917

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

SCHOOL CALENDAR

1917-18

1917			
September	11	Tuesday	First term of the nine months' and Teachers' Training Courses begins
October	23	Tuesday	First term begins; organization of classes
November	29	Thursday	Thanksgiving Day
December	22	Saturday	First term closes; Christmas recess begins
1918			
January	1	Tuesday	Registration of new students
January	2	Wednesday	Second term begins; organization of classes
February	4-9	Week	Farmers' Week
February	12	Tuesday	Lincoln's Birthday; a holiday
February	22	Friday	Washington's Birthday; a holiday
March	27	Wednesday	Senior Class Day
March	28	Thursday	Twelfth Annual Commencement; Alumni reunion.
March	29	Friday	Second term closes; Easter recess begins
April	1-6	Week	Junior Short Course
May	30	Thursday	Memorial Day; a holiday
June	1	Saturday	Nine months' course closes
June	17	Monday	Teachers' Training School begins
July	4	Thursday	Independence Day; a holiday
July	27	Saturday	Teachers' Training School closes

THE NORTHWEST SCHOOL AND STATION

FACULTY

*George Edgar Vincent, Ph.D., LL.D., President
†Marion LeRoy Burton, D.D., Ph.D., LL.D., President
Cyrus Northrop, LL.D., President Emeritus
Albert F. Woods, M.A., D.Agr., Dean
Edward M. Freeman, Ph.D., Assistant Dean

AT CROOKSTON

Conrad G. Selvig, M.A., Superintendent
Jelmer P. Bengtson, Preceptor
Anna F. Haig, B.A., Preceptress
Arthur H. Larson, B.A., Registrar
Bernice B. Smith, Librarian

AGRICULTURAL ENGINEERING

Thomas R. Sewall, Engineering and Drawing
H. Leighton Joiner, Farm Engineering
Hilmer C. Kittleson, Blacksmithing and Carpentry

AGRONOMY

Frank L. Kennard, B.S.A., Agronomy and Farm Management
Orville M. Kiser, B.S.A., Extension in Farm Crops

ANIMAL HUSBANDRY

William Dietrich, B.S.A., Animal and Dairy Husbandry
Albert R. Knutson, Extension in Livestock
C. Everard Brown, Poultry and Extension in Poultry

HOME ECONOMICS

Mrs. T. R. Sewall, B.A., Domestic Science and Art
Alice E. Glise, Dressmaking

HORTICULTURE

Thomas M. McCall, B.S.A., Botany and Horticulture

SCHOOL

Jelmer P. Bengtson, Mathematics and Civics
Anna F. Haig, B.A., English and Public Speaking
Arthur H. Larson, B.A., Advanced Subjects and Debating
Bernice B. Smith, Assistant Preceptress and English
Martinus Stenseth, Gymnasium and Military Drill
M. Lucille Holliday, Music, Drawing, and Physical Training

---

* Term of office ends June 30, 1917.
† Term of office begins July 1, 1917.

TEACHERS' TRAINING COURSE

GRACE B. SHERWOOD, Normal Training

OFFICERS OF ADMINISTRATION

THOMAS R. SEWALL, Superintendent of Buildings
ETHEL KADLEC, Matron
SELMA TUNHEIM, School Nurse
CORA PAULSBERG, Accountant
OLGA NETTUM, Office Clerk

COMMITTEES

Catalog—The Registrar and Heads of Departments

School Schedule—Superintendent SELVIG, Mrs. HAIG, BENGTSON, Miss SHERWOOD, Mrs. SEWALL, Miss HOLLIDAY, DIETRICH

Short Course for Farmers—KENNARD, DIETRICH, BROWN, SEWALL

Athletics—MCCALL, LARSON, Miss SMITH, Miss GLISE, Miss HOLLIDAY, STENSETH

Students' Work—BENGTSON, Mrs. HAIG, Mrs. SEWALL, KENNARD, LARSON

GENERAL INFORMATION

TIME OF OPENING

The Northwest School of Agriculture opens October 23, 1917, and closes March 29, 1918. The fall term closes Saturday, December 22, 1917, and the winter term begins Wednesday, January 2, 1918.

Registration at the beginning of the second term will begin Tuesday, January 1, 1918, and should be completed by Wednesday, January 2, 1918. All students enrolled during the fall term who expect to return must register for the winter term before they leave for their holiday vacation. All former students entering later than January 11 will be charged a special fee of twenty-five cents a day for each day's delay in registering, unless prevented by illness from entering on time.

Instruction begins promptly at the opening of each term, and students should be present from the first day of the term until the close of the term.

INFORMATION

Students are advised to correspond with the Superintendent of the School, C. G. Selvig, Experiment Farm, Crookston, Minnesota, and make the necessary arrangements for registration. The earlier the student comes to the School, the better the chance of getting a room at the institution. No student will be admitted late except upon presentation of a reasonable excuse.

LOCATION

The Northwest School of Agriculture is located at the Experiment Farm, one and one-half miles north of Crookston, Minnesota. The Northwest School of Agriculture is a part of the University of Minnesota and is governed by the University Board of Regents.

PURPOSE

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

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

COURSES 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 15 to 17. Instruction is given in the work shop, laboratories, barns, and fields, as well as in the classroom. The regular course for young men requires three winters of six months each for completion, and the regular course for young women requires two winters of six months each. 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 courses in cooking, sewing, laundering, and household art. The methods of instruction tend to educate students toward the farm instead of away from it, to develop in them a love for farm life by showing them its possibilities. In this respect the School has been very successful, as nearly all of its graduates continue agricultural pursuits.

A course for girls covering a period of four years of nine months each is offered, beginning on September 11 of this year. A synopsis of this course appears on page 17.

The Teachers' Training Course aims to prepare teachers for consolidated and other rural schools.

The Advanced Course aims to prepare graduates of the three-year course for college entrance.

HOW TO GET TO THE SCHOOL

Check all baggage to Crookston and bring checks to the School. A charge of ten cents is made by the school teams for transporting trunks at the opening of school. The same charge is made for the return of the baggage at the close of school, provided it is ready to go on the days assigned. A charge of twenty-five cents is made for transporting trunks at any other time.

Monday and Tuesday, October 22 and October 23, members of the School wearing lettered badges will be at the Great Northern and Northern Pacific Stations at Crookston to meet and direct new students.

HOME LIFE ON THE CAMPUS

The life of the student while attending the School is subject to supervision. Students residing in the school dormitories are not allowed to leave the grounds without permission. The home life of each student is carefully guarded and everything done to promote a healthful and moral atmosphere. The use of tobacco and spirituous liquors of all kinds is strictly forbidden. No person will be admitted as a student who is known to have the cigarette habit. 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.

ADMISSION

Applicants who have completed a common school course in English Grammar, Arithmetic, History of the United States, and Geography will

be admitted without examination, provided they can furnish the certificates of high schools or of county superintendents, and boys must have had six months' practical experience on a farm.

Applicants for admission who do not have state certificates or county diplomas showing completion of eighth-grade work should send to the Superintendent for certificates of admission which, when properly filled out by former teachers or superintendents, will be accepted in place of entrance examinations.

Students who are deficient in English Grammar and Arithmetic will be required to take special work in those subjects at the School before completing the course. Instructions regarding this special work will be given upon admission. All are urged to prepare in all common branches before applying for entrance.

Students over twenty-one years of age who can not pursue the full course, either from lack of time or proper preparation, may make special arrangements for taking such subjects as may be most helpful to them. Students taking special work are required to take enough work to occupy their time while in school.

Parents are advised not to send pupils under sixteen years of age.

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

State High School Board certificates are accepted for work in English, Physiology, Algebra, Geometry, and Civics, or credits of 75 per cent or more, received on state teachers' examinations.

REQUIREMENTS FOR GRADUATION

1. (a) *Boys' Three-Year Course.* The completion of the prescribed course of study, including all of the required work and enough elective work to make a total of 144 credit hours.

(b) *Girls' Two-Year Course.* The completion of the prescribed course of study, making a total of 96 credits.

(c) *Girls' Four-Year Course.* The completion of the prescribed course of study.

2. Honorable standing in deportment.

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

4. For young men, practical experience in farm work during each of the two summers that come between the freshman and senior years. Students will register for the study of some definite farm problem to be studied each summer and report at stated intervals during the summer the progress made. A satisfactory standing in this summer work, or its equivalent in practical work done at the School, is required for graduation. See Summer Practicums, page 31.

SUMMER PRACTICUMS AND FARM PRACTICE

Six of the 144 credits may be earned by summer practicums. (See page 31.) If summer practicums are not elected, the work in farm and barn practice offered in the school course must be taken.

FEES AND EXPENSES

The necessary expenses for the year do not exceed $120. This amount does not include the cost of the required military suit for the young men, traveling and personal expenses.

Residents of Minnesota are charged an entrance fee of $5 per school year; non-residents of the state, $10.

The cost to the student for board, heat, light, and laundry is the actual cost of maintaining the table (including management) and caring for the buildings. Each month's board is paid in advance. The sleeping rooms are each furnished with a bedstead, mattress, dressing bureau, chairs, and table. They are all lighted by electric light and warmed by steam.

Each student should come provided with sheets, blankets, quilts, one bed spread, one pillow, three pillow cases, towels, napkins, comb, brushes, one glass tumbler, and one teaspoon.

Choice of rooms will be given in the order of application up to the opening of school. After that no rooms will be held. Rooms will then be assigned to the students as they come to the School. There will be no deviation from this rule.

No deduction in charge for board is made for absences of less than three 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.

A gymnasium fee of 25 cents per term is charged all students.

Each student is required to pay for losses of, or damage to, apparatus used in practical work.

For the purpose of supplying, calcimining, and painting the sleeping-rooms, a reserve fund is created by assessing each one occupying them $3 for the school year, or $1.50 per term.

A competent nurse is kept on the ground to care for the sick. To meet this expense each student pays $1 per term.

A deposit of $5 is required of each student as a guaranty for the return of all books and other articles borrowed. This deposit is not returned until the student severs his connection with the School.

On entering the School the student, if he is a resident of Minnesota, makes a payment of $5 entrance fee; $1 book rent and reading room; $17.00 to $17.50 board and room; $5 deposit; $1.50 reserve fund; $1 maintaining nurse; 25 cents gymnasium fee; total, $30.75 to $31.25.

All the boys are required to provide themselves with the prescribed uniform, which consists of cadet gray 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 $15.50. A better quality of cloth costs $16.50.

Each girl is required to provide herself with at least two large white aprons with bibs to wear while at work in the Domestic Science Laboratory. A gymnasium suit is also required for work in gymnastics. Suitable material is black serge or mohair for bloomers and white indian head for middy blouse.

The cost of the rooms in all of the dormitories has been graded in price according to the location of the room. The cost of room and board for a month varies from $17.00 to $17.50, depending on the location of the room, as some rooms are slightly more desirable than others. These prices include flat laundry only. Flat laundry includes bed linen, towels, and napkins. Full information regarding available rooms will be given on request.

HOSPITAL FUND

The Hospital Fund will be expended under the general direction of the School Nurse. This fund insures, for those contributing to it, the care of regular nurses and such medicines and materials as the regular nurses may use.

It does not provide medical treatment by physicians or fees of special nurses.

It does not provide hospital expenses of students rooming off the campus or away from the institution. Students rooming off the campus are not expected to contribute to this fund.

STUDENTS IN DORMITORIES

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

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

ASSEMBLY

On each school day at 11:40 a.m., the students assemble in the chapel, a commodious room seating five hundred people. After the opening exercises brief talks are given by the Superintendent, members of the Faculty, or invited guests.

During the year the list of speakers includes prominent men, state and national officials, business men, particularly those connected with the agricultural industries, professional men, prominent clergymen of all

denominations, educators from other institutions, and successful farmers. The addresses are of great interest and value to the students.

LECTURE COURSE

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

A course of lectures on the following subjects will be given beginning the second week of each semester at the regular assembly period. All students will be expected to attend these lectures.

The Aim of the Northwest School. Superintendent.
How to Study. Head of Teachers' Training Department.
Use of Library. Head of English Department.
Personal Conduct. To be appointed.
Good Citizenship. Preceptor of Boys' Dormitory.
Value of An Education. Superintendent.

The following lectures on Hygiene will be given to freshmen by the head of the Home Economics Department, or Physical Director of the School. All freshmen are required to attend these lectures.

General View on Health Problem
Diet
Dress
First Aid to Injured
Care of the Sick
Special lectures: Two, one for young men and one for young women.

STUDENTS' LITERARY SOCIETIES

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

MUSICAL ORGANIZATIONS

A school band is maintained each year. A competent leader has charge of this work. A school orchestra, glee clubs, and quartettes contribute greatly in creating an interest in music.

STUDENTS' CHRISTIAN ASSOCIATIONS

Young Men's and Young Women's Christian Associations have been formed having for their objects social fellowship and moral and spiritual development. Bible classes will be held Sunday morning at 8:30. The associations are non-sectarian. Religious exercises are held at the School each Sunday evening at 7 o'clock. Various pastors and business men

address the students at these meetings. The Christian Associations conduct the exercises and secure the speakers.

BUILDINGS AND EQUIPMENT

The School has seven brick buildings: the Kiehle Building, containing the offices, library, book store, gymnasium, and assembly room; Stephens Hall, containing fifty bedrooms, dining-room and kitchen; Senior Hall, with thirty rooms; Robertson Hall, with thirty-eight rooms; Home Economics Building, containing the kitchen, sewing-rooms, class rooms, model kitchen and dining-room for serving meals; Owen Building, containing the dairy room, carpentry shop, farm machinery and cement work shop, blacksmith shop, stock judging room, and drawing class rooms; and Hill Building, which gives adequate quarters for the work in Agronomy, Horticulture, Botany, and Agricultural Science departments. The farm building, herds, and machinery are used to give the students the best current ideas regarding methods of farming.

LIBRARY AND READING ROOM

The School of Agriculture Library is being equipped to supply the needs of students. It contains books of general and technical literature, government reports, pamphlets, and bulletins. The general subject and author card index and the index of publications of the state experiment stations are always at the disposal of all students to aid them in locating the various sources of information which the library affords.

