The Bulletin of the
UNIVERSITY *of* MINNESOTA

Combined Class Schedule for 1940-1941

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CONTENTS

UNIVERSITY CALENDAR

1940-41

Fall Quarter

1940			
September	16	Monday	Extension registration first semester begins
September	19	Thursday	Payment of fees closes, except for new students[1]
September	23	Monday	Entrance tests
September	23-24		Registration for Freshman Week for all new students entering the freshman class
September	23-27		Examinations for removal of conditions Physical examinations Registration period,[2] College of Science, Literature, and the Arts
September	25-28		Freshman Week
September	26-27		Registration days[2] for all colleges not included above. Payment of fees closes for new students
September	30	Monday	Fall quarter classes begin 8:30 a.m.[3] First semester extension classes begin[4]
October	5	Saturday	Last day for extension registration without penalty
October	12	Saturday	Last day for Graduate School registration
October	17	Thursday	Senate meeting, 4:30 p.m.
October	26	Saturday	Homecoming Day
November	5	Tuesday	Election Day; a holiday (except for extension)
November	11	Monday	Armistice Day; a holiday (except for extension)
November	16	Saturday	Dads Day
November	28	Thursday	Thanksgiving Day; a holiday
December	13-14 and 16-19		Final examination period
December	19	Thursday	Commencement Convocation Senate meeting, 4:30 p.m. Fall quarter ends 6:00 p.m.[5]

[1] New students must pay fees on dates announced for registration in the registration instructions. Fees of graduate students are due one week after their registration is approved by the dean of the Graduate School.

[2] Registration subsequent to the date specified will necessitate the approval of the college concerned. See also privilege fees for late registration, page 60, Bulletin of General Information. No student will be allowed to register in the University after one week from the beginning of the quarter excepting in unusual cases wherein special circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

[3] First hour classes begin at 8:15 a.m. at University Farm.

[4] This date does not refer to correspondence study courses, which may be started at any time during the year.

[5] Extension classes continue to Saturday, December 21, and will resume Monday, January 6, 1941.

Winter Quarter

December	26	Thursday	Payment of fees closes for all students in residence fall quarter[1]
1941			
January	3	Friday	Entrance tests
January	3-4		Registration[2] for new students in all colleges except the Institute of Technology. Payment of fees closes for new students at 12:00 noon, January 4
January	4	Saturday	Registration day for all students in the Institute of Technology
January	6	Monday	Winter quarter classes begin 8:30 a.m.[3]
January	18	Saturday	Last day for Graduate School registration
January	27	Monday	Extension registration second semester begins
February	8	Saturday	First semester extension classes close
February	10	Monday	Second semester extension classes begin[4]
February	12	Wednesday	Lincoln's Birthday; a holiday (except for extension)
February	15	Saturday	Last day for extension registration without penalty
February	20	Thursday	Charter Day Convocation Senate meeting, 4:30 p.m.
February	22	Saturday	Washington's Birthday; a holiday
March 14-15 and 17-20			Final examination period
March	20	Thursday	Commencement Convocation Payment of fees closes for all students in residence winter quarter[1] Winter quarter ends 6:00 p.m.

Spring Quarter

March	28	Friday	Entrance tests
March	28-29		Registration[2] for new students in all colleges except the Institute of Technology. Payment of fees closes for new students at 12:00 noon, March 29
March	29	Saturday	Registration day for all students in the Institute of Technology
March	31	Monday	Spring quarter classes begin 8:30 a.m.[3]

[1] New students must pay fees on dates announced for registration in the registration instructions. Fees of graduate students are due one week after their registration is approved by the dean of the Graduate School.

[2] Registration subsequent to the date specified will necessitate the approval of the college concerned. See also privilege fees for late registration, page 60, Bulletin of General Information. No student will be allowed to register in the University after one week from the beginning of the quarter excepting in unusual cases wherein special circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

[3] First hour classes begin at 8:15 a.m. at University Farm.

[4] This date does not refer to correspondence study courses, which may be started at any time during the year.

April	11	Friday	Good Friday; a holiday (except for extension)
April	12	Saturday	Last day for Graduate School registration
May	10	Saturday	Mothers Day
May	15	Thursday	Cap and Gown Day Convocation
			Senate meeting, 4:30 p.m.
May	30	Friday	Memorial Day; a holiday (except for extension)
June	6	Friday	Second semester extension classes close
June 6-7 and 9-13			Final examination period
June	8	Sunday	Baccalaureate service
June	13	Friday	Spring quarter ends 6:00 p.m.
June	14	Saturday	Sixty-ninth annual commencement

Summer Session

June	16-17		Registration, first term
June	18	Wednesday	First term Summer Session classes begin 8:00 a.m.
July	4	Friday	Independence Day; a holiday
July	24	Thursday	Commencement Convocation
July	25	Friday	First term closes
July	28	Monday	Registration and payment of fees for second term close
			Second term classes begin 8:00 a.m.
August	29	Friday	Second term closes

DIRECTORY OF ADMINISTRATIVE OFFICES

ADMINISTRATION

Guy Stanton Ford, Ph.D., Litt.D., LL.D., L.H.D., President	Adm202
Malcolm M. Willey, Ph.D., University Dean and Assistant to the President	Adm202
Anne Dudley Blitz, M.A., LL.D., Dean of Women	ShH
Edward E. Nicholson, M.A., Dean of Student Affairs	Adm213
Rodney M. West, B.A., Registrar	Adm105

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

John T. Tate, Ph.D., D.Sc., Dean and Professor of Physics	Adm219
Joseph M. Thomas, Ph.D., Assistant Dean for the Senior College and Professor of English	F217
William H. Bussey, Ph.D., Assistant Dean for the Junior College and Professor of Mathematics	F106
Royal R. Shumway, B.A., Assistant Dean for Students' Work and Associate Professor of Mathematics	Adm219

COLLEGE OF EDUCATION

Wesley E. Peik, Ph.D., Dean and Professor of Education	Bu204
William S. Carlson, Ph.D., Principal of the High School, Associate Professor of Education, and Director of Student Teaching	UHS105
Jean H. Alexander, M.A., Chairman of Students' Work Committee and Instructor in Education	Bu206
Clifford P. Archer, Ph.D., Director of the Bureau of Recommendations and Assistant Professor of Education	Bu208

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

Walter C. Coffey, M.S., LL.D., Dean and Director of the Department of Agriculture	Ad(UF)201
Edward M. Freeman, Ph.D., Dean of the College of Agriculture, Forestry, and Home Economics	PP(UF)200

SCHOOL OF BUSINESS ADMINISTRATION

Russell A. Stevenson, Ph.D., Dean	VH127
John J. Reighard, M.A., C.P.A., Assistant Dean and Professor of Accounting	VH104
J. Warren Stehman, Ph.D., Chairman of the Curriculum Committee and Professor of Economics and Finance	VH204
Bruce D. Mudgett, Ph.D., Chairman of the Graduate Committee and Professor of Economics and Statistics	VH320
Harry J. Ostlund, B.A., Chairman of the Students' Work Committee and Associate Professor of Accounting	VH104

DIRECTORY OF DEPARTMENTAL OFFICES

Administration (Educational) 202,224Bu
Agricultural Biochemistry 214SnH(UF)
Agricultural Economics 303aHH(UF)
Agricultural Education 205Hr(UF)
Agricultural Engineering 201En(UF)
Agronomy and Plant Genetics 101Ag(UF)
Animal and Poultry Husbandry 8LsPav(UF)
Anthropology 106WeH
Architecture 315E
Art Education 201J
Astronomy 359Ph
Bacteriology 228MH
Botany 209Bo
Business Administration 127VH
Center for Continuation Study CCS
Chemistry 127C
Child Welfare 101bPt
Classics 118F
Clinical Psychology 112Psy
Commercial Education 102UHS
Dairy Husbandry 207HH(UF)
Drawing and Descriptive Geometry 208E
Economics 127VH
Educational Administration 224Bu
Educational Psychology 302Psy
Educational Sociology 222Bu
Elementary Education 216,220Bu
English 219F
Entomology and Economic Zoology 300Ad(UF)
Fine Arts 101J
Forestry 110GH(UF)
Geography 101aBu
Geology and Mineralogy 108P
German 210F
Greek 118F
History 102Bu
History of Education 206,226Bu
Home Economics 215HE(UF)
Home Economics Education 215HE(UF)
Horticulture 111Hr(UF)
How To Study 108Psy
Human Anatomy 201 IA
Industrial Education 222Bu
Journalism 111MurH
Latin 118F
Library Methods 107Lib
Linguistics and Comparative Philology 118F
Mathematics 119F
Methods and Directed Teaching 105UHS,220,206Bu
Military Science and Tactics 106A
Music 107Mu
Music Education 107Mu
Natural Science (College of Education) 15UHS
Naval Science and Tactics 203A
Nursery School and Kindergarten Education 100CWI
Nursing Education 125MeS
Orientation 26F
Philosophy 323F
Physical Education for Men 208CH
Physical Education for Women 101WGm
Physics 143Ph
Physiology 318MH
Plant Pathology and Botany 200PP(UF)
Political Science 203Bu
Preventive Medicine and Public Health 121MH
Professional Education of Teachers 216,220Bu
Psychology 112Psy
Public Health Nursing 121MH
Publications and Rural Journalism 113Ad(UF)
Registrar's Office, University Farm 203dAd(UF)
Rhetoric 309En(UF)
Romance Languages 200dF
Rural Sociology 202OD(UF)
Scandinavian 122F
School Health Work HS
Secondary Education 218Bu
Social Studies (College of Education) 226Bu
Sociology and Social Work 108J
Soils 100aSo(UF)
Speech 309aF
Supervision (College of Education) 218,220Bu, 105UHS
Teachers of Subnormal Children 358Psy
University Testing Bureau 310NMA
Veterinary Medicine 119Ve(UF)
Zoology 308Z

EXPLANATIONS

Course numbering.—A course is designated by a department name, a number, and a letter. It has the same number in whatever quarter it is offered. The quarter is indicated by letter (f, fall; w, winter; s, spring; su, summer).