There are complete sets of encyclopedias and dictionaries and files of fifty popular and technical magazines and periodicals.

The Librarian is always ready and glad to give whatever assistance she can to those doing reference work in connection with their classes. All those wishing to read or study are made welcome and given whatever privileges the library can provide.

SCHOOL MUSEUM

A room has been fitted up in the Hill Building as a zoological museum and as an exhibit room for farm products and appliances. The School desires donations from friends of the institution.

PRIZES, SCHOLARSHIPS, AND LOAN FUNDS

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

The Northwest School Scholarship

Friends of the Northwest School of Agriculture have provided a

fund of $100 to be given during 1917-18 to worthy needy students to assist them in completing courses at the school.

University of Minnesota Alumni Scholarship

This scholarship of $100 is provided by a group of the Alumni of the University of Minnesota residing in Crookston. It will be awarded during 1917-18 to worthy needy students to assist them in completing courses at the school.

The Scandia-American Bank of Crookston Scholarship

The Scandia-American Bank of Crookston offers a scholarship of $125 during 1917-18 to be awarded the student who is most diligent in his efforts to accomplish his work, and who shows the greatest progress during the year.

Flax and Hemp Fiber Culture Scholarship

This scholarship is the gift of the Crookston Water Works, Power & Light Company of Crookston, Minnesota. The amount is $125. It will be awarded to the young man who receives the leading place in the investigation of Flax and Hemp Fiber culture for 1917-18. This scholarship may be continued for a full course of three years, or extend only one year, at the option of the donor.

The Livestock Scholarship

A well-wisher of the school and students offers a scholarship of $125 to be awarded to the student who is the most diligent in his efforts and who makes the most progress in the Livestock courses during 1917-18.

The Farm Management Scholarship

Mr. S. A. Wallace, of Crookston, offers a scholarship of $125 to be awarded the student who is most diligent in his efforts and who makes the most progress in Farm Crops and Farm Management courses during 1917-18.

The Ruettell Scholarship in Public Speaking and Debate

Ruettell Clothing Company, of Crookston, offers a scholarship of $125 to be awarded the student who is the most diligent in his efforts and who makes the most progress in Debating and Public Speaking during 1917-18.

The Home Economics Scholarship

Mr. W. T. Carlisle, of Crookston, offers a scholarship of $125 to be awarded the student who is most diligent in her efforts and who makes the most progress in Domestic Art and Science courses during 1917-18.

ENTRANCE SCHOLARSHIPS

The following scholarships will be awarded to the boys or girls who

make the highest records in the state industrial contests hereinafter specifically enumerated.

Corn-growing Contest Scholarship

This scholarship is the gift of the Crookston State Bank. The amount is $125. It will be awarded to the young man who receives a leading place in the 1917 Acre Corn-growing Contest.

The Girls' Bread-making Contest Scholarship

The scholarship is a gift of the Crookston Milling Company. The amount is $125. It will be awarded to the girl who receives a leading place in the 1917 Girls' Bread-making Contest.

The Boys' Pig-raising Contest Scholarship

This scholarship is a gift of Mr. Charles E. Kiewel of Crookston. The amount is $125. It will be awarded to the young man who receives a leading place in the 1917 Boys' Pig-raising Contest.

The Potato-growing Contest Scholarship

This scholarship is a gift of Mr. J. W. Wheeler, of St. Paul. The amount is $125. It will be awarded to the young man who receives a leading place in the 1917 Potato-growing Contest.

STUDENT LOAN FUNDS

The Gilfillan Trust Fund

This fund of $50,000 is the gift of the Hon. John B. Gilfillan, of Minneapolis, in trust to the University of Minnesota, the annual income from which shall be at the disposal of the Executive Committee of its Board of Regents either as a gift or a temporary loan to worthy students of the University who are residents of Minnesota. The annual income from the fund is $2,000 which is loaned to students on their notes in amounts not exceeding $200 to any one person in one year, at the rate of five per cent per annum.

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

Northwest School Loan Fund

Through the efforts of a committee of Crookston citizens a students' loan fund has been provided for the use of students at the Northwest School of Agriculture to supplement the above-mentioned fund. This committee will provide money for loans as needed. This money will be loaned to students at six per cent interest as a temporary loan. For information regarding this loan fund, address the Northwest School of Agriculture, Crookston, Minnesota.

Class of 1917 Loan Fund

The Class of 1917 provided $140 to be used as a students' loan fund. This money will be loaned to students at six per cent interest as a temporary loan.

PRIZES

Three prizes of $10 each will be awarded for essays not to exceed 3,000 words on the subjects given below. The prizes will be awarded on Commencement Day, 1918.

Subject: "The Advantages of Country Life in the Red River Valley." Open to students of the Northwest School of Agriculture, 1917-18. Given by Mr. W. A. Marin, Crookston. Awarded to Charles Auburg in 1917.

Subject: "The Advantages of an Agricultural Education." Open only to boys regularly enrolled in a one- or two-room rural school during the term of 1917-18. Offered by friends of the Northwest School of Agriculture.

Subject: "The Advantages of Securing School Training in Homemaking." Open only to girls regularly enrolled in a one- or two-room rural school during 1917-18. Provided by Mr. A. A. Miller, of Crookston.

Any one interested should write for detailed information.

COURSES OF STUDY

Figures preceding the names of courses are number of credit hours granted on completion of the course. One credit hour is equivalent to one recitation period or to two laboratory periods per week for the term.

Capital letters following course names refer to corresponding course descriptions. See pages 20 to 30.

BOYS' THREE-YEAR COURSE

FIRST YEAR

Required of All

Fall Term		*Winter Term*	
Credit Hours		Credit Hours	
6	English A	6	English A
4	Cereal Crops B*	4	Plant Life A*
5	Study Breeds A*	5	Arithmetic A*
1	Personal Hygiene A	1	Personal Hygiene A
	Gymnasium	2	Corn D
8	Elective from the following		Gymnasium
		6	Elective from the following
24		24	

ANIMAL HUSBANDRY

2	Poultry A	3	Farm Dairying I
3	Bee Keeping A		

GENERAL ELECTIVES

4	Blacksmithing E*	4	Carpentry D*
2	Spelling and Penmanship E	2	Spelling and Penmanship E
4	Farm Motors I C*	1-3	Summer Practicums
1	Music B	1	Music B

Two hours per week of military drill and two hours per week of gymnasium are required of all, but carry no credit.

Students having a mark of Pass Plus on State Board Certificates will be given five hours' credit in Arithmetic and six hours' credit in English for Grammar.

* Will be offered both terms.

SECOND YEAR

Required of All

6	English B	6	English B
4	Physics A	4	Farm Accounts F
3	Stock Feeding B	3	Stock Feeding B
	Gymnasium	4	Elements of Soils A
11	Elective from the following		Gymnasium
		7	Elective from the following
24		24	

PLANT HUSBANDRY

4	Forage Crops C	3	Vegetable Gardening D
		2	Potato Culture E

ANIMAL HUSBANDRY

2	Stock Judging D	2	Stock Judging D
1	Dairy Practice J	1	Livestock Management C
2	Poultry B		

GENERAL ELECTIVES

1	Farm Machinery B	3	Mechanical Drawing H
1	Music B	1	Parliamentary Law B
2	Drainage, Rope, and Belt Work F	1	Music B
		1-3	Summer Practicums

Two hours per week of military drill and two hours per week of gymnasium are required of all, but carry no credit.

THIRD YEAR

Required of All

4	English C	4	English C
5	Civics and Farm Law A	4	Farm Management G
	Gymnasium		Gymnasium
15	Elective from the following	16	Elective from the following
24		24	

PLANT HUSBANDRY

3	Farm Forestry F	2	Plant-Breeding H
4	Fruit Growing G	1	Weeds and Seed Identification B
4	Soils Management E	2	Floriculture C

ANIMAL HUSBANDRY

4	Animal Hygiene F	3	Animal Breeding G
1	Adv. Stock Judging E	1	Dressing and Curing Meats H
3	Poultry C		

GENERAL ELECTIVES

2	Farm Motors II C	1	Conference H
3	Rural Economics D	3	Rural Sociology E
3	Farm Heating, Lighting, Plumbing, and Cement Work G	1	Music B
1	Music B		

Two hours per week of Gymnasium are required of all, but carry no credit.

CREDIT REGULATIONS REGARDING BOYS' THREE-YEAR COURSE

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

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

One credit per term may be earned by approved work in instrumental music. A special fee will be charged for such courses. The same credit

may be earned without fee by membership in the orchestra by those who are competent for the work.

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

CREDIT FOR HIGH SCHOOL WORK

A graduate of an approved high school course shall be allowed a total of 48 credit hours toward graduation.

A graduate of an approved high school course offering four units of work in Agriculture shall be allowed 96 credits toward graduation.

For each four units of credit received for approved high school work 12 credit hours shall be granted in the School of Agriculture, and 12 additional credit hours for each unit of Agriculture offered.

GIRLS' FOUR-YEAR COURSE

FIRST YEAR

First Semester		*Second Semester*	
Credits		Credits	
5	English F	5	English F
5	Plant Life A	3	Vegetable Gardening D
5	Ancient History C	2	Floriculture C
*4	Foods and Cookery A	5	Ancient History C
*3	Food Production C	*4	Foods and Cookery A
*3	El. Garment Making J	*3	Home Sanitation and Decoration H
*1	Music B	*3	El. Garment Making J
*	Physical Training C	*1	Music B
		*	Physical Training C

SECOND YEAR

5	English G	5	English G
5	Algebra B	5	Algebra B
5	Modern History C	5	Modern History C
*4	Household Physics N	*4	Household Chemistry O
*2	El. Dressmaking K	*2	El. Dressmaking K
*4	Home Nursing & Invalid Cookery I	*4	Foods and Cookery B
*1	Music B	*1	Music B
*1	Drawing D	*1	Drawing D
*	Physical Training C	*	Physical Training C

THIRD YEAR

5	English H	5	English H
5	Plane Geometry C	5	Plane Geometry C
3	Rural Economics D	3	Rural Sociology E
*3	Home Management F	*3	Home Management F
*2	Sewing and Needle Work L	*2	Home Accounts G
5	Food Study D	*2	Millinery, Arts and Crafts M
*1	Music B	3	Food Study D
*2	Cooking E	*2	Cooking E
*1	Drawing D	*1	Music B
*	Physical Training C	*1	Drawing D
		*	Physical Training C

* Very largely devoted to actual practice and laboratory work.

FOURTH YEAR

5	English D or I
10	Prof. Reviews A
2	Home Economics Methods O
5	Pedagogy D
5	Special Methods F
5	Observation and Teaching G
1	Music C
1	Manual Training B

5	English D or I
10	Prof. Reviews A
2	Home Economics Methods O
5	Rural School Methods and Management E
5	Special Methods F
5	Observation and Teaching G
1	Drawing E
1	Elementary Agriculture C

GIRLS' TWO-YEAR COURSE

FIRST YEAR

Fall Term

Credit Hours	
6	English A
5	Arithmetic A
4	Foods and Cookery A
3	Food Production C
5	El. Garment Making J
1	Music
	Physical Training C

Winter Term

Credit Hours	
6	English A
5	Arithmetic A
4	Foods and Cookery A
3	Home Sanitation and Decoration H
5	El. Garment Making J
1	Music
	Physical Training C

SECOND YEAR

6	English B
4	Foods and Cookery B
5	Sewing and Needlework L
4	Home Nursing & Invalid Cookery I
2	Dairy Practice J
2	Poultry D
1	Music
	Physical Training C

6	English B
4	Foods and Cookery B
4	El. Dressmaking K
3	Home Management F
2	Home Accounts F
5	Civics and Farm Law A
1	Music
	Physical Training C

ADVANCED COURSES

A number of courses of a more advanced nature than those taught in the School are offered to graduates and other qualified students of the School of Agriculture.

TEACHERS' TRAINING COURSE

This course at the Northwest School of Agriculture is designed to prepare teachers for one-room rural and consolidated schools. The work will extend through a period of twelve months, including two summer terms of six weeks each, and one year of nine months. The young women will have the opportunity of preparing to direct the household art and science work in such schools. An ungraded demonstration school will be maintained in connection with the department. This course will afford training to graduates of this school and other qualified students of equivalent preliminary training. A Training Department certificate will be issued to each graduate recommended to receive it.

OUTLINE OF COURSE

Preliminary work to be done at Summer Sessions

Arithmetic (2 periods each day)
Grammar (2 periods each day)
Physiology (2 periods each day)
Reading (1 period each day)
Primary Methods (1 period each day)
Rural School Methods (1 period)
Electives (3 periods each day)

For work of regular school year of nine months, see fourth year of four-year course on page 18.

ADVANCED COURSE

For graduates of the School of Agriculture

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

Upon the completion of two summers of supervised work in addition to this course, graduates will be admitted to the Colleges of Agriculture and Forestry.

OUTLINE OF COURSE

(One Year)

First Term		*Second Term*	
Credit Hours		Credit Hours	
5	Elementary Algebra B	5	Elementary Algebra B
5	Plane Geometry C	5	Plane Geometry C
5	English D	5	English D
3	Elementary Economics D	3	Rural Sociology E
5	General History C	5	General History C

DESCRIPTION OF COURSES

AGRICULTURE

A. Elements of Soils. The principles of elementary chemistry and their applications most important to plant life. The chemical and physical properties of compounds common in water, air, soils, fertilizers, and foods. Kennard.

B. Cereal Crops. A study of the classes of field crops with special study of the most important cereals, as to history, habits, varieties, planting, harvesting, storing, uses and values, pests, including insects, diseases, and weeds. Kennard.

C. Grasses and Forage Crops. This course is devoted especially to the kinds, methods of storing, methods of handling, uses, value, and adaptability of grasses and forage crops. All field crops will be studied from actual specimens in the laboratory. Kennard.

D. Corn. This course consists of a detailed study of the corn crop. Scoring, judging, testing, and grading will comprise the major part of the course. Recitations will deal with the growing, cultivating, harvesting, storing, and marketing of the crop. Kennard.

E. Soils Management. This work consists of a study of geology as related to soil formation; classification of soils; soil moisture and soil tillage; the relation of these crops to each other in a systematic rotation and in their relation to soil fertility. Kennard.

F. Farm Accounts. This is bookkeeping, but for the farmer rather than for the merchant. The principle of debits and credits is the same. This course aims to help the farmer in keeping his records that he may know where his profits and losses come from. Bengtson.

G. Farm Management. Systems of farming; selection of farms; the planning of rotations suitable to the students' home farms and to farms operated under different systems. Cost of producing crops; marketing products; business methods applied to the farm. Kennard.

H. Conference. This course consists of a review of bulletins and publications relating to soils, crops, farm management, and other agronomy topics. The student will become acquainted with the latest successful practices and will learn to use bulletins to his advantage. Kennard.

I. Farm Practice. This course will consist of practical work in the laboratory and the seed house in judging, grading, testing, treating, storing, and cleaning seeds of all the common grains and grass crops. Kennard.

AGRICULTURAL ENGINEERING

A. AGRICULTURAL PHYSICS. Deals with the nature of matter and force in its application to draft, levers, and pulleys in farm and household machinery, lightning protection, supports in house and bridge building, principles of heating and ventilation, soil formation, heat and moisture of soil. BENGTSON.

B. FARM MACHINERY. This course consists of a study of all common farm machinery. Comparisons are made between different types of seeding, tillage and harvesting machinery. Some time is spent in becoming familiar with replacing parts which are subjected to wear. KENNARD.

C. FARM MOTORS I. The course includes lectures on handling, construction, and repair of gasoline engines, both stationary and traction. Practical work is given in repairing and running gasoline engines of all kinds. Babbitting of boxes and soldering are taught to enable the student to repair worn bearings, leaky gasoline tanks and pipes. SEWALL.

FARM MOTORS II. A study of steam engines, beginning with the construction and care of boilers, boiler fittings, fuel, including the handling and care of steam engines. Each student is required to pass an examination at the end of the course, similar to one taken in getting an engineer's license. SEWALL.

D. CARPENTRY. The care and use of tools is taught by means of shop exercises. Each student is required to sharpen his own tools and is given instruction in pointing, estimating and selecting building materials, and farm building construction. FERRIS.

E. BLACKSMITHING. Instruction is given in the management of the forge, in bending, shaping, and welding iron and steel, and tempering steel tools, thus familiarizing the student with the operations necessary for blacksmith repair work on the farm. FERRIS.

F. DRAINAGE—ROPE AND BELT WORK. Practice in laying out and taking levels for farm drainage ditches, making of simple leveling instruments and how to use them. Both lectures and field work are given. The students are taught the lacing and care of belts of all kinds, how to make rope halters, and to splice and tie ropes. SEWALL.

G. FARM HEATING, LIGHTING, PLUMBING AND CEMENT WORK. Lectures including the heating and lighting of farm homes, the installation of plumbing and water systems and the use and making of concrete. Practical work is done by the students in pipe fitting and cutting and in the making and placing of concrete. SEWALL.

H. DRAWING. This course teaches the use of the tools and the practical value of drawings in designing buildings and machinery. Drawings

of the carpentry exercises and work from the drawings in the shop, affords direct application. Students design dwellings, barns, sheds, and other farm buildings, estimating the quantity of material needed and the cost of the building when completed. SEWALL.

DAIRY AND ANIMAL HUSBANDRY

A. STUDY OF BREEDS. Cattle, horses, sheep, and swine are studied as to origin, quality, and general adaptation to conditions in the state. The work is made practical by frequent illustrations with stock kept at the Experiment Farm for that purpose. DIETRICH.

B. STOCK-FEEDING. The principles of feeding as applied to the production of horses, beef cattle, hogs, and sheep are taught. Instruction is given in compounding rations for the different classes of stock. DIETRICH.

C. LIVESTOCK MANAGEMENT. Practical work in feeding and handling the various classes of farm livestock. DIETRICH.

D. STOCK JUDGING. Instruction is given on types and breeds of livestock, and attention is called to desirable and undesirable qualities in each. Practice is given in judging animals. DIETRICH.

E. ADVANCED STOCK JUDGING. A continuation of D. Blank cards for written reasons as to why one animal is given a rating above another are used in place of score cards. DIETRICH.

F. ANIMAL HYGIENE. This course is designed to enable the student to diagnose a disease. Practice is given in filing the teeth and trimming the hoofs of horses and in treating the common diseases of farm stock. DIETRICH.

G. ANIMAL BREEDING. In this class the boys learn the laws that govern breeding and the principles to be considered in the breeding of horses, cattle, sheep and swine. The importance of the male in the herd and the value of good blood are emphasized. DIETRICH.

H. DRESSING AND CURING MEATS. Practice in slaughtering is given to the young men, while both young men and young women learn the name and value of the different cuts. Both get lessons in simple methods of preserving meats for future use. DIETRICH.

I. FARM DAIRYING. A study of the principles and practice of producing dairy products, including a discussion on dairy barns, silos, herd management, milk production and testing, butter making, etc. DIETRICH.

J. DAIRY PRACTICE. Students receive instruction in the most advanced methods of creaming milk, ripening cream, churning, working, and packing butter, and measuring the value of milk by the Babcock test and lactometer. DIETRICH.

ENGLISH

A. FRESHMAN ENGLISH. Oral and written composition with particular attention to sentence structure. Punctuation and spelling. Letter writing. Drills for the purpose of eliminating errors. The reading of simple classics to illustrate the fable, allegory, parable, myth, and ballad. HAIG.

PUBLIC SPEAKING, one hour a week. Reading aloud, drilling upon articulation and enunciation, short talks on familiar subjects. Public programs to enable the students to learn to speak clearly and easily before an audience. HAIG.

DEBATING, one hour a week. Principles of argumentation, briefs, debates in class, in public programs, and in debating societies. LARSON.

B. JUNIOR ENGLISH. Practical business English. Magore's text. Study of paragraph and methods of paragraph development. Narration, description, and exposition studied in oral and written composition work. Study of good literature as a basis for composition work, and as a means of increasing the student's vocabulary. HAIG.

PUBLIC SPEAKING. Extemporaneous talks, longer discussions, and a little dramatic work. HAIG.

DEBATING. A development and a continuation of the first year. LARSON.

C. SENIOR ENGLISH. Study of whole composition with reference to principles of unity, coherence, and emphasis. Exposition studied in oral and written composition work. Reading of best English writers with a view to increasing the students' appreciation of good literature. HAIG.

PUBLIC SPEAKING. The dramatization of scenes from literature studied, after dinner speeches, and talks. HAIG.

DEBATING. A continuation of the work of the previous years, with emphasis upon extemporaneous speaking. LARSON.

D. ADVANCED ENGLISH. Oral and written composition illustrative of forms of discourse and principles of composition previously learned. Study of the novel and the short story; the drama; the essay and the oration; narrative and lyrical poetry. HAIG.

E. SPELLING AND PENMANSHIP. Practical drills closely related to work in other subjects aiming to give proficiency in every day requirements. SHERWOOD.

FOUR-YEAR COURSE FOR GIRLS

F. FRESHMAN YEAR. Letter writing and the simpler forms of discourse —narration and description. The correct use of words, punctuation

and sentence structure. Literature as a basis for composition work. HAIG.

G. SOPHOMORE YEAR. Exposition, argument, the development of the paragraph and of the whole composition. Literature selected from English classics, illustrating the rhetoric studied, and also the development of the novel.

H. JUNIOR YEAR. A review of the principles of rhetoric and composition previously learned, and a study of the forms of poetry. English literature through the Classical Age of the 18th century.

I. SENIOR YEAR. First term: English literature from the Romantic Age to the 20th century; second term: American literature.

HISTORY AND CIVICS

A. CIVICS AND FARM LAW. Legislative, judicial, and executive departments and the functions of each. Special attention to the school district, township, county, and state government. The national government is also considered, but not so extensively. One hour per week is devoted to the essentials of law relating to the farm. BENGTSON.

B. PARLIAMENTARY LAW. The essentials of parliamentary practice as necessary in conducting public meetings effectively. LARSON.

C. ANCIENT AND MODERN HISTORY. A survey of the world's history with particular emphasis placed on the development of institutions, states, industries, and organizations that have influenced to the greatest degree the progress of civilization. LARSON.

D. ELEMENTARY ECONOMICS. Special emphasis will be placed on rural economics. SELVIG.

E. RURAL SOCIOLOGY. The problems of rural communities, of rural health and sanitation, and of rural social institutions will receive attention. SELVIG.

HOME ECONOMICS

FOODS AND HOUSEHOLD MANAGEMENT

A. FOODS AND COOKERY. Elementary cooking. Preparation and serving of the carbohydrate, fat, and protein foods; doughs and batters; beverages, desserts, and salads; special emphasis on bread-making, meat-cooking, and canning; serving of simple breakfast, luncheon, and dinner by groups. MRS. SEWALL.

B. FOODS AND COOKERY. The aim of this course is to determine by experiments the fundamental scientific principles underlying and controlling cookery processes; correction and perfection of recipes; cooking in large quantities; and outlining menus. MRS. SEWALL.

C. Food Production. The study of foods by classes, their production, distribution, cost, manufacture, and marketing. Mrs. Sewall.

D. Food Study. Review of structure of human body; digestion, absorption, and metabolism of foods; fundamental principles of human nutrition; balanced rations and formulation of dietaries for people in various occupations. Special emphasis on value of mineral matter in nutrition. Mrs. Sewall.

E. Cooking. Preparation of dishes preparatory to the boarding-club work. Working out menus in dietary form to keep within certain limits from nutritive and cost standpoints. Each girl does a week of practical cooking for six people, doing her own ordering and keeping her own accounts. A financial statement is handed in at the end of week. Mrs. Sewall.

F. Home Management. Planning of daily work; household records; labor-saving devices; planning of meals with reference to cost; duties and responsibilities of women to the home, and of the home to the community, etc. Mail-order buying, coöperative buying, economics of fashion; standard of living as related to the efficiency of the home. Mrs. Sewall.

G. Home Accounts. Thoro drill by keeping a year's account for a model household; attention to budget, cash paid out, cash received; farm products used in the household, and business forms. Bengtson.

H. Home Sanitation and Decoration. Location, construction, and planning of farm homes; heating, lighting, ventilation, and equipping the house; artistic and economical furnishing with work on cost and schemes of furniture, floor and wall coverings, curtains and pictures for each room. Mrs. Sewall.

I. Home Nursing and Invalid Cookery. Home care of the sick; sick room etiquette; care of children; first aid in emergencies; preparation and serving of food for the sick. Practical work is given in assisting the regular school nurse. Mrs. Sewall.

CLOTHING

J. Elementary Garment Making. Hand stitches as applied to simple garments and household articles; drafting of patterns for and making of undergarments. Care of sewing machines. Glise.

K. Elementary Dressmaking. Making of wash dress; lingerie or tailored waist; cotton or wool dress skirt; silk or woolen dress, using commercial patterns. Study of silk and woolen fabrics and fibers, and tests for adulteration and substitution. Glise.

L. Sewing and Needlework. Decorative needlework applied to undergarments, linen or lingerie dresses, and household linens. Glise.

M. Arts and Crafts and Millinery. A study of design and color harmony in its relation to the home. Designing of curtains, table and pillow covers; lamp shades; basketry, pottery, and leather work. Designing, making, and trimming of hats with a view to developing originality, skill and artistic taste. .....

N. Household Physics is taken up applying the principles of statics, dynamics, heat, sound, light, and electricity to various household processes. .....

O. Household Chemistry includes a study of air, water, and food. Special emphasis on analysis of milk, detection of adulterations in foods, analysis of water and chemistry of cleaning. .....

P. Methods of Teaching Home Economics. This course is designed to prepare for the teaching of sewing and cooking in the one-room rural and consolidated schools. Special attention is given to the cooking and serving of hot noon lunches; to the serving of luncheons for school entertainments and other gatherings; to the state contest work as carried on through the Girls' Club Movement. Mrs. Sewall.

MATHEMATICS

A. Arithmetic. Drill for speed and accuracy in simple processes; practical application of principles to every-day farm problems, such as measurements of material, extension, capacity; marketing of grain, stock, and products; purchase of machinery and supplies; cash accounts, business forms, and interest. Bengtson.

B. Algebra. This work covers *First Course in Algebra,* by Hawkes-Lubby-Touton, or equivalent text, omitting Ratio and Proportion, Graphical Representation, and Imaginaries. Bengtson.

C. Geometry. The course in Geometry covers *Wentworth and Smith's Geometry,* from Book I to Book VIII, or equivalent texts, except the work in symmetry, maxima and minima. Larson.

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 institutions which are its beneficiaries. For this purpose the United States Government furnishes the Department of Agriculture with the necessary arms and equipment. All male students of the freshman and junior classes not physically unfit, and not enrolled in the band, are required to attend military drill.

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. STENSETH.

MUSIC AND DRAWING

A. PIANO AND VOCAL. Piano.—The instruction of each student is adapted to his capacity or needs. The course of study includes technical exercises for the development and control of the fingers, hands, and arms. Studies and compositions by the best composers are given. A special fee is charged for this work. HOLLIDAY.

Voice.—This course embraces the following work: exercise in breathing and tone placing, for relaxing the throat, for the formation of vowels and consonants, and for sight reading. Songs by American and foreign composers are studied. This work also requires a special fee. HOLLIDAY.

Chorus work.—A glee club, chorus, and quartets are organized during the year. Students with the best voices are admitted to these. No special fee is charged. HOLLIDAY.

B. MUSIC. In the regular course of study, there is offered one hour a week in music each year, consisting of work in ear training; vocal development; sight reading and chorus; and appreciation of music. HOLLIDAY.

C. MUSIC METHODS. Music suitable for rural schools will be given. The course will include methods for training the ear and voice, sight reading, teaching songs by note, and rote songs for use in the school room. Student teachers will have opportunity to take special voice work. HOLLIDAY.

D. FREEHAND DRAWING. Drawing of plant forms and landscapes in pencil, charcoal, and water color, the study of perspective and still life, and design, with the view of developing an appreciation of the beautiful in nature and art. Application is made to home decoration. HOLLIDAY.