Examples:

1f-2w, a two-quarter course given in the fall and winter.
1w-2s, the same course given in the winter and spring.
3f,w,s, a one-quarter course given each quarter.

Junior College courses in the College of Science, Literature, and the Arts (primarily for freshmen and sophomores) are numbered from 1 to 49. Senior College courses in the College of Science, Literature, and the Arts are numbered as follows: courses pri marily for junior and seniors, from 50 to 99; for juniors, seniors, and graduates, from 100 to 199; for graduates only, from 200 up. This system is not uniformly followed by departments in other colleges than Science, Literature, and the Arts.

Statement of credits.—The number of credits stated for two- and three-quarter courses is the number for the entire course, not the number for each quarter.

OTHER ABBREVIATIONS AND SYMBOLS

I, II, III, etc.	Main campus, first hour (8:30 to 9:20), second hour (9:30 to 10:20), third hour (10:30 to 11:20), fourth hour (11:30 to 12:20), fifth hour (12:30 to 1:20), sixth hour (1:30 to 2:20), seventh hour (2:30 to 3:20), eighth hour (3:30 to 4:20), ninth hour (4:30 to 5:20). University Farm, first hour (8:15 to 9:05), second hour (9:15 to 10:05), etc., to 1:05; sixth hour (1:30 to 2:20), etc.
Ar.	To be arranged or assigned.
Aud.	Auditorium.
Cred.	Credits.
Lab.	Laboratory.
Lect.	Lecture.
MTWThFS	Monday, Tuesday, etc.
Prereq.	Prerequisite.
Rec.	Recitation.
Sec.	Section.

† To receive credit for any part of this course, a student must complete the parts preceding the dagger.

‡ There is a fee (amount to be specified) for this course.

A parenthetical statement after the title of each course gives the following information: the number of credits the course carries, the classes to whom it is open, and the courses prerequisite to it. *Abbreviated statement:* (5 cred.; jr., sr.; prereq. 6). *Expanded statement:* This course carries five credits, is open to juniors and seniors only, and has for a prerequisite, Course 6 in the same department.

Buildings

A, Armory
Ad, Administration, University Farm
Adm, Administration
Ag, Agronomy Bldg., University Farm
BB, Bull Barn, University Farm
BCB, Beef Cattle Barn, University Farm
BFH, Botany Field House, University Farm
Bo, Botany
BoG, Botany Greenhouse

Bu, Burton Hall
C, Chemistry Bldg.
CCS, Center for Continuation Study
CGD, College Girls' Dormitory, University Farm
CH, Cooke Hall
CMU, Coffman Memorial Union
CoH, Ada Comstock Hall
CS, Carpenter Shop, University Farm
CSP, Cold Storage Plant, University Farm
CWI, Child Welfare Institute
DCB, Dairy Cattle Barn, University Farm
DeH, Dexter Hall, University Farm
DH, Dining Hall, University Farm
DHD, Dining Hall Dormitory, University Farm
E, Main Engineering
EdH, Eddy Hall
EE, Electrical Engineering
En, Engineering Bldg., University Farm
Ex, Experimental Engineering
F, Folwell Hall
FCFH, Farm Crops Field House, University Farm
FdH, Field House
G, Greenhouse (13th and University Ave. S.E.)
GH, Green Hall, University Farm
Gy, Gymnasium, University Farm
Hospitals
  CI, Cancer Institute
  EH, Eustis Hospital
  EMH, Elliot Memorial Hospital
  HS, Health Service
  PW, Psychiatric Ward
  TM, Todd Memorial Hospital
  UD, University Dispensary
HB, Horse Barn, University Farm
HE, Home Economics, University Farm
HH, Haecker Hall, University Farm
HL, Hydraulics Laboratory, Hennepin Island
HMH, Home Management Houses, University Farm
HP, Heating Plant
Hr, Horticulture, University Farm
HS, Health Service
HS, Health Service, University Farm
IA, Institute of Anatomy
J, Jones Hall
L, Law Bldg.
Lib, Library Bldg.
LsPav, Livestock Pavilion, University Farm
M, Mines Bldg.
MB, Music Bldg., University Farm
ME, Mechanical Engineering
MeS, Medical Sciences
MEx, Mines Experiment Station
MH, Millard Hall
MNH, Museum of Natural History
MS, Machinery Shop, University Farm
MSh, Meat Shop, University Farm
Mu, Music Bldg.
MurH, William J. Murphy Hall
NMA, Northrop Memorial Auditorium
O, Observatory
OD, Old Dairy, University Farm
OSL, Oak Street Laboratories
P, Pillsbury Hall
Pe, Pendergast Hall, University Farm
PG, Poultry Group, University Farm
Ph, Physics
PH, Power House, University Farm
Phm, Pharmacy
PiH, Pioneer Hall
PoH, Louise M. Powell Hall
PP, Plant Pathology, University Farm
Psy, Psychology
Pt, Pattee Hall
S, Stadium
SaH, Sanford Hall
SB, Swine Barn, University Farm
SBH, State Board of Health
SGD, School Girls' Dormitory, University Farm
SH, Seed House, University Farm
ShH, Shevlin Hall
SnH, Snyder Hall, University Farm
So, Soils, University Farm
SpB, Sheep Barn, University Farm
SS, Storehouse and Shops
St, Stock Pavilion, University Farm
TH, Thatcher Hall, University Farm
TRL, Technological Research Laboratory
UHS, University High School
VB, Veterinary Barn, University Farm
Ve, Veterinary, University Farm
VH, Vincent Hall
WeH, Wesbrook Hall
WGm, Women's Gymnasium
WH, Women's Hall, University Farm
Z, Zoology Bldg.

LIBRARY INSTRUCTION

Library Methods 1 is not a part of the professional curriculum of the Division of Library Instruction. Library Methods 51 to 126 are professional courses open only to senior students or graduates (except for a minor in the College of Education). A full four-year course of preparation instead of three is advised wherever practicable. The completion of a full year in Library Methods is accepted for graduation in the College of Science, Literature, and the Arts, the College of Education, and the University College. Senior students from other colleges may be admitted on approval by the dean of the college concerned and the director of the Division of Library Instruction.

The fees for Library Methods (51-126) are $3 per credit hour or $40 per quarter ($3.50 per credit hour or $50 per quarter for nonresidents). Students with programs in other colleges or divisions (except those registered in Library Methods 1), must pay the special fee for all library instruction courses taken.

A course for hospital library training will also be given in the spring quarter. It will include 12 credit hours of class work, followed by six weeks of practice, or internship, in an approved hospital library. Requirements for admission are the satisfactory completion of at least two quarters of work in an approved library school and the following courses: Preventive Medicine and Public Health 50; Psychology 1-2, and 144-145; Sociology 1, 49, and 90; and Zoology 1-2-3, or equivalent courses approved by the assistant dean of the College of Science, Literature, and the Arts. Candidates for admission to this course should apply for a bulletin giving more detailed information regarding the course.

No.	Title	Hour	Day	Bldg.	Instructor
1f,w,s*	Use of Books and Libraries (2 cred.; fr., soph. only; no prereq.)				
	Sec. 1	II	MW	3Lib	Mr. Russell, Miss Moen
	2	IV	MW	3Lib	Mr. Shove, Miss Davenport
	3	VI	MW	5Lib	Miss Ogden
	Professional Courses				
51f	Bibliography (3 cred.; no prereq.)	III	MWF	5Lib	Mr. Shove
52f§	Cataloging (3 cred.; no prereq.)				
	Sec. 1 (Ed. students)	I	MWF	5Lib	Miss Hutchinson
	2	IV	MWF	5Lib	Miss Hutchinson
53w	Advanced Cataloging (3 cred.; prereq. 52)	IV	MWF	5Lib	Miss Hutchinson
54f§	Classification (3 cred.; no prereq.)	II	TThS	5Lib	Miss Hutchinson
55w	Advanced Classification (3 cred.; prereq. 54)	II	TThS	5Lib	Miss Hutchinson
57s	Secondary School Libraries (3 cred.; prereq. 9 cred. in library methods)	VIII	W	5Lib	Miss Greer
		I, IV	S		
58s	Public Library Administration (3 cred.; prereq. 9 cred. in library methods)	II	TThS	5Lib	Mr. Vitz
60f	Library Binding (1 cred.; no prereq.)	III	T	5Lib	Mr. Walter
61f,w,s§	Library Practice (3 to 4½ cred.; prereq. 15 cred. in library methods)	Ar	Ar	Ar	Mr. Walter
62w§	Reference (3 cred.; no prereq.)	III	MWF	5Lib	Miss Hutchinson

* For students in the College of Science, Literature, and the Arts. Others may obtain a special card from the Junior College office.