E. DRAWING METHODS. The object of this course is to develop an appreciation of the beautiful in nature and art. Suggestions will be given which will aid the student teacher in developing this appreciation in their class rooms. A course of study suitable for rural schools will be suggested and methods for teaching it will be given. HOLLIDAY.

PHYSICAL TRAINING

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

MEN

A. PERSONAL HYGIENE. An effort is made to show the student the importance of a proper care of the human body. Special attention is given to foods, water, air, narcotics, cleanliness, clothing, exercise, first aid to injured, care of sick, and the care of the special organs of the body. BENGTSON.

B. GYMNASIUM. Required of all young men not excused on account of physical disability. Aims to inspire each pupil with a desire to reach and maintain highest possible physical efficiency. First part of the hour is given over to calisthenics with dumb-bells, wands, Indian clubs, and free arm movement. Then light apparatus work is followed by some game or running. STENSETH.

WOMEN

C. PHYSICAL TRAINING. The following lectures on Hygiene will be given by the head of the Home Economics Department. All young women are required to attend. General view on health problem; diet; dress; first aid to injured; care of the sick; special lectures. MRS. SEWALL.

Free-hand gymnastics, aiming to produce correct posture and to correct faults of posture; athletic movements aiming at grace; folk games. HOLLIDAY.

PLANT LIFE AND HORTICULTURE

A. PLANT LIFE. This subject is taught with special reference to plants that are of interest to the Minnesota farmer. Plant specimens are collected from the greenhouse and field and are examined, mounted, and classified. MCCALL.

B. WEEDS AND SEED IDENTIFICATION. The seeds and plants of the common weeds are studied, classified, and identified. A study of weed and seed laws also occupies a prominent place in the course. MCCALL.

C. FLORICULTURE. A study of flowers, with special reference to their planting, growing, and propagation. Considerable time is spent on the grouping and planting of the ornamental flowers and shrubs and in making landscape planting plans. The station greenhouses supply material for laboratory work. MCCALL.

D. VEGETABLE GARDENING. The value of the home vegetable garden, the preparation of the ground, and the selection of plants and seeds are given attention. Includes tillage, rotation, transplanting, preparation and care of hotbeds, and insects dangerous to the garden. MCCALL.

E. POTATO CULTURE. The importance of the potato as a crop for Minnesota is recognized in this course. Includes the study of potato soils;

seed selection; growing the crop, harvesting, storing, marketing, diseases and their control. McCall.

F. Farm Forestry. Why, how, when, and where to plant windbreaks and wood-lots are taught; also characteristics and adaptability of the more common trees; methods of propagation, and the conservation of planted and natural forests. McCall.

G. Fruit-Growing. The importance of the farm orchard and small-fruit garden is emphasized in this course. The work consists of a study of orchard soils, planting and cultural methods, propagation, pruning, spraying, harvesting, marketing, and selection of varieties of native and hardy fruits. McCall.

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

BEE CULTURE

A. Beekeeping. The importance of beekeeping as an adjunct to the general farm of northern Minnesota is emphasized in this course. The species, life history, and habits of bees are studied. Local apiaries furnish excellent material for the practical handling of hives and swarms. McCall.

POULTRY

A. Farm Poultry. The study of breeds; planning and arrangement of poultry houses; feeds and feeding; killing and dressing fowls. Brown.

B. Young Poultry. Management of incubators and brooders and of natural incubation and brooding. The care and feeding of young stock. Brown.

C. Poultry Farm Management. Practice in judging fowls for exhibits and utility, judging eggs for market, caponizing and dressing fowls for market and table use. Brown.

D. Poultry for Girls. The care and management of fowls, the construction of poultry houses and equipment, natural and artificial incubation and brooding, feeds and feeding, judging fowls, dressing and drawing fowls for table use, boning fowls and carving table poultry. Brown.

TEACHERS' COURSES

A. Reviews. The aim of this course is to make the student teacher perfectly familiar with the subject matter in the various branches to be

taught in the rural schools. It includes a review of the subject matter in arithmetic, history and civics, grammar, geography, and physiology. SHERWOOD.

B. MANUAL TRAINING. The course in manual training is planned to meet the needs of the rural schools. Problems suitable for making in the rural schools will be made. SEWALL.

C. ELEMENTARY AGRICULTURE. This course will consist of the study of birds, flowers, insects, weeds, grasses, soils, trees, corn, corn breeding, etc. An outline suitable for use in the rural schools will be suggested. KENNARD, MCCALL.

D. PEDAGOGY. This is a course dealing with the problems of teaching, including types of lessons; questions and questioning; assignments; study and teaching how to study; lesson planning; class management and discipline and the general laws and principles of teaching. SHERWOOD.

E. RURAL SCHOOL METHODS AND MANAGEMENT. This course will include school law; study of the public school system of Minnesota; rural school organization and management; school hygiene and health; rural community problems and other topics that will aid the student teacher to do efficient work in the school room and community. SHERWOOD.

F. SPECIAL METHODS. The work in this course includes methods for teaching the various common school subjects, also penmanship, physical training, and construction work. Student teachers will be given opportunity to see these methods developed in the demonstration school, and later to test their ability in applying them. SHERWOOD.

G. OBSERVATION AND TEACHING. An ungraded demonstration school is maintained in connection with this course. The aim is to give student-teachers actual experience in the management and control of a schoolroom and in the practical application of the principles of teaching studied in the methods classes. SHERWOOD.

SUMMER PRACTICUMS

The work consists of practical work on the home farm in following up studies taken at the School during the winter. The projects selected must be submitted for approval before March 1. Regular reports of the progress of the summer work are required each month. Some one connected with the School and Experiment Station will, if possible, inspect the work at least once during the summer. Suggestions regarding the work will be given, and the progress made will be noted. Students will receive credit for this work to apply on the work required for graduation. Those students who are unable to carry on the summer practicum work at home during the two summers will be expected to do extra work in some department of the Northwest Experiment Station to supplement their class work. From one to three hours of credit will be given for the work satisfactorily completed each summer, depending upon the nature of the project and the manner in which it is carried out. The reports of the best summer practicum work will be published in a School circular with the rank secured by each student.

PRACTICAL FARM AND HOME EXERCISES

A certain degree of efficiency in farm operations is required of every young man before graduation. Farm Practice is therefore a definite part of the course and is so planned as to supplement the previous experience of the students and the theoretical instruction of the class room. Every farm-reared boy, through experience in fundamental operations on the farm, has a working knowledge of such things as harnessing horses, milking cows, plowing, planting, and harvesting, but does not always know the best way of doing them. Practice in such fundamentals is to give a fund of "helpful hints" to make the work easier and better. Farm practice, which constitutes an essential part of the agricultural course, includes two distinct phases: (1) practice during the school course—work in laboratory, field, and barn; (2) vacation work on home farms—summer practicums.

The following is a partial outline of the practice work in the various subjects of the course. It makes no mention of a great number of purely laboratory exercises that are a usual part of every course.

FARM CROPS

SOIL MANAGEMENT. (1) Making soil samples; (2) making soil moisture determinations; (3) capillary water test; (4) influence of color on temperature; (5) mechanical analysis of soil; (6) study of different soils when wet, and microscopic study of soil types; (7) acid and alkaline soil tests, and absorption of gases; (8) determination of acid insoluble and acid soluble matter; (9) extraction of humus; (10) influence of manure upon moisture content, physical condition, and water-holding capacity of soil types; (11) tests for nitrates, and phosphoric acid; and (12) summary of results as outlined by Snyder (experiment 31), soil from home farm used in tests.

FORAGE CROPS. (1) Identification of grasses and forage crops; (2) comparative study of grasses and forage crops; (3) identification of seeds of forage crops, of annual and miscellaneous crops, and of legumes; (4) meadow and pasture mixtures; (5) germination tests of seeds of grasses and forage crops; (6) depth of planting.

CEREAL CROPS. (1) Varietal study and judging of wheat, oats, barley, rye, buckwheat, flax, speltz; (2) cleaning and grading of cereals; (3) treatment of wheat, oats, and barley for diseases; (4) cereal crop insect pests and their control; (5) shocking grain; (6) stacking grain.

CORN. (1) Corn types; (2) corn varieties; (3) use of score cards; (4) comparative judging of samples in all leading varieties; (5) individual ear testing; (6) storing seed corn, storage houses; (7) seed corn selection.

FARM MANAGEMENT. (1) Drawing original plans of farms and farmsteads; (2) intermediate plans looking toward an effective rotation for individual farm and owner's condition and type of farming; (3) completed farm plan which should be actually in force at end of transition period (5 to 8 years); (4) completed farmstead plan; (5) farm accounting, working out a complete year's accounts from data gathered in the actual operation of a typical Red River Valley farm; (6) farm business.

ANIMAL HUSBANDRY

DAIRY PRACTICE. (1) Making butter; (2) testing milk, cream, buttermilk, and skimmilk; (3) study and operation of different types of cream separators; (4) pasteurizing milk; (5) making ice cream and cottage cheese.

LIVESTOCK JUDGING. Practice work in judging the following breeds of stock: Shorthorn, Holstein, Angus, Hereford, Guernsey, and grade cattle; Percheron, Clydesdale, and grade horses; Shropshire and grade sheep; large Yorkshire, Berkshire, and Duroc Jersey hogs; handling market, feeding, and breeding stock.

LIVESTOCK MANAGEMENT. Practical exercises in feeding, care, and management of horses, cattle, sheep, and swine are given, using Experiment Station stock.

ANIMAL HYGIENE. Castrating, docking, dehorning, trimming feet, testing for tuberculosis, treating animals for lice, dressing wounds, dressing teeth.

BUTCHERING. (1) Killing and dressing swine, beeves, and sheep; (2) salting and care of hides and pelts.

MEATS. (1) Cutting up carcasses; (2) preparing head cheese, pig's feet, etc.; (3) curing and smoking hams and bacon; (4) rendering lard.

POULTRY

HOUSING. Including construction of colony coops, setting-hen coops, fattening crates, shipping crates, interior poultry house fixtures including trap-nests, etc.

FEEDS AND FEEDING. (1) Preparing and mixing feeds; (2) study of feeding materials; (3) practice feeding of laying stock; (4) practice feeding of breeding stock; (5) feeding chicks.

HATCHING AND BROODING. (1) Testing eggs; (2) study of incubators; (3) management of incubators; (4) artificial brooding, types of brooders, and their management.

FATTENING MARKET POULTRY. (1) Preparing and mixing rations; (2) feeding, methods, etc.; (3) killing and dressing, turkeys, chickens, ducks, geese; (4) drawing and boxing fowls for table.

CAPONIZING.

POULTRY JUDGING. (1) Study of anatomy of fowls; (2) practice work in judging breeding and fattening stock; (3) diagnosing poultry diseases.

PLANT LIFE AND HORTICULTURE

PLANT LIFE. (1) Collecting, pressing, mounting, and identifying fifteen weed specimens; (2) parasitic fungi, including work with control of smuts of wheat, oats, and barley; rusts of small grains and asparagus; fire blight of tree fruits; black knot of plum; and cherry and plum pocket; (3) propagation of plants; planting of hardwood and soft-wood cuttings.

BEE-KEEPING. (1) Preparation of hives for winter; (2) study of bee-keeping equipment (hives, brood frames, foundations, smokers, extractors, etc.); (3) wintering; (4) management of colonies; (5) swarming, clipping of queens, etc.; (6) extracting honey.

WEED AND SEED IDENTIFICATION. (1) Purity tests of all kinds of farm seed; separation and identification of weed impurities; (2) germination tests using the different types of homemade germinators; (3) the common and noxious weeds in the following plant families are studied and identified: grass, mustard, mallow, morning glory, composite, goose foot, amaranth, buckwheat, plantain, and cockle.

VEGETABLE GARDENING. (1) Actual practice in the making of hotbeds and cold frames; (2) preparation of vegetables for market; (3) marketing packages; (4) preparation and use of garden spray materials; (5) making of a home garden plan of one-half acre, in which at least fifteen types of garden crops are to be grown in quantity sufficient to supply the ordinary sized family one year.

POTATO CULTURE. Identification of the eight standard varieties of potatoes for Minnesota; (2) tuber diseases and their treatment; (3) preparation of treating solutions and sprays; (4) storage cellars; (5) seed selection; (6) potato machinery.

FARM FORESTRY. (1) Identification of deciduous and evergreen trees of value for Northwestern Minnesota; (2) rate of growth of the common deciduous and evergreen trees, determined by actual diameter and height growth (each student measures ten trees of each species); (3) fuel- and post-production of the different species (determined from figures gathered in exercise 3); (4) making and planting of forest tree cuttings; (5) gathering and storing of dry and fleshy forest and shade tree seeds; (6) plan of windbreak sufficient for protection and shelter of a ten-acre farmstead.

FRUIT-GROWING. (1) Propagation of fruits, including cuttings, grafts (root and top), and budding and layers; (2) pruning tree and bush fruits; (3) preparation and application of spray mixtures; (4) winter protection of fruits, including all bush, small, and tree fruits; (5) planting of fruits; (6) plan for a one-acre farm fruit garden required of all.

FLORICULTURE. Work in the greenhouse including (1) making of softwood cuttings; (2) potting of rooted cuttings; (3) repotting of rooted plants; (4) separation and division of dahlias, cannas, and crowned plants; (5) plans required for flower beds of bedding plants, annual and perennial plants.

FARM ENGINEERING

FARM MACHINERY. The construction, ease of operation, quality of workmanship, general utility, and manipulation and repairing of farm machinery are studied. The following machines are included: plows, harrows, disks, cultivators, mowing machines, ropes, loading devices, binders, threshing machines, fanning mills, corn machinery, potato machinery, and smut machines.

FARM DRAINAGE. (1) Taking levels and figuring elevation for tile and ditches; (2) practice work in laying tile.

ROPE-SPLICING AND BELT-LACING.

MECHANICAL DRAWING. (1) Use of tools in drawing straight lines; (2) letter plate; (3) problems with compass; (4) mortise and tenon joint; (5) bench hook; (6) planning and drawing of a farm barn, two floor plans, end and side elevation, cross-section.