§ Required of all candidates for a degree in library methods.

No.	Title	Hour	Day	Bldg.	Instructor
63s	Advanced Reference (3 cred.; prereq. 62)	III	MWF	5Lib	Miss Hutchinson
64s	Selection of Books for Adolescents (3 cred.; prereq. 9 cred. in library methods)	II	MWF	5Lib	Miss McGregor
67w	Library Printing (1 cred.; no prereq.)	III	T	5Lib	Mr. Walter
68s	Circulation Work (1 cred.; prereq. 9 cred. in library methods)	III	T	5Lib	Mr. Walter
69f	Current Library Problems (3 cred.; prereq. 9 cred. in library methods or with Lib. Meth. 51, 52, 54)	II	MWF	5Lib	Mr. Walter
70w	Current Library Problems (3 cred.; prereq. 69)	II	MWF	5Lib	Mr. Walter
71w	Library Work with Children (3 cred.; prereq. 9 cred. in library methods or 6 cred. and one 3-cred. course in library training with 71)	I	MWF	5Lib	Miss McGregor
72s	Library Work with Children (3 cred.; prereq. 71)	I	MWF	5Lib	Miss McGregor
73f	Selection of Books for Adults (2 cred.; no prereq.)	III	ThS	5Lib	Miss Hutchinson
74w	Selection of Books for Adults (2 cred.; prereq. 73)	III	ThS	5Lib	Miss Hutchinson
75s	Selection of Books for Adults (2 cred.; prereq. 73, 74)	III	ThS	5Lib	Miss Hutchinson
76s	Library Service in Hospitals (3 cred.)	I	TThS	3Lib	Miss Jones and others
77s	Book Selection for Hospital Patients (3 cred.)	IV	MWF	3Lib	Miss Methven and others
78s	Reading and the Mental Patient (2 cred.)	III	TS	3Lib	Miss Jones and others
79s	Medical Reference Work (3 cred.)	II	MWF	314Lib	Mr. Walter and others
80s*	Hospital Library Practice—A six-week internship in approved hospitals (4 cred.)				Miss Methven
126s	Subject Bibliography (Prereq. sr. or grad. standing and bibliographical or research training or experience)	I	MWF	3Lib	Mr. Russell

* This practice will be a six-week internship in approved hospitals. The specific arrangements will be made by Miss Methven after the close of the class work early in June. This internship is required of all candidates for degrees or certificates.

MILITARY SCIENCE AND TACTICS

(Coast Artillery Unit *Only*)

No.	Title	Hour	Day	Bldg.	Instructor
	Basic Courses				
1f*	First Year Course (1 cred.; no prereq.)				
	Sec. 1	III	MWF	A	Ar
	2	VI	MWF	A	Ar
	3	VIII	MWTh	A	Ar
2w*	First Year Basic Course (1 cred.; no prereq.)				
	Sec. 1	III	MWF	A	Ar
	2	VI	MWF	A	Ar
	3	IX	MWF	A	Ar
3s*	First Year Basic Course (1 cred.; no prereq.)				
	Sec. 1	I	M	A	Ar
		V, IX	T	A	Ar
	2	I, V, IX	T	A	Ar
	3	V, VII, IX	T	A	Ar
4f*	Second Year Basic Course (1 cred.; soph.; prereq. 1, 2, 3, higher algebra and plane trigonometry)				
	Sec. 1	II	TThS	A	Ar
	2	IV	MWF	A	Ar
	3	VIII	MWTh	A	Ar
5w*	Second Year Basic Course (1 cred.; soph.; prereq. 4f)				
	Sec. 1	II	TThS	A	Ar
	2	IV	MWF	A	Ar
	3	IX	MWF	A	Ar
6s*	Second Year Basic Course (1 cred.; soph.; prereq. same as for 4f)				
	Sec. 1	I, V, IX	T	A	Ar
	2	I	M	A	Ar
		V, IX	T	A	Ar
	3	V, VII, IX	T	A	Ar

NOTE.—Students may register for Courses 1 to 6 and substitute playing in the band for regular military work, with the understanding that this choice renders them ineligible for the Advanced Courses. Premedical students should take First Year Basic Course in C.A.C. unit; Second Year Basic Course and Advanced Courses in Medical Unit are given in the Medical School.

	Advanced Courses				
151f-152w*	First Year Advanced Course (3 cred. per qtr.; prereq. 4, 5, 6) Total of five hours to be taken as follows:				
		One of the two-hour sections:			
	Sec. 1	VI-VII	M	A	Ar
	2	VI-VII	W	A	Ar
		One of the three-hour sections:			
	Sec. 1	II	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar
153s*	First Year Advanced Course (3 cred.; prereq. 4, 5, 6) Total of five hours to be taken as follows:				
	Sec. 1	V, IX	T	A	Ar
		One of the three-hour sections:			
	Sec. 1	II	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar

* Offered on the Main campus.

No.	Title	Hour	Day	Bldg.	Instructor
154f*	Second Year Advanced Course (3 cred.; prereq. 151-152, 153) Total of five hours to be taken as follows:				
		One of the two-hour sections:			
	Sec. 1	VIII-IX	W	A	Ar
	2	VIII-IX	F	A	Ar
		One of the three-hour sections:			
	Sec. 1	I	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar
155w*	Second Year Advanced Course (3 cred.; prereq. 54) Total of five hours to be taken as follows:				
		One of the two-hour sections:			
	Sec. 1	VIII-IX	W	A	Ar
	2	VIII-IX	F	A	Ar
		One of the three-hour sections:			
	Sec. 1	III	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	IV	TTh	A	Ar
		II	S	A	Ar
156s*	Second Year Advanced Course (3 cred.; prereq. 54-55) Total of five hours to be taken as follows:				
	Sec. 1	V, IX	T		
		One of the three-hour sections:			
	Sec. 1	I	MWF	A	Ar
	2	IV	MWF	A	Ar
	3	VI	MWF	A	Ar

NOTE.—The general rule regarding credit for the Advanced Courses is: "Three credits per quarter will be allowed for work in the advanced R.O.T.C. courses with a maximum of 18 quarter credits for the two-year course.

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* Offered on the Main campus.

NAVAL SCIENCE AND TACTICS

NAVAL SCIENCE

No.	Title	Hour	Day	Bldg.	Instructor
	Basic Courses				
1f	First Year Basic Course (1½ cred.; no prereq.)				
	Sec. 1	III	MWF	A	Ar
	2	VI	MWF	A	Ar
	3	VII	MWF	A	Ar
	4	VIII	MWF	A	Ar

NOTE.—All students must be interviewed by a professor of naval science and tactics, given special physical examination, and selected for the course before registering for Naval Science 1.

2w	First Year Basic Course (1½ cred.; prereq. 1f)				
	Sec. 1	III	MW	A	Ar
	2	IV	WF	A	Ar
	3	VI	TTh	A	Ar
	4	VIII	WF	A	Ar
	All sections	V	T	A	Ar
3s	First Year Basic Course (1½ cred.; prereq. 2w)				
	Sec. 1	I	TTh	A	Ar
	2	III	TTh	A	Ar
	3	VII	MW	A	Ar
	4	VII	Th	A	Ar
		III	S	A	Ar
	All sections	IX	T	A	Ar
4f	Second Year Basic Course (1½ cred.; prereq. 3s)				
	Sec. 1	II	TThS	A	Ar
	2	IV	MWF	A	Ar
	3	VIII	MWF	A	Ar
5w	Second Year Basic Couse (1½ cred.; prereq. 4f)				
	Sec. 1	II	TTh	A	Ar
	2	IV	MT	A	Ar
	3	VII	MW	A	Ar
	All sections	V	T	A	Ar
6s	Second Year Basic Course (1½ cred.; prereq. 5w)				
	Sec. 1	I	WF	A	Ar
	2	IV	MW	A	Ar
	3	VI	TTh	A	Ar
	All sections	IX	T	A	Ar

NAVIGATION

NOTE.—Offered to all university students whether or not registered in Naval Science.

1f	Elementary Navigation and Piloting (3 cred.; prereq. high school trigonometry)				
	Sec. 1	VI	MWF	A	Lt.Comdr. Pullen
	2	VII	MWF	A	Lt.Comdr. Pullen
1s	Sec. 1	I	MWF	A	Lt.Comdr. Pullen
	2	IV	MWF	A	Lt.Comdr. Pullen
2f	Celestial Navigation (3 cred.; prereq. Nav. 1)				
	Sec. 1	IV	MWF	A	Lt.Comdr. Pullen
2w	Sec. 1	I	MWF	A	Lt.Comdr. Pullen
	2	VI	MWF	A	Lt.Comdr. Pullen
3w	Deep Sea and Aerial Navigation (3 cred.; prereq. Nav. 2)				
	Sec. 1	IV	MWF	A	Lt.Comdr. Pullen
3s	Sec. 1	VI	MWF	A	Lt.Comdr. Pullen

PHYSICAL EDUCATION FOR MEN

See College of Education section of this bulletin.