BLACKSMITHING. Exercises familiarizing the student with operations necessary for blacksmith repair work on the farm, including the making of: square piece of half-inch iron; chain, 10 or 12 links; ring for chain; hook for chain; bolt tongs; blacksmith tongs; clevis; extra piece.

CARPENTRY. Exercises familiarizing the student with care and use of tools in farm repair and building construction, including: mortise and tenon joint, halved splice, bench hook, drawing board, hammer handle, coat hanger, evener, single-tree, extra piece; making of small farm buildings as needed, chicken coops, hog cots.

HOME ECONOMICS

COOKING. Cooking of all the simple dishes for the home, special emphasis on vegetables, bread, meats, substitutes for meat, dressing poultry; buying, cooking, and serving meals to six people at a given cost and given nutritive value, and keeping accurate accounts.

SEWING. Making of undergarments, dresses at a given cost, quilts; hemming of bed and table linen; embroidery and crocheting.

HOME SANITATION. Cleaning rooms, stove, silver, traps, and other plumbing fixtures; dish-washing; washing and ironing clothes; removal of stains.

HOME NURSING. Assisting school nurse in illnesses; bandaging; making beds; preparation of liniments, hand lotions, and healing salves; disinfection of rooms and clothing.

SHORT COURSES

FARMERS' SHORT COURSE

A short course for farmers was organized at this School in 1911 to meet the needs of men and women who wish to study the problems of the farm and home. The exhibit of farm crops in connection with the course of that year was the origin of the Annual Farm Crops Show held at Crookston usually during the second week in February. A six-day meeting at this time with strong programs for both men and women serves the purpose of the original short course.

JUNIOR SHORT COURSES

The sixth annual Junior Short Course will follow the regular school course, April 1 to April 6, 1918. It is open to boys and girls from 12 to 18 years of age. With the exception of $2 for board, there is no expense connected with the course. The course aims to deepen the interest of boys and girls in life on the farm. It aims to interest and instruct them in corn- and potato-growing, pig- and chicken-raising, care of cattle and horses, cooking and sewing, club work, and industrial contests. Illustrated lectures, moving pictures of educational value, social games, singing, and excursions to places of interest in Crookston and vicinity will add interest and pleasure to the course. The students during the week will room in the commodious dormitories on the campus, in charge of the preceptor and preceptress of the regular faculty. A special bulletin on this course will be ready for distribution in January, 1918.

SUMMER TRAINING SCHOOL FOR TEACHERS

A State Teachers' Training School will be held at the Northwest School of Agriculture from June 17 to July 27, 1918.

The School has been organized by the authority of the Department of Education and will be conducted under its supervision. The buildings, apparatus, and library of the School are available for the use of the teachers of northwestern Minnesota.

The general aim of the School is not only to offer a review of the elementary and high-school subjects that are required for the first- and second-grade state teachers' certificates, but to give practical courses in professional training. Particular attention will be paid to the organization and conduct of rural schools. Besides the instructors provided by the state department, the members of the agricultural school faculty conduct some of the classes, affording particular opportunities for the study of industrial work.

A circular describing this course may be obtained by addressing the Superintendent, Northwest School of Agriculture, Crookston, Minnesota.

SPECIAL COURSES

I. DRESSMAKING

Two three-months' courses, beginning in October and January, are offered. Each student drafts, cuts, fits, and finishes dresses and garments of various kinds. Beginning students are taught to make their own garments and those who have had some experience, to become dressmakers.

II. STUDENTS' SHORT COURSE

The Students' Short Courses begin after the holidays to meet the demand for this work by young men who could not take the entire three years' course.

Subjects Offered. Gasoline engine work, including the problems met in operating a tractor, a smaller engine, or an automobile; Agriculture, including farm crops, rotations, soil study, clovers, alfalfa, and other related topics; Study of Farm Animals, including a study of the different breeds, their feeding, care, management, and breeding. Blacksmithing, giving a thoro practice in iron work; Carpentry, including farm buildings; English, including letter-writing; Farm Bookkeeping and accounts. In addition students may take any of the subjects offered in the regular courses.

School and Station Equipment. The School has excellent facilities for thoroly interesting and practical work in all of these lines. There are over two hundred head of horses, cattle, sheep, and hogs there. These animals furnish practical work for all the classes in feeding, care, and management, as well as specimens for judging work. The Station has a gas tractor, several gasoline engines, and modern farm machinery, in addition to several gas tractors loaned by implement manufacturers, all of which give the students practical farm advantages. The blacksmithing and carpentry shops are well equipped.

Credits Offered. Credits will be given to all who do satisfactory work which will be accepted in the regular school course.

Expenses. Total expenses for one term amount to about $60. Board and room in the school dormitories are furnished at an average price of $17 per month. The rooms are steam heated, electric lighted, with modern bath room on each floor. Fees for three months including book rent, entrance fee, etc., total $8.50, plus a $5 deposit which is returned at the close of the term. Bedding is furnished by students themselves.

Special circulars will be sent on application describing such courses as:
Gasoline and Farm Engineering
Potato Growing and Weed Eradication
Opportunities in Music
Farm Husbandry
Practical Cooking and Household Problems
Dressmaking
Livestock

AWARDS OF SCHOLARSHIP

1916-1917

THE SCANDIA-AMERICAN BANK OF CROOKSTON SCHOLARSHIP

General diligence and progress

1. Newell Lee, Junior Class, Halma, $75.
2. Emil Hallgren, Junior Class, Bronson, $50.
3. Fred Rubert, Junior Class, Orleans, Honorable Mention.
4. Cora Lindfors, Freshman Class, Fosston, Honorable Mention.

LIVESTOCK SCHOLARSHIP

Provided by a "Well-Wisher of the School and Students"

1. Peter Ness, Senior Class, Cass Lake, $75.
2. Martin Saugen, Junior Class, Newfolden, $50.
3. Oscar Samuelson, Junior Class, Crookston, Honorable Mention.
4. Stanley Arneson, Junior Class, Shelly, Honorable Mention.

FARM MANAGEMENT SCHOLARSHIP

Provided by S. A. Wallace, Crookston

1. Alfred Wiger, Junior Class, Ulen, $75.
2. Clarence Lee, Junior Class, Pencer, $50.
3. Arthur Skonovd, Junior Class, Viking, Honorable Mention.
4. Marion Johnson, Senior Class, Felton, Honorable Mention.

PUBLIC SPEAKING AND DEBATING SCHOLARSHIP

Provided by Ruettell Clothing Company, Crookston

1. Walter Sheridan, Senior Class, Crookston, $75.
2. Henry Nobben, Freshman Class, Thief River Falls, $50.
3. Walter Peterson, Senior Class, Lancaster, Honorable Mention.
4. Albin Johnson, Freshman Class, Fertile, Honorable Mention.

HOME ECONOMICS SCHOLARSHIP

Provided by W. T. Carlisle, Crookston

1. Olga Tunheim, Junior Class, Newfolden, $75.
2. Leah Stewart, Freshman Class, Hallock, $50.
3. Emma Peterson, Freshman Class, East Grand Forks, Honorable Mention.
4. Gerda Kulle, Junior Class, Alvarado, Honorable Mention.

NORTHWEST EXPERIMENT STATION

Substation, Department of Agriculture, University of Minnesota

STATION CORPS

C. G. SELVIG, M.A., Superintendent
WILLIAM DIETRICH, Animal and Dairy Husbandry
F. L. KENNARD, Agronomy and Farm Management
T. R. SEWALL, Farm Buildings
C. E. BROWN, Poultry
T. M. MCCALL, Horticulture
CORA PAULSBERG, Accountant

The Northwest Experiment Station was established in 1895 to investigate agricultural conditions in northwestern Minnesota and to acquire and diffuse among the people of this section practical results from these investigations. Up to the present time funds have not been provided to enable the Station corps to do a great deal of investigational work. The Station is taking on more and more work each year, and results of great value are being secured.

The Station contains 480 acres and is one mile north of the city. The land is extremely low and presents a drainage problem of more than usual difficulty. With aid from the United States Office of Experiment Stations the Station is taking an active part in testing surface and tile drainage for the Red River Valley region. Much valuable information on the subject of farm drainage is being secured.

The Station has well-equipped barns and yards. From a small beginning it has acquired valuable stock which is distributed to farmers in every section of the state. The dairy stock, hogs, and poultry from the Northwest Experiment Station have started an interest in high-quality stock in many places. Beef cattle, sheep, and horse-breeding work is gradually being brought to the point where the Station can do more along these projects than heretofore. Various feeding experiments are conducted.

With the aid of the Federal Department of Agriculture, the Minnesota Experiment Station, St. Paul, and in coöperation with experiment stations in other states and in Canada, the Northwest Station is actively engaged in the production and distribution of pure seed grain, grasses, corn, and potatoes. This work has already demonstrated its value and will grow to be of the greatest importance to this section of the state. Pure, pedigreed seed will be distributed to farmers who agree to maintain its purity and quality. The entire area of the Station is devoted to this work. This Station has begun work which will make it an important corn- and seed-breeding center.

Experiments with various systems of crop rotations, methods of tillage, alfalfa, disease-resistant plants, methods of growing grasses, the

eradication of weeds, fiber flax (in coöperation with the United States Department of Agriculture), winter wheat, rate of sowing grains, and with various fertilizers have been begun and are yielding valuable results.

Extensive projects embracing horticulture and vegetable gardening have been started. Many varieties of small fruits are being tested as to their adaptability to this climate.

The poultry department has maintained its work of investigating the housing, feeding, and breeding of chickens. Valuable results have been secured and since the publication of the first bulletin other important investigations now under way are showing valuable results.

The Northwest School of Agriculture is maintained in connection with the farm with Station men as instructors.

BULLETINS OF THE NORTHWEST EXPERIMENT STATION

Installation of an Experimental Drainage System at Crookston, by W. Robertson and J. T. Stewart. Minn. Agr. Exp. Sta. Bul. 110, 1908.

Poultry, by C. E. Brown. Minn. Agr. Exp. Sta. Bul. 119, 1910.

Report of Northwest Experiment Station for 1911 and 1912. February, 1913.

Two Types of Silos at Northwest Experiment Station. C. G. Selvig. Minn. Agr. Ext. Div. Bul. 41, 1913.

Crookston Series, vol. 10, No. 1, Report of the Superintendent, 1910-1916, Northwest Experiment Station. January, 1917.

Supplement to No. 1, Fruits, Trees and Shrubs Recommended for Northern Minnesota, T. M. McCall.

Supplement to No. 1, Building a Farm Poultry House in Northwestern Minnesota, C. E. Brown.

No. 3, Sow Thistle, F. L. Kennard. March, 1917.

SUMMARY OF ATTENDANCE

1916-1917

	Men	Women	Total
Regular School Course			
Advanced Course	6	10	16
Seniors	20	7	27
Juniors	20	5	25
Freshmen	107	30	137
Total, Regular School Course	153	52	205
Summer Session, 1916	9	180	189
Junior Short Course, 1917	49	11	60
Farmers' Short Course and Farm Crops Show, 1917	1,345	181	1,526
Total	1,556	424	1,980

STUDENTS

1916-17

ADVANCED CLASS—6

Billings, Robert, Audubon
Erickson, Palmer, Goodhue
Flaat, Ole A., Fisher
Garceau, Lester R., Red Lake Falls
Hammer, Edwin, Heiberg
Tunheim, Thorval, Newfolden

TEACHERS' TRAINING—8

Bagaas, Gertrude, Stephen
Eklund, Amanda, Hallock
Huot, Helen, Wylie
Imsdahl, Hannah, Oslo
Newman, Pearle, Halma
Pearson, Esther, Argyle
Torgerson, Almira, Fosston
Torgerson, Josephine, Fosston

SENIORS—27

Anderson, Herbert, Clearbrook
Anderson, Nellies, Ortonville
Anderson, Raymond, Hiiterdal
Anderson, Sam, Alvarado
Auburg, Charles, Bagley
Bjorsness, Albert, Newfolden
Davids, George, Bagley
Gigstad, Oscar, St. Hilaire
Hagglund, Birger, Alvarado
Haenke, Florence, Eveleth
Heiberg, Rasmus, Heiberg
Imsdahl, Josie, Oslo
Johnson, Fred, Argyle
Johnson, Marion, Felton
Monson, Johanna, Drayton, N. D.
Ness, Peter, Cass Lake
Ovnan, Carrie, East Grand Forks
Petersen, Maja, Mentor
Peterson, Walter, Lancaster
Porten, James, Alvarado
Sather, Julius, Halstad
Scherfenberg, King, St. Cloud
Soberg, Martin, Fertile
Spjut, Magnus, Karlstad
Sheridan, Walter, Minneapolis
Tunheim, Oscar, Newfolden
Westberg, Ethel, Cottonwood Lake, N. D.

JUNIORS—26

Abbott, Thomas, Mentor
Arneson, Stanley, Shelly
Boness, Olaf, Saum
Cawelti, Arthur, Crookston
Christianson, Arthur, Crookston
Hallgren, Emil, Bronson
Isaacson, Carl, Thief River Falls
Johnston, Earl, Fargo, N. D.
Jones, Frank, Clearwater
Kulle, Gerda, Alvarado
Lee, Clarence, Pencer
Lee, Newell, Halma
Lofgren, Inga, Warroad
Morris, Harold, Middle River
Moses, Bernard, Pelican Rapids
Nyquist, Hilda, Fertile
Osgaard, Henry, Crookston
Rubert, Fred, Orleans
Sknooovd, Arthur, Viking
Spokely, Guy, Nielsville
Sathre, Helen, Crookston
Saugen, Martin, Newfolden
Samuelson, Oscar, Crookston
Tunheim, Olga, Newfolden
Westphalen, Adelia, Crookston
Wieger, Alfred, Ulen

FRESHMEN—138

Aasland, Russell, Winner
Abbott, Daisy, Mentor
Amundson, Olaf, Bemidji
Anderson, Andrew, St. Vincent
Anderson, Arthur, Greenbush
Anderson, Edna, Greenbush
Aure, Elvin, Audubon
Austad, Ella, Fosston
Austin, William, Malung
Bakke, Adolph, Newfolden
Bertrand, Wilfred, Stephen
Bjelland, Nels, Erskine
Bjorge, Arthur, Crookston
Boe, Gunnar, Neilsville
Bollie, George, Gatzke
Borg, Oscar, Hampden, N. D.
Bradley, Joseph, Erskine
Brokke, Carl, Buxton, N. D.
Brunnell, Joseph, Crookston
Burnquist, Gustave, Crookston
Cawelti, Ruth, Crookston
Dahle, Otto, Fertile

Davids, Thomas, Bagley
Eggen, Herman, Oxville, Alberta
Ellingboe, Helge, Roseau
Ellingson, Eigurd, Nielsville
Engelstad, Mabel, Nielsville
Enger, Tenny, Halstad
Erickson, Carrie, Argyle
Erickson, Emil, Fertile
Erickson, Olaus, Gatzke
Evernham, Fern, Rollis
Folland, Torger, Halma
Gibson, Henry, Ulen
Gilbertson, Orvan, Fertile
Gordon, Lloyd H., Cummings, N. D.
Goodwin, Oliver, Angus
Grothe, Clarence, Halstad
Grady, Willard, Crookston
Gustafson, Alvin, Beltrami
Hagelie, Otto, Beltrami
Hallstrom, Martin, Wylie
Hanson, Alice, Newfolden
Hanson, Bernt, Holt
Hedin, Andrew, Twin Valley
Hedlund, Albin, Malung
Hegland, Thorval, White Earth, N. D.
Hillmer, Ruth, Crookston
Hjelle, Hjalmar, Newfolden
Hoiland, Johnnie, Halstad
Hoiland, Ole, Shelly
Holland, Elmer, Shelly
Hutchinson, Harry, Euclid
Imsdal, Verna, Oslo
Jacobson, Peder, Neilsville
Johnson, Anna, Fisher
Johnson, Anna E., Warren
Johnson, Albin, Fertile
Johnson, Axel, Stephen
Johnson, Calmer, Argyle
Jorgenson, Carl A., Twin Valley
Kelly, Alex, Crookston
Knox, William, Fisher
Krbechek, Sophia, Erie
Kvamme, Bennie, Ada
Laroche, Arnold, Euclid
Layton, Arthur, Crookston
Layson, Louis, Crookston
Landin, Caroline, Swift
Lanager, Ida, Plummer
Laliberte, Leander, Gentilly
LeBlanc, Ovid, Crookston
Lien, Albert, Audubon
Lindfors, Cora, Fosston
Lindfors, Florence, Fosston
Lindberg, Hannah, Roland
Lillo, Walter, Lengby
Lundin, Oscar, Stephen
Malme, Arthur, Halstad
Malme, Ole, Neilsville
McCrae, Clarence, Beltrami
McGrath, Clement, Greenbush
McMillan, Harold, Crookston
Mellen, Clayton, Ulen
Miller, Fred, Drayton, N. D.
Morberg, Hjalmar, Alvarado
Nelson, Albie, Donaldson
Nobben, Henry, Thief River Falls
Olson, Henry, Erskine
Olson, Nobel, Middle River
Omdahl, Peter, Halstad
Paulson, Alvilde, Neilsville
Paulson, Christian, Stephen
Paulsrud, Gunnar, Neilsville
Paulsrud, John, Neilsville
Pederson, Clarence, Halstad
Pelowski, Dominic, Greenbush
Pederson, Emma, East Grand Forks
Pearson, Swan, Argyle
Peterson, John, Fisher
Peterson, Theodore, Fisher
Quam, Edwin, Erskine
Rodseth, Andrew, Neilsville
Roed, Claudius, Fertile
Roed, Luther, Fertile
Rud, Martin, Viking
Rubert, Lettie, Orleans
Rutherford, Raymond, Euclid
Salverson, Anna, Fisher
Sanbeck, Martin, Charwin, Alberta
Sandbeck, Oscar, Mossbank, Alberta
Sandeen, Willie, Clearbrook
Simon, Thomas, Neilsville
Sirjord, Harold, Flaming
Schaper, Emma, Red Lake Falls
Shefveland, Richard, Audubon
Soltvet, Eric, Newfolden
Spokely, Earl, Neilsville
Stalemo, Anna, Fisher
Steenerson, Tarjie, Climax
Sundem, Elsie, Lancaster
Stewart, Leah, Hallock
Strand, Olaf, Roseau
Swanson, Tina, Wylie
Swenson, Milo, Gary
Tangjerd, Harold, Bagley
Tendeland, Clara, Neilsville
Thompson, Dora, Twin Valley
Thompson, Carl, Shellbrook, Saskatchewan
Thompson, David, Orleans
Thompson, Gilford, Ada
Thompson, Gunder J., Shellbrook, Saskatch.
Thorson, Knute, Ulen
Tollefson, George, Hatton, N. D.
Tronnes, Edwin, Shelly
Valley, Alpha, Crookston
Villand, Clara, Nielsville
Westlin, Julia, Newfolden

The Bulletin of the University of Minnesota

West Central School and Station
Morris, Minnesota
Announcement for the Year
1917-1918

Catalog Series No. 18

Vol. XX No. 21 June 9 1917

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

SCHOOL CALENDAR

1917-1918

1917			
October	1	Monday	First term opens: Registration
October	2	Tuesday	Organization of classes
October	27	Saturday	Field Day
November	29	Thursday	Thanksgiving Day; a holiday
December	8	Saturday	Inter-society Debate
December	21	Friday	First term closes; Christmas vacation begins
1918			
January	7	Monday	Christmas vacation ends; Second term opens: Registration
January	8	Tuesday	Organization of classes
February	12	Saturday	Lincoln's Birthday
February	18	Monday	Farmers' Short Course opens
February	22	Friday	Washington's Birthday
February	23	Saturday	Farmers' Short Course closes
March	20	Wednesday	Morris-Crookston Debate
March	28	Thursday	Junior-Senior-Alumni Banquet
March	29	Friday	Commencement Day
April	2-6	Week	Junior Short Course

WEST CENTRAL SCHOOL AND STATION

FACULTY

*George Edgar Vincent, Ph.D., LL.D., President
†Marion LeRoy Burton, D.D., Ph.D., LL.D., President
Cyrus Northrop, LL.D., President Emeritus
Albert F. Woods, M.A., D.Agr., Dean
Edward M. Freeman, Ph.D., Assistant Dean
Paul E. Miller, B.S.A., Acting Superintendent

John A. Anderson, B.S., Horticulture, Music
Ole O. Bye, Carpentry, Farm Structures, and Superintendent of Buildings
Joyce E. Fiero, B.A., English
Louise Fitzgerald, B.S., Home Economics
Irma Hathorn, B.A., Preceptress
Florence Hulett, R.N., Home Nursing and Resident Nurse
Mae Middleton, Piano and Gymnasium
Philip Jordan, B.S., Animal and Dairy Husbandry
Mary E. King, B.A., Librarian and English
Theodore Odlund, B.S., Agronomy and Farm Management
Philip Schweickhard, Preceptor and Social Science
Susan Wilder, B.A., B.S., Home Economics
Arthur Woodman, B.S., Agricultural Engineering

---

* Term of office ends June 30, 1917.
† Term of office begins July 1, 1917.

GENERAL INFORMATION

PURPOSE

The West Central School of Agriculture is an institution established primarily for the training of young men for the profession of farming, and young women for the profession of home making. The courses are planned and the subjects are taught with the purpose of making the students masters of this work. The courses are sufficiently extended to give, not only a fairly complete technical knowledge of the business of production, but a working basis for the economic and sociological aspects of farm life. The farmer must have a broad grasp of his profession in its relationships with other callings, as well as a realization of the possibilities of its social development.

LOCATION

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

ADMISSION

The School will admit any mature young man or woman. Applicants above sixteen years of age will be welcomed even tho they have not graduated from the eighth grade. Whenever possible, prospective students should present county or High School Board certificates in the common branches. These will admit to the regular work without conditions. In certain lines of work high-school subjects will be accepted for advanced credit.

TIME OF OPENING

The School of Agriculture will open Monday, October 1 and the fall term will close Friday, December 21. The winter term will open Monday, January 7 and close Friday, March 29. The School work covers a period of six months at a time when the students can best be spared from home.

SPECIAL INFORMATION

Old or new students planning to attend the School of Agriculture should write early to the Registrar asking him to reserve a room. Students may reserve rooms in advance by paying a deposit fee of two dollars, which will be refunded upon entering school. If the student is unable to enter school the deposit may be reclaimed before September 15. Each dormitory room is furnished with two single beds, dresser, table, chairs, curtains, sheets, bed spreads, pillows, and pillow cases. Each student should bring with him quilts or blankets for one single bed, towels, comb, brushes, and other toilet articles.

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

Students more than two weeks late in entering may not be able to complete all of the term's work without conditions. If a student can not enter before the middle of November, he should wait until January 7 for the new term and new classes to start.

All trains will be met by special committees Monday, October 1. If possible, be on hand the first day.

EXPENSES

The expenses at the institution are as low as it is possible to make them. During 1916-17 they were as follows:

Incidental fee (per year)	$5.00
Board (per week)	3.00
Room, light, heat, and flat laundry (per week)	1.25
Deposit (per year)	5.00
Hospital fee (per term)	1.00

No increases will be made unless living costs necessitate an increase in the cost of board. Board and room are payable one month in advance. Small fees, to cover the cost of material used, are charged for certain of the laboratory courses. The amount of the fee in each case will be found in the description of the course. When a student drops such a course within two weeks after registration the laboratory fee will be refunded. The five dollar deposit, less deductions for breakage and other damage to school property, will be returned in full at the end of the year.

The buildings are lighted by electricity and heated by steam. The charge for room ($1.25 per week) covers the entire period during which the room is occupied. No deductions for board will be made unless arrangements are made at the beginning of the semester with the matron. Any student who makes arrangements in advance to be gone regularly Sunday and Monday will receive a pro rata reduction in board. A charge of twenty-five cents per meal will be made for guests. Guests' meal tickets should be purchased in advance. A penalty of 10 per cent on board bills and 25 per cent on fees will be exacted where payment is delayed two weeks or more after registration.

REQUIREMENTS FOR GRADUATION

For graduation it is required that a student complete the prescribed three-year course of study with an honorable standing in deportment. When a student receives a condition in any subject, it must be removed in one month's time otherwise it will become a failure. Students failed in any subject will be required to take the subject a second time. It is essential that the student should do some work of a practical nature during the vacation following the first and second school years respectively. If a student has had no farm experience, it is required that he

spend these two seasons upon a farm, and that special reports from both himself and his employer be given regarding his work.

DORMITORIES

Two new dormitories, one for young men and one for young women, are now in use. Each is in charge of one of the members of the faculty. These buildings are modern, three-story structures, splendidly equipped, and heated by a central heating plant. They will accommodate about one hundred and fifty students.

HOME LIFE ON THE CAMPUS

The dormitory life of the students while attending the School of Agriculture is subject to supervision. Everything possible is done to promote a healthful, moral atmosphere. The use of tobacco and spirituous liquors of all kinds is strictly forbidden. Anyone not in accord with these restrictions and not willing to lend a hand toward strong, moral growth should not come to the School of Agriculture.

HOLIDAYS

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

STUDENT ORGANIZATIONS

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

The following societies hold regularly weekly meetings during the school year: The Vincent Literary Society, the Agricolae Literary Society, the Ceres Club.

An intersociety debate cup for the promotion of interest in civic and political questions has been offered by the Superintendent.

Both the Young Men's and Young Women's Christian Associations have local organizations. Sunday mornings and evenings services are conducted under the direction of these associations.

Boys' and Girls' Glee Clubs are organized and trained throughout the school year. These clubs appear at various school functions.

Band and orchestra organizations have been perfected during the past year. Credit will be given for membership and regular attendance at practices and entertainments.

INTERSCHOLASTIC ACTIVITIES

Each year the School is represented by two debating teams which debate the Northwest School at Crookston.

In athletics the school is represented by both football and basketball teams. These teams schedule games with the high schools of this section.

LECTURE COURSE

During the school year a lecture and entertainment course, consisting of four or five numbers, is given at a cost of one dollar for the series. These entertainments are strictly high grade and furnish a pleasant relaxation from regular school work.

LIBRARY

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

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

EXPERIMENT STATION

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

SCHOOL FARM

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

STATION FLOCKS AND HERDS

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

TYPES OF COURSES

LONG COURSES

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

ADVANCED COURSES

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

COLLEGE PREPARATORY

Graduates of the West Central School of Agriculture who have completed two summers of supervised work on their own farms, one additional school year of six months and one additional summer's work or the equivalent thereof, will be admitted to the Colleges of Agriculture and Forestry of the University of Minnesota.

DEPARTMENT OF MUSIC

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

SHORT COURSES

The short courses include the six weeks' terms and the one week sessions. The first are given during the six weeks following June 12 and include instruction in teacher training, dressmaking, homemaking, music, and academic subjects. The one week sessions are three in number as follows: The Farmers' Short Course, regularly held the third week in February; the Junior Short Course given immediately after the close of the long courses in March; and the Short Vacation for Farm Women, which is planned for Chautauqua week in June.

TEACHERS' TRAINING SCHOOL

The fourth annual session for rural school teachers will open June 12 and continue six weeks. The technical work will be offered by members of the regular faculty and the usual summer school courses will be in charge of a corps of ten instructors furnished by the State Department of Education. The proper completion of any course will command certificate credit without the usual examination.

SUMMER DRESSMAKERS' COURSE

A course in commercial dressmaking is offered in the summer session. Instruction is given in plain sewing, dress trimming, tailoring, and the study of standard dress materials and their manufacture. The aim of the course is to teach dressmaking as a trade.

SUMMER HOME MAKERS' COURSE

The purpose of the Home Makers' Course is to afford an opportunity to those who desire to obtain training in the administration of the home. The work is organized with the purpose of developing efficient home makers. This course is given during the summer session.