PHYSICAL EDUCATION FOR WOMEN

Major advisers.—Professor J. Anna Norris; Associate Professors Baker and Kissock.

The General Course in Physical Education offered by the Department of Physical Education for Women provides a wide program of sports and other activities to meet the varying interests and needs of all the women students. The program offers an opportunity to take courses for the purpose of body building and conditioning and for the acquisition of personal and recreational skills.

The status of these courses in the various colleges for which these courses are offered is as follows:

1. **College of Education.**—Requirement: 6 quarters, including Phys. Ed. 7§, Lectures in Health and Physical Education, a total of five credits, i.e., 1 credit each for three freshman quarters and ⅔ credit each for three sophomore quarters.
2. **General College.**—Requirement: 6 quarters, including Phys. Ed. 7§, Lectures in Health and Physical Education.
3. **College of Agriculture, Forestry, and Home Economics.**—Requirement: 3 quarters chosen from Phys. Ed. 1, 2, 3, 4, 5, 6, and 8, one credit each per quarter; Phys. Ed. 7, 2 credits per quarter. This requirement may be completed any time during the period of residence.
4. **School of Dentistry; Dental Hygienists.**—Requirement: 3 quarters of activity plus Phys. Ed. 7, Lectures in Health and Physical Education.
5. **All other colleges.**—Elective without credit.

Statement of fees.—A physical education fee of $1.75 per quarter is charged for all starred courses. Maximum fee per student, $3.50 per quarter. For methods and practice teaching courses a fee of $1 per credit is charged as indicated in the footnote.

The facilities of the Department of Physical Education for Women, including an 18-hole golf course, tennis courts, three gymnasiums, two swimming pools, squash court, large indoor sports room, outdoor playing fields, are available for use by all women students.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s,4f, 5w,6s*	General Course in Physical Education				
	Aquatics				
	Canoe Paddling (spring)	II	TTh	58WGm	Miss Starr
	Class limited to 15				
	Swimming, Beginning¶				
	Sec. 1 (fall, spring)	II	TTh	51WGm	Ar
	2 (fall, spring)	III	TTh	51WGm	Ar
	3 (fall, spring)	VI	TTh	51WGm	Ar
	4 (fall, spring)	VIII	TTh	51WGm	Ar
	5 (fall, winter, spring)	IV	MW	51WGm	Ar
	6 (fall, winter, spring)	VI	MW	51WGm	Ar
	Swimming, Advanced Beginning** (winter)				
	Sec. 1	III	TTh	51WGm	Ar
	2	VIII	TTh	51WGm	Ar
	Swimming, Intermediate				
	Sec. 1 (fall, winter, spring)	IV	MW	58WGm	Ar
	2 (fall, winter, spring)	VIII	MW	51WGm	Ar
	3 (fall, spring)	VII	MW	58WGm	Ar

* A physical education fee of $1.75 per quarter is charged for this course.

¶ For students with no experience in swimming.

§ This course must be taken during the first year in residence. If exempt, College of Education students must substitute an activity course; General College students, if exempt, are required to take only five activity courses.

** For students with some experience in swimming.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s,4f, 5w,6s*	General Course in Physical Education—Continued				
	Aquatics—Continued				
	Swimming, Advanced (fall, winter, spring)				
	Sec. 1	VIII	MW	58WGm	Ar
	2	VIII	TTh	58WGm	Ar
	Senior Lifesaving				
	Sec. 1 (fall, spring)	VI	TTh	58WGm	Ar
	2 (spring)	IX	MW	58WGm	Ar
	Preliminary Water Safety Instructor's Course§ (Prereq. senior lifesaving certificate) (spring)	VI	MW	58WGm	Ar
	The Dance				
	Folk Dancing (fall, winter)	II	MW	153WGm	Ar
	Recreational Rhythms—Basic rhythmic training through recreational rhythmic activities				
	Sec. 1 (winter)	VIII	TTh	151WGm	Ar
	2 (spring)	VIII	MW	151WGm	Ar
	Modern Dance, Elementary (fall, winter, spring)	VI	MW	151WGm	Miss Gardner
	Modern Dance, Intermediate (fall, winter, spring)	VII	TTh	151WGm	Miss Gardner
	Modern Dance, Advanced (fall, winter, spring)	IV	MW	151WGm	Miss Gardner
	Social Dancing				
	Sec. 1 (fall)	III	TTh	151WGm	Ar
	2 (fall, winter)	VI	TTh	151WGm	Ar
	3 (fall)	VIII	TTh	151WGm	Ar
	4 (winter)	III	MW	151WGm	Ar
	Tap Dancing, Elementary				
	Sec. 1 (fall)	III	MW	151WGm	Ar
	2 (winter)	III	TTh	153WGm	Ar
	Tap Dancing, Intermediate (winter)	VIII	TTh	153WGm	Ar
	Individual Sports and Activities				
	Archery, Elementary				
	Sec. 1 (fall)	I	MW	60WGm	Ar
	2 (fall, spring)	IV	MW	60WGm	Ar
	3 (fall)	VI	MW	60WGm	Ar
	4 (fall, winter, spring)	VI	TTh	60WGm	Ar
	5 (winter)	II	MW	60WGm	Ar
	6 (winter)	VII	MW	60WGm	Ar
	7 (winter)	VIII	MW	60WGm	Ar
	8 (spring)	III	TTh	60WGm	Ar
	Archery, Intermediate				
	Sec. 1 (fall, winter)	III	MW	60WGm	Ar
	2 (fall, spring)	VIII	MW	60WGm	Ar
	3 (winter)	I	TTh	60WGm	Ar
	4 (spring)	II	MW	60WGm	Ar
	Badminton, Elementary				
	Sec. 1 (fall)	III	TTh	60WGm	Ar
	2 (fall)	VII	MW	153WGm	Ar
	3 (fall)	VIII	MW	153WGm	Ar
	4 (fall)	VIII	TTh	60WGm	Ar
	5 (winter)	I	MW	60WGm	Ar
	6 (winter)	VI	MW	60WGm	Ar
	7 (spring)	VI	TTh	153WGm	Ar
	8 (spring)	III	MW	153WGm	Ar

* A physical education fee of $1.75 per quarter is charged for this course.

§ This course covers the review required by the Red Cross for all candidates for the rank of water safety instructor.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s,4f, 5w,6s*	General Course in Physical Education—Continued				
	Individual Sports and Activities—Continued				
	Badminton, Intermediate				
	Sec. 1 (fall)	II	TTh	153WGm	Ar
	2 (fall, winter)	VI	TTh	153WGm	Ar
	3 (winter)	VII	TTh	60WGm	Ar
	Golf, Elementary§				
	Sec. 1 (winter)	IV	MW	60WGm	Ar
	2 (winter)	III	TTh	60WGm	Ar
	3 (winter)	VIII	TTh	60WGm	Ar
	4 (spring)	I	MW	60WGm	Ar
	5 (spring)	III	MW	60WGm	Ar
	Golf, Intermediate§ (spring)				
	Sec. 1	VI	MW	60WGm	Ar
	2	VIII	TTh	60WGm	Ar
	Golf, Advanced§ (winter, spring)	Ar	Ar	Ar	Ar
	Horseback Riding (fall, spring) (See General Courses for Which No Physical Education Fee Is Charged, p. 18)				
	Individual Body Building				
	Sec. 1 (fall)	II	TTh	153AWGm	Miss Mee
	2 (fall, winter, spring)	III	TTh	153AWGm	Miss Mee
	3 (fall)	VI	MW	153AWGm	Miss Mee
	4 (winter)	III	MW	153AWGm	Miss Mee
	Rifle Marksmanship (spring)				
	Sec. 1	II	MW	151WGm	Ar
	2	VII	MW	151WGm	Ar
	Skating¶ (winter) Plain, figure. Classes meet at Hippodrome.				
	Sec. 1	VI	W	Ar	Ar
	2	VII	W	Ar	Ar
	3	VIII	W	Ar	Ar
	4	VI	Th	Ar	Ar
	5	VII	Th	Ar	Ar
	6	VIII	Th	Ar	Ar
	7	VI	F	Ar	Ar
	8	VII	F	Ar	Ar
	9	VIII	F	Ar	Ar
	Tennis, Elementary‡ (spring)				
	Sec. 1	I	MW	151WGm	Ar
	2	III	TTh	151WGm	Ar
	3	IV	MW	153WGm	Ar
	4	VI	MW	153WGm	Ar
	Tennis, Intermediate‡ (spring)				
	Sec. 1	I	TTh	151WGm	Ar
	2	III	MW	151WGm	Ar
	3	VIII	MW	153WGm	Ar
	Tennis, Tournament‡ (spring)	VIII	TTh	151WGm	Ar
	Team Sports and Activities				
	Baseball (spring)	VI	TTh	151WGm	Ar
	Basketball, Elementary (winter)				
	Sec. 1	VI	MW	153WGm	Ar
	2	VIII	MW	153WGm	Ar
	Basketball, Intermediate (winter)	II	TTh	60WGm	Ar
	Posture and Daily Life Skills				
	Sec. 1 (fall)	I	MW	151WGm	Ar
	2 (fall)	IV	MW	153AWGm	Ar
	3 (winter)	II	MW	153AWGm	Ar

* A physical education fee of $1.75 per quarter is charged for this course.
‡ Students taking tennis must pay $1 for a tennis permit.
§ Students must supply their own equipment.
¶ Students should have a free hour before or after the skating class.

No.	Title	Hour	Day	Bldg.	Instructor
1f,2w,3s,4f, 5w,6s*	General Course in Physical Education—Continued				
	Team Sports and Activities—Continued				
	Introductory Course in Sport Skills				
	Sec. 1 (fall)	III	MW	153WGm	Ar
	2 (winter)	IV	MW	153WGm	Ar
	Spectator's Survey of Sports and the Dance (winter)—Movies, demonstrations, talks by experts on sports and the dance.	IV	MW	201WGm	Ar
	Volleyball				
	Sec. 1 (fall)	III	TTh	153WGm	Ar
	2 (fall)	IV	MW	153WGm	Ar
	3 (winter)	I	MW	151WGm	Ar
	4 (spring)	II	TTh	153WGm	Ar

General Courses for Which No Physical Education Fee Is Charged

7f,w,s§	Lectures in Health and Physical Education				
	Sec. 1 (fall, winter, spring)	III	TTh	201WGm	Ar
	2 (fall)	II	TTh	201WGm	Ar
	3 (fall, winter)	VI	MW	201WGm	Ar
8f,s‡‡	Horseback Riding				
	Sec. 1 (Intermediate and Advanced)	VI	MW	Ar	Ar
	2 (Beginning)	VII	MW	Ar	Ar
	3 (Beginning)	VI	TTh	Ar	Ar
	4 (Intermediate and Advanced)	VII	TTh	Ar	Ar

Recreational Activities for Which No Registration Is Required

IX MTWTh 151WGm

Fall	*Winter*	*Spring*
Field Hockey	Basketball	Baseball
Horseback Riding	Swimming	Horseback Riding
Volleyball	Winter Sports	Tennis
Swimming	Tap Dancing	Golf
Archery	Badminton	Badminton
Badminton	Archery	Swimming
Tap Dancing	Rifle Marksmanship	Archery
Rifle Marksmanship	Social Dancing	
Fencing	Fencing	

Courses in Major and Minor Curricula in Physical Education for Women

Open only to students in the College of Education, with the exception of Courses 23A-B, 46A-B-C, 54, 66, and 80.

21Af-Bw-Cs*	Freshman Major Team Sports (1½ cred.; no prereq.)				
		VIII (fall, spring)	MW	151WGm	Ar
		III (winter)	TTh	151WGm	Ar
22Af-Bs*‡	Freshman Individual Sports (1 cred.; no prereq.)				
		I (fall)	TTh	60WGm	Ar
		II (spring)	TTh	151WGm	Ar
23Af-Bw*	Elementary Folk Dances and Games (1 cred.; no prereq.)				
		II	TTh	151WGm	Miss Kissock

* A physical education fee of $1.75 per quarter is charged for this course.

‡ Students must supply their own golf equipment and must pay $1 for tennis permit.

‡‡ For horesback riding, students must pay about $1 a lesson.

§ If exempt, College of Education students must substitute an activity course; General College students, if exempt, are required to take only five activity courses.

No.	Title	Hour	Day	Bldg.	Instructor
25w,s	First Aid (1 cred.; no prereq.)	I (winter)	TTh	3WGm	Miss Mee
		III (spring)	MW	3WGm	Miss Mee
41Af-Bw-Cs*	Sophomore Team Sports (1½ cred.; prereq. 21A-B-C)				
		VIII	MW	151WGm	Ar
42Af-Bs*‡‡‡	Sophomore Individual Sports (1 cred.; prereq. 22A-B)				
		II (fall)	MW	60WGm	Miss Kissock
		I (spring)	TTh	151WGm	Ar
43s*	Advanced Folk Dancing (1 cred.; no prereq.)				
		II	TThS	153WGm	Miss Snell
44Af-Bw*	Group Gymnastics (1 cred.; no prereq.)				
		I	MW	151WGm	Miss Snell, Miss Gardner
45Af-Bw*	Sophomore Major Swimming (1 cred.; prereq. elem. swim. test)				
		II	TTh	58WGm	Miss Starr
46Af-Bw-Cs*	Modern Dance, Elementary (1½ cred.; no prereq.)				
		VII	MW	151WGm	Miss Gardner
47Af-Bw*	Tumbling, Stunts, and Apparatus (1 cred.; no prereq.)				
		I	TTh	151WGm	Ar
48s*¶	Lifesaving and Water Front Safety (1 cred.; prereq. 45A-B) (Formerly Course 68)				
		III, IV	T	58WGm	Miss Starr
		III	Th		
50s‡‡	General Anatomy (4 cred.; prereq. Zool. 1-2-3)				
		III, IV	MWF	312IA	Miss Braun
51s‡‡	Mechanics of Movement (3 cred.; prereq. 50 and some knowledge of physics)				
		VI, VII	TTh	312IA	Miss Braun
60s	Principles of Play (2 cred.; prereq. Psy. 1-2)				
		III	MW	201WGm	Miss Kissock
61Af-Bw-Cs*‡	Technique of Teaching Sports (3 cred.; jr.; prereq. 41A-B-C, 42A-B)				
		II	MWF	151WGm	Miss Snell
62s	Physical Examination (2 cred.; jr.; prereq. 51)				
		II	TThS	153AWGm	Miss Mee
63w*‡	Technique of Teaching Folk Dancing (1 cred.; jr.; prereq. 23A-B, 43)				
		II	TThS	151WGm	Miss Baker
64w*‡	Technique of Teaching Group Gymnastics (1 cred.; jr.; prereq. 44A-B, 69)				
		IV	TS	151WGm	Miss Snell, Miss Gardner
65s*‡	Integration of Special Methods (2 cred.; jr.; prereq. minimum of 2 courses in special techniques)				
		III	TThF	151WGm	Miss Baker
		IV	T		
66f*	Modern Dance, Intermediate (½ cred.; jr.; prereq. 46A-B-C)				
		I (begins 8 a.m.)	Th	151WGm	Miss Baker
67Af-Bw*‡	Technique of Teaching Swimming (2 cred.; jr.; prereq. 45A-B and 48)				
		III	TThS	58WGm	Miss Starr
69f*	Fundamentals of Movement (½ cred.; jr.; no prereq.) (Formerly Course 22B)				
		IV	TS	151WGm	Miss Snell
73Aw-Bs*‡	Technique of Teaching Rhythm (1½ cred.; jr.; prereq. 66f) (1 cred. 73A, ½ cred. 73B)				
		I	TTh	151WGm	Miss Baker
74Af-Bw*	Advanced Fundamentals of Movement (1 cred.; sr.; prereq. 64)				
		II (fall)	TTh	151WGm	Miss Baker
		III (winter)	MW	153WGm	Miss Baker
81f	Trends in Physical Education (2 cred.; sr.; no prereq.)				
		III	TTh	3WGm	Miss Kissock
82f	Principles of Physical Education (3 cred.; sr.; prereq. 65)				
		II	MWF	201WGm	Miss Baker

* A physical education fee of $1.75 per quarter is charged for this course.
‡ A fee of $1 per credit is charged for this course.
‡‡ A fee of $2 is charged for 50 and 51 whether taken as a whole or as a part.
‡‡‡ Students must supply their own golf equipment and must pay $1 for tennis permit.
¶ A lifesaving certificate is a prerequisite for student teaching in swimming.