A SHORT VACATION FOR FARM WOMEN

The fourth annual short vacation for farm women will be held during the Chautauqua week. This affords to those enrolled the opportunity of attending the splendid lectures and entertainments offered during the Chautauqua season. In addition, there will be the usual talks and periods of visiting. The training school will be in session and faculty members will help make the time pleasant and profitable. The fee for the course will be $4.00. This will pay for the board and all other expenses, including the Chautauqua tickets. This course is offered June 25 to 29, 1917.

COURSES OF STUDY REQUIRED FOR GRADUATION

Three Year Course

BOYS

FIRST YEAR

First Term

Credit Hours	
5	English A
5	Corn
5	Farm Accounts
5	Types and Breeds
2	Carpentry
2	Blacksmithing
1	Milk Testing
1	Spelling
1	Gymnasium

Second Term

Credit Hours	
5	English B
5	Grain
5	Anatomy-Hygiene
5	Industrial Geography or 3 Gas Engines
2	Carpentry
2	Blacksmithing
1	Stock Judging
1	Penmanship
1	Gymnasium

SECOND YEAR

Fall Term

REQUIRED SUBJECTS

5 English C
5 Chemistry
1 Gymnasium

	Agronomy	or	Animal Husbandry	or	Agrl. Engineering
2	Grain Judging	1	Stock Judging	5	Drainage
3	Garden and Orchard	2	Grain Judging	3	Mechanical Drawing
9	Elective	11	Elective	6	Elective

Winter Term

REQUIRED SUBJECTS

5 Government and Law
5 Agricultural Physics
1 Gymnasium

	Agronomy	or	Animal Husbandry	or	Agrl. Engineering
4	Forage Crops	5	Feeds and Feeding	3	Farm Structures A
5	Feeds and Feeding	4	Forage Crops	3	Rural Sanitation
5	Elective	1	Stock Judging	8	Elective
		4	Elective		

THIRD YEAR

Fall Term

REQUIRED SUBJECTS

5 English D
1 Gymnasium

	Agronomy	or	Animal Husbandry	or	Agrl. Engineering
5	Farm Management A	3	Animal Breeding	3	Gas Engines B
14	Elective	1	Stock Judging	3	Farm Structures B
		15	Elective	13	Elective

REQUIRED SUBJECTS

Winter Term

5 English E
1 Gymnasium

	AGRONOMY	or	ANIMAL HUSBANDRY	or	AGRL. ENGINEERING
2	Farm Management B	3	Animal Diseases	5	Farm Mechanics
5	Soils	16	Elective	14	Elective
12	Elective				

NOTE: In the second and third years, students choosing one group may elect from either of the other two groups, or from the following general list until a total of 25 hours is filled.

ELECTIVE LIST

The following list of electives is open to juniors and seniors, from which they may complete their classification:

3 Beef Production, first term
3 Dairy Production, second term
3 Poultry, second term
2 Commercial Seed Production, first term
5 Advanced Farm Management
3 Garden and Orchard, first term
3 Botany, second term
5 Advanced Carpentry, first and second terms
1 Cement Construction, first and second terms
2 Traction Engineering, first term
3 Mechanical Drawing, first and second terms
5 Algebra, first and second terms
5 Geometry, first and second terms
2 Business Accounting, second term
2 Public Speaking, second term
2 Debate, second term
3 Government and Law, first term
5 United States History, second term
5 Modern History, first term
5 Home Literature, first term
3 Music, first and second terms

GIRLS

FIRST YEAR

First Term		*Second Term*	
Credit Hours		Credit Hours	
5	English A	5	English B
2	Garment Making A	2	Garment Making B
3	Foods and Cookery A	3	Foods and Cookery B
5	Home Nursing A	5	Home Nursing B
1	Gymnasium	1	Gymnasium A
1	Spelling	1	Penmanship
8	Electives	8	Elective

ELECTIVES

5 Commercial Geography
5 Home Accounts

SECOND YEAR

5	English C	5	English D
3	Food Preservation	3	Dietetics
2	Dressmaking A	2	Dressmaking B
1	Gymnasium B	1	Gymnasium B
5	Industrial History A	5	Industrial History B
9	Elective	9	Elective

ELECTIVES

5	Algebra	3	Home Decoration
5	Food and Household Chemistry	5	Home Nursing C
5	Piano	2	Textiles

THIRD YEAR

5	English E	5	English F
3	Home Management A	3	Home Management B
2	Dressmaking C	3	Dressmaking D
1	Gymnasium C	1	Gymnasium C
14	Elective	14	Elective

ELECTIVES

5	Geometry	5	Home Nursing D
5	Household Physics	5	Music
2	Textiles	5	Government

GENERAL ELECTIVE LIST

2	Piano	2	Public Speaking
1	History of Music	½	Glee Club
1	Theory of Music	2	Dressmaking E
2	Art Needlework		

NOTE: The electives are to be chosen from the special electives for each year or from the general elective list.

DESCRIPTION OF COURSES

AGRONOMY AND FARM MANAGEMENT

CORN GROWING. A study of the corn plant; its botanical structure; relation to soil and climate; selection and testing; soil preparation; harvesting; diseases; silage; varieties and corn judging, supplemented with laboratory practice. Rec. 3 hrs.; Lab. 2, 2 hrs.; 5 credits; fee 50 cents.

GRAIN GROWING. A study of the principal cereal crops. Seed selection; soil and cultural requirements; harvesting. Class room work supplemented with laboratory practice. Rec. 3 hrs.; Lab. 2, 2 hrs.; fee, 50 cents.

CORN AND GRAIN JUDGING. Score card practice, commercial grading and judging work with the object in view of making the student proficient in the judging and growing of pure-bred seed. Lab. 2, 2 hrs.; 2 credits; fee, $1.00.

FORAGE CROPS. A study of the leguminous crops, clover, alfalfa, etc., pastures and meadows, and the annual forage crops. Cultural requirements of forage crops and their importance on the farm. Rec. 2 hrs.; Lab. 2, 2 hrs.; 4 credits; fee, $1.75.

COMMERCIAL SEED PRODUCTION. The breeding and growing of pure-bred seed corn and grain upon the farm, and the best methods of marketing these products. Lab. 2, 2 hrs.; 2 credits.

SOILS. This course is applied to the needs of western Minnesota. Soil formation, soil types, soil physics, soil chemistry, soil tillage, and the use of fertilizers are given chief attention. Rec. 3 hrs.; Lab. 2, 2 hrs.; 5 credits.

FARM MANAGEMENT I. The management of the land, labor, and capital in their relation to the farm business. Rec. 3 hrs.; Lab. 2, 2 hrs.; 5 credits.

FARM MANAGEMENT II. A study of farm accounts. The student keeps a practical set of books on the year's work, from the taking of the inventory to closing the accounts at the end of the year. Lab. 2, 2 hrs.; 2 credits.

ADVANCED STUDIES IN FARM MANAGEMENT. Advanced work in some of the more important problems of farm management, including farm labor, cost of production, marketing, and similar subjects. Rec. 1 hr.; Lab. 4, 2 hrs.; 5 credits.

GARDEN AND ORCHARD. The planning, planting, culture, value, and management of the orchard and garden upon the general farm. Rec. 2 hrs.; Lab. 1, 2 hrs.; 3 credits.

BOTANY. The principles of elementary Botany. Intended for students who may wish to use the credit for college entrance. Rec. 2 hrs.; Lab. 2, 2 hrs.; 4 credits.

ANIMAL AND DAIRY HUSBANDRY

TYPES AND BREEDS. The study of the history, development, characteristics, and adaptability of the various breeds of horses, cattle, sheep, and swine. Rec. 5 hrs.; 5 credits.

MILK TESTING. Principles of milk testing. The students are given a practical working knowledge of herd testing and record work. Lab. 1, 2 hrs.; 1 credit; fee, 50 cents.

STOCK JUDGING A. The study and practice in the use of the score card, showing the relation of body structure to economical production. Lab. 1, 2 hrs.; 1 credit.

STOCK JUDGING B. Competitive and comparative judging of all classes of livestock. Lab. 1, 2 hrs.; 1 credit.

STOCK JUDGING C. A continuation of Stock Judging B. Lab. 1, 2 hrs.; 1 credit.

STOCK JUDGING D. A continuation of Stock Judging C. Lab. 1, 2 hrs.; 1 credit.

FEEDS AND FEEDING. The general composition of the animal body; the composition and digestibility of foods; feeding standards; methods of feeding. Rec. 5 hrs.; 5 credits.

ANIMAL BREEDING. The theory and practice of animal breeding, including variation, heredity, selection, effect of pure-bred animals in improving types of stock, and pedigrees. Rec. 3 hrs.; 3 credits.

ANIMAL DISEASES. The causes, prevention and cure of animal diseases, including emergency treatment. Rec. 3 hrs.; 3 credits.

BEEF PRODUCTION. The production of beef cattle, both pure-bred and market stock, including from a practical standpoint, feeding and management of the herd, the selection of breeding stock, and the arrangement of buildings and yards. Rec. 2 hrs.; Lab. 1, 2 hrs.; 3 credits.

POULTRY. Practical instruction in the breeding and care of poultry for general farm use. Rec. 2 hrs.; 2 credits.

DAIRY PRODUCTION. An advanced course designed to fit a student for the successful management of a dairy herd. Rec. 2 hrs.; Lab. 1, 2 hrs.; 3 credits.

AGRICULTURAL ENGINEERING

WOODWORK A. Carpentry: care, use, and sharpening tools; laying off work; making of joints and framing. Work designed to be especially helpful in planning, framing, and construction of farm buildings. Lab. 2, 3 hrs.; 2 credits; fee, $1.25.

WOODWORK B. Continuation of Course A. Lab. 2, 3 hrs.; 2 credits; fee, $1.25.

FORGE WORK A. Blacksmithing: forging, and welding of iron and steel, making and tempering hand tools. Work designed to be especially helpful in the repair and operation of machinery. Lab. 2, 3 hrs.; 2 credits; fee, $1.50.

FORGE WORK B. Continuation of Forge Work A. Lab. 2, 3 hrs.; 2 credits; fee, $1.50.

MECHANICAL DRAWING A. The use of drawing instruments, lettering, and the making of working drawings. Lab. 3, 2 hrs.; 3 credits.

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

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

FARM STRUCTURES A. The design, location, and erection of farm buildings; study of proper pitches; roof trusses; barn frames; estimates of costs. Working models are made in the shop from these plans. Lab. 3, 2 hrs.; 3 credits.

FARM STRUCTURES B. A continuation of Farm Structures A. Designing of buildings needed on the home farm, and the working out of a general plan that will meet the builder's requirements. Lab. 3, 2 hrs.; 3 credits.

RURAL SANITATION. The lighting, heating, and ventilation of farm buildings; a study of lighting systems; plumbing; systems of water supply and sewage disposal. Rec. 3 hrs.; 3 credits.

MECHANICAL DRAWING B. A continuation of Mechanical Drawing A. Practice in designing, in isometric drawing, and projection. Drawings are made from parts of such machines as gas engines and cream separators. Lab. 3, 2 hrs.; 3 credits.

CEMENT CONSTRUCTION. Properties of sand, gravel, cement, and concrete. Practice in proportioning and mixing concrete; in making concrete

blocks and fence posts, and in designing foundations. Lab. 1, 2 hrs.; 1 credit; fee, $1.00.

GAS ENGINES A. Development, existing types, theory and practice of operation, adjustment, repair, and utility of the internal combustion engine. Practice in valve and ignition timing, in valve grinding, and the adjustment of bearings. Rec. 1 hr.; Lab. 2, 2 hrs.; 3 credits; fee, $1.50.

TRACTION ENGINES. Instruction in stopping and starting the motor, in handling the engine on the practice field, in lining up, backing into the belt, plowing, etc. Lab. 1, 2 hrs.; 1 credit; fee, $1.50.

FARM MECHANICS. Farm machinery and farm motors. Selection, use, and care of tilling, seeding, harvesting, threshing and fertilizing machinery. Work is given with pumping and grinding machinery; transmission of power, grading machinery, etc. Rec. 3 hrs.; Lab. 2, 2 hours; 5 credits; fee, $1.25.

ADVANCED CARPENTRY. Designed for special carpentry preparation aiming to bring together in an applied way earlier elements of the course, together with such practical topics as designing and estimating. Final credit will be dependent upon eight months of actual work under an approved carpenter. Lab. as arranged.

ENGLISH

ENGLISH A. Reading, spelling, and a brief review of the principles of grammar. Considerable time is devoted to oral reports. Short written themes required. Rec. 5 hrs.; 5 credits.

ENGLISH B. Continuation of English A. Letter writing in connection with simple sentence and paragraph structure. Several selections are memorized. Rec. 5 hrs.; 5 credits.

ENGLISH C. Letter writing and spelling continued. Standard books and selections of interest are read. The outline is used extensively in oral and written work. Rec. 5 hrs.; 5 credits.

ENGLISH D. A continuation of English C. Rec. 5 hrs.; 5 credits.

ENGLISH E. Advanced work in written composition of a narrative type. An appreciation of good literature is cultivated by extensive reading. Rec. 5 hrs.; 5 credits.

ENGLISH F. Reading and advanced composition of descriptive, expository, and argumentative types continued. The derivation, usage, and meaning of words. Rec. 5 hrs.; 5 credits.

SPELLING. Students are required to secure one credit in spelling. Rec. 1 hr.; 1 credit.

PENMANSHIP. Students are required to secure one credit in penmanship Rec. 1 hr.; 1 credit.

PUBLIC SPEAKING A. Practice in conducting meetings and presenting material before public gatherings. Rec. 2 hrs.; 2 credits.

PUBLIC SPEAKING B. A continuance of Public Speaking A. Rec. 2 hrs.; 2 credits.

PUBLIC SPEAKING C. Students will be trained to present readings before the public. Rec. 2 hrs.; 2 credits.

PUBLIC SPEAKING D. Continuation of Public Speaking C. Rec. 2 hrs.; 2 credits.

PUBLIC SPEAKING E. Designed to give boys training in extemporaneous speaking and debate. Rec. 2 hrs.; 2 credits.