No.	Title	Hour	Day	Bldg.	Instructor
83f‖	School Health Education, Method and Content (3 cred.; sr.; prereq. 65, P.M.&P.H. 50 or 51)				
		III	MWF	201WGm	Miss Starr
84s	Problems in Physical Education (2 cred.; prereq. permission of instructor)				
		II	TTh	201WGm	Miss Snell
85Af-Bw	Remedial Gymnastics (3 cred.; sr.; prereq. 62)				
		I (fall)	MWF	153AWGm	Miss Mee
		I (winter) and 1 hr ar	MW	153AWGm	Miss Mee
90Af-Bw-Cs‡	Student Teaching (7 cred.; sr.; prereq. 60, 61A-B-C, 63, 64, 65, 67A-B, 73A-B)				
		Ar	Ar	Ar	Miss Baker
95Aw-Bs‖	Administration of Physical Education (3 cred.; sr.; prereq. 60, 81, 82, 83)				
		IV (winter)	WF	201WGm	Dr. Norris, Miss Snell
		IV (spring)	F	201WGm	Dr. Norris, Miss Snell
111Ef‡§	An Advanced Course in Methods of Teaching in Physical Education (3 cred.; sr., grad.; prereq. undergrad. methods courses, 60 and 82 or equiv.)				
		IX, X and 1 hr ar	W	3WGm	Miss Baker
112Es§	Supervision of Physical Education (3 cred.; sr., grad.; prereq. teaching experience)				
		IX, X and 1 hr ar	W	3WGm	Miss Baker
113Ew§	Physical Education in the Elementary Schools (3 cred.; sr., grad.; prereq. 60 and 82 or equiv. and experience teaching elementary grade children)				
		IX, X and 1 hr ar	T	3WGm	Miss Baker
114Ew§	The Administration of the School Health Education Program (3 cred.; sr., grad.; prereq. 83, P.M.&P.H. 50 or 51 or equiv.)				
		IX, X and 1 hr ar	W	3WGm	Miss Starr
115Ef§	Recent Literature and Research in Mechanics of Movement (3 cred.; sr., grad.; prereq. Physiol. 51, Phys.Ed. 71 or equiv.)				
		Ar	Ar	Ar	Miss Braun
221f-222w-223s	Seminar in Physical Education				
		Ar	Ar	Ar	Dr. Norris, Miss Baker, Miss Kissock, Miss Snell, Miss Starr

Elective Courses

54s*	Camp Leadership (2 cred.; no prereq.)				
		IV and 1 hr ar	MW	201WGm	Miss Starr
71f*	Applied Physiology (3 cred.; prereq. 51 and Physiol. 51)				
		I	TThS	3WGm	Miss Braun
		II	S		
79s	Massage and Therapeutic Exercises (2 cred.; prereq. 85A-B)				
		I	TThS	153AWGm	Miss Mee
80w	Principles of Rhythm (2 cred.; prereq. some rhythm experience)				
		II	WF	201WGm	Miss Baker

* A physical education fee of $1.75 per quarter is charged for this course.

‡ A fee of $1 per credit is charged for this course.

§ The designation "E" after a course number over 100 indicates that the course is of graduate level in the College of Education but does not carry credit for Plans A and B in the Graduate School.

‖ For students minoring in Physical Education, this course carries 2 credits, and no prerequisites are required.

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

The College of Science, Literature, and the Arts distinguishes between Junior College courses, intended primarily for freshmen and sophomores, and Senior College courses, intended primarily for juniors and seniors.

Senior College courses appear in the announcement as open to "juniors and seniors" or to "juniors, seniors, and graduates."

Some Senior College courses are regularly open to Junior College students who have an average grade of at least C in the prerequisite courses. They are listed beneath the heading *Senior College Courses* in departmental statements in the Science, Literature, and the Arts section of this Combined Class Schedule Bulletin. Other Senior College courses are open to Junior College students only by special permission of the Students' Work Committee. The committee will usually grant such permission to students who have an average grade of at least C in all their work and in the prerequisite courses. Requests for the special permission should be presented to Assistant Dean Bussey in 106 Folwell Hall. Courses which carry graduate credit may not be taken earlier than the third quarter of the student's sophomore year.

ANATOMY

See Human Anatomy, page 61.

ANTHROPOLOGY

Major adviser in the College of Science, Literature, and the Arts.—Professor Wallis.

Major sequence in the College of Science, Literature, and the Arts.—At least twenty-seven credits selected from: Anthropology courses numbered 80 or above, Zoology 83, 170-171.

(Prerequisites: Course 41, with fifteen additional credits from either the social or biological sciences.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
41f	Introduction to Anthropology—Physical characteristics of the human races; fossil men; prehistory; primitive economic and industrial activities; religious life, social organization, and other phases of culture (5 cred.; soph., jr., sr.; prereq. 10 cred. in sci. or soc. sci.)	IV	MTWFS	301F	Mr. Mandelbaum
41w	Introduction to Anthropology (See 41f)	VI	MTWThF	206Pt	Mr. Wallis
41s	Introduction to Anthropology (See 41f)	VI	MTWThF	166Ph	Mr. Cline

Senior College Courses

Courses 54, 56, 80 are open to Junior College students who have a grade of at least C in Course 41. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement at the top of this page.

54s	Social Organization—An analysis and survey of forms of social life (3 cred.; jr., sr.; prereq. 41)	I	MWF	6WeH	Mr. Wallis

No.	Title	Hour	Day	Bldg.	Instructor
56f	Primitive Science—The beliefs and knowledge of primitive man (3 cred.; jr., sr.; prereq. 41)	VI	MWF	6WeH	Mr. Wallis
80w	The American Indian—A survey of native cultures of the New World. Physical and cultural characteristics (3 cred.; jr., sr.; prereq. 41) (Formerly Course 115)	IV	MWF	6WeH	Mr. Wallis
105f	Elements of Language—A survey of speech sounds followed by practice in phonetic recording. Analysis of phonetic patterns in language. Practical work in dictation of Chippewa, Dakota, Finnish, and other languages (3 cred.; jr., sr., grad.; prereq. 41 or 10 credits of any language)	II	MWF	6WeH	Mr. Mandelbaum
106w	European Prehistory (3 cred.; jr., sr., grad.; prereq. 41)	I	TThS	6WeH	Mr. Cline
110f	Physical Anthropology—Man's place in the animal kingdom. Comparison of man's structure with that of the anthropoid apes; types of prehistoric men; anthropometry (3 cred.; jr., sr., grad.; prereq. 41 or one course in human anat. or zool.)	III	MWF	6WeH	Mr. Wallis
115	This course has been renumbered 80.				
116s	Indians of the Southwest—The pueblo dwellers, Navaho, Apache, and other aborigines of New Mexico and Arizona. The ancient civilizations of the region. (3 cred.; jr., sr., grad.; prereq. 41)	I	TThS	6WeH	Mr. Mandelbaum
117f	Culture and Culture Areas—An analysis of culture; diffusion of culture traits; trait complexes (3 cred.; jr., sr., grad.; prereq. 41)	IV	MWF	6WeH	Mr. Wallis
118f	Races and Cultures of Middle and South America (3 cred.; jr., sr., grad.; prereq. 41)	I	TThS	6WeH	Mr. Cline
119s	The Contact of Cultures—The impact of western civilization on native societies. The tenacity of culture patterns and the disintegration of aboriginal cultures. Case examples from North America, Africa, and Asia (3 cred.; jr., sr., grad.; prereq. 41)	III	TThS	6WeH	Mr. Mandelbaum
120	*Indians of the Plains*—The aboriginal inhabitants of the prairies and plains. The tribes which lived between the Upper Mississippi and the Rockies, from the forests of western Canada to Texas (3 cred.; jr., sr., grad.; prereq. 41) *(Not offered)*				
122f-123w-124s	Problems in Anthropology (Cred. ar.; jr., sr., grad.; prereq. three courses and permission of instructor; for honors course students)	Ar	Ar	Ar	Mr. Wallis, Mr. Cline, Mr. Mandelbaum
131w-132s*	Races and Cultures of Arabia, Egypt, and North Africa—Course 131: Pre-Muslim Culture. Course 132: Muslim Culture (6 cred.; jr., sr., grad.; prereq. 41)	III	MWF	6WeH	Mr. Cline
133f-134w*	Races and Cultures of the Far East—This course will focus on the growth of native civilization in China and Japan. Attention will be given also to the cultures of Mongolia, Tibet, Korea, and southeastern Asia, especially in their relation to the Chinese (6 cred.; jr., sr., grad.; prereq. 41)	I	MWF	6WeH	Mr. Cline
135f-136w-137s	Cultural History of Egypt from the Earliest Times to the Sixteenth Century A. D. (9 cred.; jr., sr., grad.; prereq. permission of instructor and a B average in the student's major subject)	Ar	Ar	Ar	Mr. Cline, Mr. Jones
150§	Field Trip in Archeology (1 to 8 cred.; sr. and grad. only; prereq. one Senior College course)	Ar	Ar	Ar	Ar
161s	Primitive Religion—Beliefs and practices in primitive religion. The rôle of the sacred and the supernatural. Beliefs in the life after death (3 cred.; jr., sr., grad.; prereq. 41)	II	MWF	6WeH	Mr. Wallis

* Students may enter either quarter.

§ This course may be taken for credit only once.

No.	Title	Hour	Day	Bldg.	Instructor
162f	Races and Cultures of Negro Africa (3 cred.; jr., sr., grad.; prereq. 41)	III	TThS	6WeH	Mr. Cline
163w	Ethnology of India—A survey of the primitive tribes, Hindu caste society, and Mohammedan communities in India (3 cred.; jr., sr., grad.; prereq. 41)	III	TThS	6WeH	Mr. Mandelbaum
165w	Psychological Phases of Culture—The interplay between culture and personality (3 cred.; jr., sr., grad.; prereq. 41)	II	MWF	6WeH	Mr. Mandelbaum
166w	History of Anthropological Theory and Method—A review of the development of anthropology from early times to the present day. Schools of anthropological thought and various approaches to the data of anthropology (3 cred.; jr., sr., grad.; prereq. 41)	II	TThS	6WeH	Mr. Mandelbaum
167s	Primitive Mythology—Plots and motives in folklore and mythology. Mythology as a reflection of culture and interests. Explanatory tales (3 cred.; jr., sr., grad.; prereq. 41)	II	TThS	6WeH	Mr. Wallis
168	*Prehistoric and Primitive Metal Cultures* (3 cred.; jr., sr., grad.; prereq. 41) *(Not offered)*				
170s	Primitive Art—The rôle of esthetics in primitive life, the spread of art styles, symbolism. The graphic and plastic arts and the place of the artist. Music, drama, the dance, in primitive societies (3 cred.; jr., sr., grad.; prereq. 41)	IV	MWF	6WeH	Mr. Mandelbaum
204f-205w-206s	Seminar in Anthropology (3 cred. per qtr.; grad.)	Ar	Ar	Ar	Mr. Wallis, Mr. Cline, Mr. Mandelbaum

ARCHITECTURE

INSTITUTE OF TECHNOLOGY

Major adviser in the College of Science, Literature, and the Arts.—Professor Roy Jones.

Major sequence in the College of Science, Literature, and the Arts.—Courses AD-II, 51-52-53, 57-58-59.

(Prerequisites: Courses 4-5-6, AD-I, DP-I, DP-II¶)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Junior College Courses

Note.—Consult the Bulletin of the Institute of Technology for program of hours, days, buildings, and instructors.

1f-2w-3s	Introduction to Architecture (3 cred.; open only to students whose major subject is architecture or interior architecture; no prereq.)
4f-5w-6s	Graphic Representation (6 cred.; soph.; no prereq.)
DP-If,w,s‡§	Drawing and Painting, Grade I (6 cred., normally 2 cred. per qtr.; all; no prereq.)
DP-IIf,w,s‡§	Drawing and Painting, Grade II (6 cred., normally 2 cred. per qtr.; soph., jr., sr.; prereq. DP-I)
M-If,w,s‡§	Modeling, Grade I (6 cred., normally 2 cred. per qtr.; all; no prereq.)
M-Iaf,w,s§	Modeling for Architects (2 cred., normally 2 cred. per qtr.; open only to students whose major subject is architecture or interior architecture; prereq. registration in Architectural Design)
AD-If,w,s‡‡§	Architectural Design, Grade I (15 cred., normally 5 cred. per qtr.; soph., jr.; prereq. registration in 4-5-6)

‡ A fee of $1 per quarter is charged for this course.

‡‡ A fee of $2 per quarter is charged for this course.

§ Completion of this course is dependent on achievement rather than time. Students will continue their registration until the course is completed and a mark reported. The number of credits earned per quarter may be larger or smaller than the amount indicated as normal.

¶ This course, DP-II, may be postponed until the student's junior year, if necessary.

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

Note.—Consult the Bulletin of the Institute of Technology for program of hours, days, buildings, and instructors, and for additional courses.

51f-52w-53s† History of Architecture (9 cred.; jr., sr.; prereq. consent of instructor)
57f-58w-59s Building Materials and Methods (6 cred.; jr., sr.; no prereq.)
61f-62w-63s History of Architecture (6 cred.; jr., sr.; prereq. 53)
104f Housing (3 cred.; sr.; no prereq.)
107f-108w-109s Furniture and Decoration (6 cred.; jr., sr.; prereq. consent of instructor)
DP-IIIf,w,s‡§ Drawing and Painting, Grade III (6 cred., normally 2 cred. per qtr.; jr., sr.; prereq. DP-II or equiv.)
DP-IVf,w,s‡§ Drawing and Painting, Grade IV (6 cred., normally 2 cred. per qtr.; jr., sr.; prereq. DP-III or equiv.)
IHP-If§ Illustration (2 cred., normally 2 cred. per qtr.; jr., sr.; prereq. DP-I or equiv.)
IHP-IIw,s§ Hand Print Processes (4 cred., normally 2 cred. per qtr.; jr., sr.; prereq. DP-I or equiv.)
M-IIf,w,s‡§ Modeling, Grade II (6 cred., normally 2 cred. per qtr.; jr., sr.; prereq. M-I)
SD-If,w§ Stage Design (4 cred., normally 2 cred. per qtr.; jr., sr.; no prereq.)
AD-IIf,w,s‡‡§ Architectural Design, Grade II (18 cred., normally 6 cred. per qtr.; jr., sr.; prereq. AD-I)
ID-If,w,s‡‡§ Interior Architectural Design (24 cred., normally 8 cred. per qtr.; sr.; prereq. AD-II)

ART EDUCATION

See Education, page 39.

ASTRONOMY

Major adviser in the College of Science, Literature, and the Arts.—Professor Luyten.

Major sequence in the College of Science, Literature, and the Arts.—Courses 51-52-53, 101, and Mathematics 50, 51, 105.

(Prerequisites: Mathematics 1, 6-7, or physical science and Mathematics 6.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
11f*	Descriptive Astronomy (5 cred.; all; no prereq.)	IV	MTWFS¶	150Ph	Mr. Luyten
11s*	Descriptive Astronomy (5 cred.; all; no prereq.)	IV	MTWFS¶	133Ph	Mr. Luyten

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

* No student may receive credit for both Course 11 and Course 51.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

‡‡ A fee of $2 per quarter is charged for this course.

§ Completion of this course is dependent on achievement rather than time. Students will continue their registration until the course is completed and a mark reported. The number of credits earned per quarter may be larger or smaller than the amount indicated as normal.

¶ The Saturday lecture will be replaced by an evening's observation with the telescope when the weather permits.

No.	Title	Hour	Day	Bldg.	Instructor
51w§	Astronomy (3 cred.; jr., sr.; prereq. Math. 6)	IV	MWF	133Ph	Mr. Luyten
52w	Astrophysics (4 cred.; prereq. 51 or 11 and Math. 6)	II	MTWF	359Ph	Mr. Luyten
53s	Stellar Astronomy (3 cred.; prereq. 51 or 11 and Math. 6)	II	MWF	359Ph	Mr. Luyten
101f	Celestial Mechanics (3 cred.; jr., sr., grad.; prereq. Math. 51)	II	MWF	359Ph	Mr. Luyten
140f	Least Squares (3 cred.; prereq. 51 or 11 and at least Math. 51)	II	MWF	359Ph	Mr. Luyten

NOTE.—Courses 101 and 140 are usually offered in alternate years, and only one will be given in each year, depending largely on the demand.

BACTERIOLOGY

MEDICAL SCHOOL

Major adviser in the College of Science, Literature, and the Arts.—Dr. Larson.

Major sequences in the College of Science, Literature, and the Arts.—Sequence A. For work in medical or public health bacteriology, Course 101-102, 104, 114, 116, 120, 124, and Zoology 51.

(Prerequisites: Zoology 1-2-3 and 10 credits in chemistry.)

Sequence B. For work in industrial bacteriology, Courses 53, 103, 104, 114, 121-122, 123.

(Prerequisites: 4 credits in botany or zoology; 15 credits in chemistry; and 8 credits in biochemistry or organic chemistry.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Senior College Courses

Course 53 is open to Junior College students who have a grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

No.	Title	Hour	Day	Bldg.	Instructor
41	This course has been renumbered 53.				
53f,w,s‡¶	General Bacteriology (5 cred.; soph. with a C average in the prerequisite courses, jr., sr.; prereq. 10 cred. in chem. and 4 cred. in bot. or zool.) (Formerly Course 41)	VII, VIII, IX	MWF	MH	Ar
101w*‡¶	Medical Bacteriology (5 cred.; jr., sr., grad.; prereq. Zool. 1-2-3 and 10 cred. in chem.)				
	Lect.	IV	MWF	MH	Dr. Henrici,
	Lab. Sec. 1	I, II	MWF	MH	Dr. Larson
	2	I, II	TThS	MH	
102s*‡	Medical Bacteriology (4 cred.; jr., sr., grad.; prereq. 101)				
	Lect.	I	MWF	MH	Dr. Larson
	Lab. Sec. 1	II, III	M	MH	Dr. Henrici
		II	WF	MH	Dr. Green
	2	I, II	T	MH	
		I	ThS	MH	

* Both Courses 101 and 102 must be completed before credit will be given for either.

‡ Microscope required. Students (except medical) may obtain use of microscope by purchasing $1.50 microscope card from bursar.

§ No student may receive credit for both Course 11 and Course 51.

¶ No student may receive credit for both Course 53 and Course 101.

No.	Title	Hour	Day	Bldg.	Instructor
103w	Soil Microbiology (5 cred.; jr., sr., grad.; prereq. 53, and 15 cred. in chem.)	I, II, III	TThS	MH	Dr. Skinner
104s	Sanitary Bacteriology (4 cred.; jr., sr., grad.; prereq. 53 and 15 cred. in chem.) (Class limited to 15 students)	VI, VII, VIII	TTh	MH	Dr. Skinner
114s	Molds, Yeasts, and Actinomycetes (4 cred.; jr., sr., grad.; prereq. 53 or 101)	VII, VIII	TTh	MH	Dr. Henrici
		III, IV	S	MH	
116w	Immunity (3 cred.; jr., sr., grad.; prereq. 102)	VI, VII, VIII	TTh	MH	Dr. Larson
120s	Diseases of Animals Transmissible to Man (3 cred.; jr., sr., grad.; prereq. 102)	VI	MWF	MH	Dr. Green
121f-122w†	Physiology of Bacteria (6 cred.; jr., sr., grad.; prereq. Bact. 53 and 8 cred. in org. chem. or biochem.)	III	TThS	MH	Dr. Halvorson
123s	Applied Bacteriology (3 cred.; jr., sr., grad.; prereq. 121-122)	III	TThS	MH	Dr. Halvorson
124f	Filterable Viruses (4 cred.; jr., sr., grad.; prereq. 102, Anat. 103 (Human Histology) or Zool. 149 (Histology) and Path. 101)				
	Lect.	VI	TTh	MH	Dr. Green
	Lab.	VII, VIII	TTh	MH	
153f,w,s	Problems in Bacteriology (Cred. ar.; prereq. permission of chairman of dept.)	Ar	Ar	Ar	Staff

BIOSTATISTICS

See page 91.