PUBLIC SPEAKING F. A continuation of Public Speaking E. Rec. 2 hrs.; 2 credits.

MATHEMATICS

FARM ACCOUNTS. For boys. Ledger account forms. Drill is given in rapid calculation and accuracy. Application of the keeping of accounts to farm operations.

HOME ACCOUNTS. For girls. Similar to Farm Accounts for boys except that application is made to home instead of farm work. Rec. 5 hrs.; 5 credits.

ALGEBRA A. Designed to cover the usual first year academic credit work in Elementary Algebra. Rec. 5 hrs.; 5 credits.

ALGEBRA B. Continuation of Course A. Rec. 5 hrs.; 5 credits.

PLANE GEOMETRY A. Planned to cover usual academic course in Plane Geometry. Rec. 5 hrs.; 5 credits.

PLANE GEOMETRY B. Completion of Plane Geometry A. Rec. 5 hrs.; 5 credits.

BUSINESS ACCOUNTING. Business mathematics for those specializing in engineering, carpentry, etc. Rec. 2 hrs.; 2 credits.

HOME ECONOMICS

DOMESTIC ART

GARMENT MAKING A. A gymnasium suit, consisting of bloomers and blouse, a cooking outfit, and a kimono are made in the first term. Rec. 1 hr.; Lab. 2, 2 hrs.; 2 credits.

GARMENT MAKING B. The laboratory work consists in the making of a four-piece suit of underwear. The various kinds of material and their wearing qualities; simple decoration and trimmings and the cost of the finished garments are discussed. Rec. 1 hr.; Lab. 2, 2 hrs.; 2 credits.

DRESSMAKING A. Each girl makes herself a snug-fitting waist and skirt which is placed on a dress form and padded out. This form is used throughout the rest of the course. A shirt waist and wool dress are made during the term. Rec. 1 hr.; Lab. 2, 2 hrs.; 2 credits.

DRESSMAKING B. The making of summer dresses. A house dress and a light summer dress are made. The suitability of material and design, color and lines, and cost of the garments are discussed. Rec. 1 hr.; Lab. 2, 2 hrs.; 2 credits.

DRESSMAKING C. A wool suit is made in this term. Special attention is given to standard materials, color, lines, and cost of outside garments. Materials are purchased under direction of the instructor. Rec. 1 hr.; Lab. 2, 2 hrs.; 2 credits.

DRESSMAKING D. Continuation of the work in Dressmaking C, making an inexpensive graduation dress. Rec. 1 hr.; Lab. 2, 2 hrs.; 2 credits.

DRESSMAKING E. This course is open to any one wishing extra work in dressmaking. Lab. 2, 2 hrs.; 2 credits.

TEXTILES. Manufacture of cloth from wool, cotton, silk, and flax fiber; adulterations of cloth and the methods of detecting such adulterations; relation of clothing to health; clothes budgets, etc.

ART NEEDLE WORK. Color combinations, making designs for embroidering, and stenciling. Several pieces of fancy work are completed during the course. Lab. 2, 2 hrs.; 2 credits.

HOME DECORATION. Selection of furnishings, draperies, etc., for the home. Rec. 3 hrs.; 3 credits.

DOMESTIC SCIENCE

FOODS AND COOKERY A. The laboratory work consists in practice in cooking cereals, soups, vegetables, fruits, and some simple desserts. The lecture work deals with the source of food products, the digestibility of foods, and the theory of cooking. Rec. 1 hr.; Lab. 2, 2 hrs.; 3 credits.

FOODS AND COOKERY B. The laboratory work includes the making of pancakes, muffins, biscuit, bread, cakes, cookies, etc., and the cooking of meats and eggs. The lecture work is a continuation of that of the first term. Rec. 1 hr.; Lab. 2, 2 hrs.; 3 credits.

FOOD PRESERVATION. The laboratory work consists largely in canning, pickling, preserving, and jelly making. The lecture work includes the study of cold storage, injurious preservatives, curing of meats, and preserving eggs. Rec. 2 hrs.; Lab. 2, 2 hrs.; 3 credits.

DIETETICS. Invalid cookery, including the preparation of custards, gelatins, ice creams, and beverages. The lecture work is designed to give an understanding of the proper diet for different disease conditions. Rec. 1 hr.; Lab. 2, 2 hrs.; 3 credits.

HOME MANAGEMENT. This is a summary of the previous work offered. Plans and devices for saving of labor, money, and time are discussed. Each girl is offered two weeks' practice in actual preparation and serving of meals. Rec. 1 hr.; Lab. 2, 2 hrs.; 3 credits.

ADVANCED HOME MANAGEMENT. A continuation of the course in Home Management. Rec. 1 hr.; Lab. 2, 2 hrs.; 3 credits.

FOOD AND HOUSEHOLD CHEMISTRY. Continuation of Foods and Cookery B, applying the general principles of chemistry to food in all of its uses. Rec. 3 hrs.; Lab. 2, 2 hrs.; 5 credits.

HOUSEHOLD PHYSICS. The mechanics of solids, liquids, and gases. Application of the principles is made to home problems. One half of the term is devoted to heat in its relation to the household. Rec. 3 hrs.; Lab. 2, 2 hrs.; 5 credits.

HOME NURSING

HOME NURSING A. The structures and functions of the human body. Hygiene and the proper care of the sick. Rec. 5 hrs.; 5 credits.

HOME NURSING B. A continuation of Home Nursing A. Rec. 5 hrs.; 5 credits.

HOME NURSING C. Simple medicines in relation to disease. Rec. 5 hrs.; 5 credits.

HOME NURSING D. Common diseases and methods of prevention; first aid. Rec. 5 hrs.; 5 credits.

MUSIC

PIANO MUSIC

PIANO PLAYING A. Exercises for hand position and rhythm; two, three, and five-finger exercises; major scales. Studies: Gurlitt Technic and Melody; Tapper, First Piano Book, or Graded Studies, Grade 1. Solos: Tapper, Sartorio, etc.

PIANO PLAYING B. Exercises for hand and arm control; thumb exercises, major scales, transposition of five-finger exercises, two and three-finger exercises. Studies: Streabbog's Twelve Very Easy

Studies, Czerny Anthology Vol. I. Solos: Graded Pieces, Grade II.

PIANO PLAYING C. Scales with different rhythms, one and two notes, 80 mm.; broken chords. Studies: Concone Twenty-four Melodious Studies; Tapper's Graded Studies, Grade III; Czerny Anthology, Vol. II. Solos: Beethoven, Heller, etc.

PIANO PLAYING D. Scales with different touches, one, two, three, and four notes, 80 mm.; Herz exercises; simple arpeggios; block chords with pressure and drop arm. Studies: Foote, First Year Bach; Czerny; Wrist and Forearm Studies. Solos: Graded Pieces, Grade III; Mozart; Sonatinas.

PIANO PLAYING E. Studies: Lynnes Key Circle Exercises, Book I; Heller, Opus 47; First Year Bach. Solos: Easy sonatas by Haydn and Mozart. Graded Pieces, Grades III and IV, Tapper, Graded Pieces III. Classes in Musical History and Music Theory.

PIANO PLAYING F. Studies: Schmitt finger exercises; the major and minor scales, hands separate, legato and staccato in varied rhythms; octave studies. Solos: Pieces by Schumann, Mendelssohn, Jensen, etc. Easier Beethoven works. Classes in musical history and music theory.

TEACHERS' COURSE. Studies: Stamaty, Rhythmic Training for the fingers; Heller, Opus 45; Smith, Octave Studies; selected Cramer studies. Solos: Bach, Two Part Inventions; Mendelssohn, Songs Without Words; Schumann, Scenes from Childhood. Chaminade, Godard, Raff, MacDowell, etc.

VIOLIN MUSIC

The violin instruction will comprise the correct principles of violin playing. Solo playing will be encouraged and a class in orchestra playing will be a part of the regular study of violin pupils.

Registration for violin lessons will be regulated by the rules governing all musical instruction given at the school. See page 8.

BAND INSTRUMENTS

Instruction in the various instruments, such as cornet, clarinet, trombone, etc., will be given.

MISCELLANEOUS

ANATOMY–HYGIENE (For boys). Comparative anatomy and human hygiene. An introduction to the later animal husbandry course and a preparation for the care of the health.

AGRICULTURAL CHEMISTRY. A general introductory course preparatory for later work in agronomy, animal husbandry, and home economics.

GOVERNMENT AND LAW. Local, state, and national governmental forms and practices. A brief study of common contracts, deeds, mortgages, line fences, etc.

COMMERCIAL GEOGRAPHY. Designed to give the student a view of the broad relation of Geography to Commerce. Rec. 5 hrs.; 5 credits.

INDUSTRIAL HISTORY. The development of the industries of the country. Special emphasis is laid on the history of agriculture. Rec. 5 hrs.; 5 credits.

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

GYMNASIUM (Boys). Credit will be allowed to boys for membership on school teams, and participation in special lines of gymnasium work which they will be allowed to elect. 1 credit.

STUDENT ROLL

STUDENTS IN ATTENDANCE AT WEST CENTRAL SCHOOL AND STATION

MORRIS, MINNESOTA, 1916-1917

Aanerud, Magna, Elbow Lake
Anderson, Amanda, Wadena
Anderson, Jim, Clarinda, Iowa
Anderson, Nellie, Ortonville
Anderson, Otto, Clara City
Anderson, Stena, Belgrade
Anderson, Walfred, Murdock
Bennett, Robert, Lowry
Benson, Sherman, Kensington
Bjorklund, Reuben, Kensington
Bloomquist, Irene, Starbuck
Bolstad, Clara, Dawson
Brevig, Agnes, Starbuck
Brevig, Caroline, Starbuck
Brisbane, Gladys, Morris
Brisbane, Lowell, Morris
Burros, Irene, Evansville
Christenson, Mabel, Porter
Cook, Aura, Westport
Cook, Perry, Donnelly
Cooper, Donald, Carlos
Cummings, Kenneth, Dawson
Dehne, Henry, Holloway
Diebold, Edwin, Bellingham
Doe, Lyle, Beardsley
Dosen, Clifford, Starbuck
Dosen, Karen, Starbuck
Dripps, Allen, Spencer, Iowa
Dyrstad, Agnes, Glenwood
Erdahl, Manford, St. Cloud
Erickson, Ethel, Nelson
Erickson, George, Westport
Evenson, Harvey, Wolverton
Fauskee, Ella, Brooten
Fauskee, Tina, Brooten
Ferrell, Herbert, Morris
Field, Hoyt, Spicer
Fosberg, John, Winnipeg, Can.
Gorder, Leroy, Starbuck
Hagesteun, Ida, Starbuck
Halvorson, Roy, Kerkhoven
Halvorson, Theodore, Barrett
Hanson, John, Louisburg
Hanson, Silas, Harmony
Hendrickson, Walter, Kensington
Herring, Guy, Renville
Hiebel, Anna, Alexandria
Hilleren, Bertine, Benson
Holtan, Joseph, Dawson
Huizinga, Flora, Ortonville
Huntley, Max, Hancock
James, Harold, Glenwood
Jenson, Chris, Morris
Johnson, Frank, Ortonville
Johnson, Mabel, Ortonville
Keeler, Herbert, Chokio
Kling, Louise, Morris
Knutson, Carl, Tenney
Koehntopp, Herbert, Bellingham
Korn, William, Clara City
Kranker, Svend, Morris
Laird, Muriel, Terrace
Larson, Arnold, Kensington
Larson, Arthur, Rothsay
Larson, Earl, Clinton
Larson, Julia, Lowry
Larson, Mamie, Rothsay
Larson, Phillip, Murdock
Larson, Selma, Cyrus
Larson, William, Wolverton
Lerdahl, Hilma, Cyrus
Lilienthal, Hazel, Glenwood
Lindholm, Gottfred, Ortonville
Maanum, Elmer, Hancock
Madsen, Ole, Herman
Mahoney, Francis, Correll
Mecklenberg, Dora, Nashua
Moen, Edward, Kensington
Monson, Clarence, Doran
Myrum, Agnes, Louisburg
Myrum, Viola, Louisburg
Nelson, Jessie, Dawson
Ness, Ben, Cyrus
Norby, Christine, Morris
Nord, Richard, Wolverton
Odden, Harold, Echo
Olds, Pearl, Morris
Olson, Adolph, Murdock
Olson, Selma, Ortonville
Olmeim, Carl, Starbuck
Pearson, Victor, Grove City
Pehl, Ralph, Campbell
Peterson, Clara, Cyrus
Peterson, Walter, Maynard
Pittier, Emilio, Washington, D. C.
Pushor, Kyle, Donnelly
Quam, Andrew, Glyndon
Quam, Godeo, Glyndon

Quitney, Gerard, Lowry
Reisrud, Clara, Starbuck
Ritzschke, Herman, Herman
Roiland, Tilman, Louisburg
Rolen, Carl, Clinton
Rolen, Harold, Clinton
Rolin, Vear, Breckenridge
Rolighed, Marvin, Appleton
Rosenau, William, Sauk Center
Saterlie, Arthur, Appleton
Sears, Elmer, Motley
Shaw, Curtis, Morris
Simonson, Anna, Terrace
Simonson, Helga, Terrace
Sinclaire, Wayne, La Moille
Snyder, Charles, Cottonwood
Solbrekken, Emma, Sedan
Solvie, Alice, Cyrus
Solvie, Eilert, Cyrus
Solvie, Otto, Hancock
Spalinger, Mary, Clinton
Steinbring, Henry, Morris
Stotesbury, Lydia, Barry
Sugden, Pearl, Herman
Sund, Henry, Wendell
Swenson, Alvin, Clinton
Swenson, Otto, Chicago, Ill.
Thieke, Anna, Beardsley
Thimmesch, Mary, Osakis
Thoen, Elmer, Dawson
Thompson, Magnus, Starbuck
Thompson, Truman, Osakis
Torgerson, Leslie, Motley
Ulvestad, Johanna, Chokio
Ulvestad, Ruth, Chokio
Vaala, Horance, Madison
Warner, Sadie, Hancock
Welfare, Alfred, Morris
Westberg, Ethel, Alamo, N. D.