BOTANY

Major adviser in the College of Science, Literature, and the Arts.—Professor Burr.

Major sequences in the College of Science, Literature, and the Arts.—

A. In Botany, Courses 61, 62, 63, 113, 118, 119, 131, 140, and additional credits in approved courses to make a total of 30 credits in Senior College courses.

B. In special fields, such as morphology, taxonomy, physiology, or ecology, a major will consist of the respective courses with numbers over 100 and additional credits in approved courses to make a total of 30 credits in Senior College courses.

(Prerequisites: *For sequences A and B:* Courses 1, 2, 5, 7, 21, 22. If possible, beginning chemistry and at least one year of French or German should be completed as part of the Junior College work.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Butters.

Requirements for a teacher's certificate.—Major recommendation, 30 credits in botany including Courses 1, 2, 5, 7, 21, 22, 61, 62 and 5 credits of electives.

Minor recommendation, 19 credits in botany including Courses 1, 2, 7, 21, 22 and three additional credits.

For a specialized curriculum in natural science see the Bulletin of the College of Education.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	General Botany—A survey lecture course on plants and their human interest, contributing to liberal culture; characteristics of living matter; fundamental facts of structure, growth, and reproduction; relation of plants to their environment and to each other; principles underlying inheritance, variation, plant breeding, and organic evolution (4 cred.; all; no prereq.)				
	Lect. Sec. 1	III	TThS	BoAud	Mr. Huff
	2	VI	W	BoAud	Mr. Huff
		VI, VII	F	BoAud	Mr. Huff
	3 (Agr. stud. only)	VI	T	BoAud	Mr. Huff
		VI, VII	Th	BoAud	Mr. Huff
	Quiz-Lab. Sec. 1	I	TTh		
	2	II	TTh		
	3	III	MW		
	4	IV	TS		
	5	V	TTh		
	6	VI, VII	M		
	7	VII, VIII	W		
	8 (Agr. stud. only)	VII, VIII	T		
	9 (Agr. stud. only)	VIII, IX	Th		
1w,s	General Botany (See 1f)				
	Lect.	III	TThS	BoAud	Mr. Huff
	Quiz-Lab. Sec. 1	I	TTh		
	2	II	TTh		
	3	III	MW		
	4	IV	TS		
	5	IV	MW		
2w,s‡	Elementary General Morphology of Plants (3 cred.; all; prereq. 1)				
	Lect.	III, IV	M	BoAud	Mr. Huff
	Lab.	III, IV	WF	1,4,5,8Bo	
3su	Forest Botany (1 cred.; students in agriculture and forestry; no prereq. Given at Itasca Park)				Mr. Rosendahl
5w‡	Elementary Plant Histology (3 cred.; all; prereq. 1)	VI, VII, VIII	WF	1,4,5,8Bo	Mr. Butters
7f‡	Taxonomy of Flowering Plants (3 cred.; all; prereq. 1)	I, II	MWF	1,4,5,8Bo	Mr. Butters
7s‡	Taxonomy of Flowering Plants (See 7f)				
	Sec. 1	I, II	MWF	1,4,5,8Bo	Mr. Abbe
	2	VI, VII, VIII	TTh	1,4,5,8Bo	Mr. Butters
21f‡	Elementary Ecology (3 cred.; all; prereq. 1)	III, IV	MWF	1,4,5,8Bo	Mr. Cooper, Mr. Lawrence
21w‡	Elementary Ecology (See 21f) (Laboratory sections in 21w are limited to 90 each)				
	Lect.	VII	TTh	BoAud	Mr. Cooper,
	Lab. Sec. 1 (Agr. stud. only)	V, VI	TTh	1,4,5,8Bo	Mr. Lawrence
	2 (Agr. stud. only)	VIII, IX	TTh	1,4,5,8Bo	
	3	I, II	ThS	1,4,5,8Bo	
21s‡	Elementary Ecology (See 21f)				
	Lect.	VII	TTh	BoAud	Mr. Cooper,
	Lab. Sec. 1	V, VI	TTh	1,4,5,8Bo	Mr. Lawrence
	2	VIII, IX	TTh	1,4,5,8Bo	
22f,w,s‡	Elementary Plant Physiology (3 cred.; all; prereq. 1 and high school or college chem. or registration in college chem.) (Laboratory sections are limited to 56 each)				
	Lect.	VII	TTh	4Bo	Mr. Burr,
	Lab. Sec. 1	V, VI	TTh	104Bo	Mr. Moyer
	2	VIII, IX	TTh	104Bo	

‡ A fee of $1 is charged for this course.

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

No.	Title	Hour	Day	Bldg.	Instructor
61f‡	Thallophytes (3 cred.; jr., sr.; prereq. 10 cred. incl. 2)	VI, VII, VIII	MF	8Bo	Mr. Moyer
62w‡	Bryophytes and Pteridophytes (3 cred.; jr., sr.; prereq. 10 cred. incl. 2)	VI, VII, VIII	MW	8Bo	Mr. Huff
63s‡	Gymnosperms and Angiosperms (3 cred.; jr., sr.; prereq. 7 and either 2 or 62)	III, IV	MWF	215Bo	Mr. Butters
108	*Pteridophytes* (5 cred.; sr., grad.; prereq. 18 cred. incl. 7 and 62) *(Not offered)*				
110w	Gymnosperms (5 cred.; sr., grad.; prereq. 18 cred. incl. 7 and 63)	Ar	Ar	Ar	Mr. Butters
113f-114w-115s*	Advanced Taxonomy of Flowering Plants (9 cred.; jr., sr., grad.; prereq. 10 cred. incl. 7)	VI, VII, VIII	MF	110Bo	Mr. Rosendahl
118f‡	Cytology I—Cytoplasmic Phenomena (3 cred.; jr., sr., grad.; prereq. 15 cred. in biol. incl. Bot. 5 and an elem. course in chem.)	III-IV	MWF	202Bo	Mr. Moyer
119w‡	Cytology II—Nuclear Phenomena (3 cred.; jr., sr., grad.; prereq. 15 cred. in biol. incl. Bot. 5 and an elem. course in chem.)	III-IV	MWF	202Bo	Mr. Abbe
120s‡‡	Research Methods in Histology and Cytology (3 or 5 cred.; prereq. 118 and 119)	Ar	Ar	202Bo	Mr. Abbe
121f‡	Morphogenesis (3 cred.; jr., sr., grad.; prereq. 119 and 127 or equiv.)	Ar	Ar	202Bo	Mr. Abbe
127f	Anatomy of Vascular Plants (5 cred.; jr., sr., grad.; prereq. 18 cred. incl. 5)				
	Lect.	II	TThS	215Bo	Mr. Butters
	Lab.	III, IV	TS		
		III	Th		
		or			
		Ar	Ar		
131f	Field Ecology (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 21)	VI, VII, VIII	MWF	214Bo	Mr. Cooper, Mr. Lawrence
132w‡	Ecological Anatomy (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 5 and 21)	VI, VII, VIII	MWF	214Bo	Mr. Cooper
133s	Plant Geography of North America (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 21)	VI, VII, VIII	MWF	214Bo	Mr. Cooper
134s‡	Research Methods in Ecology (5 cred.; jr., sr., grad.; prereq. 18 cred. incl. 21)	VI, VII, VIII	MWF	214Bo	Mr. Lawrence
136s	Physiology of the Cell (3 cred.; jr., sr., grad.; prereq. 20 cred. in phys., chem., or biochem., or permission of instructor)	II	TThS	110Bo	Mr. Moyer
137	*Experimental Ecology* (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 21 and 22) *(Not offered)*				
140w	General Plant Physiology (3 cred.; jr., sr., grad.; prereq. 22, elem. inorg. chem.)	III	MWF	110Bo	Mr. Miller
141f	Physicochemical Principles and Measurements in Plant Physiology (3 cred.; jr., sr., grad.; prereq. 20 cred. in chem. or biochem.)				
	Lect.	7:55	MWF	110Bo	Mr. Moyer
142w	Photosynthesis and Other Effects of Radiation (3 cred.; jr., sr., grad.; prereq. same as for 141)				
	Lect.	7:55	MWF	110Bo	Mr. Burr
143s	Plant Metabolism (3 cred.; jr., sr., grad.; prereq. same as for 141)				
	Lect.	7:55	MWF	110Bo	Mr. Miller

* Any quarter may be taken separately, except 115s, which requires either 113f or 114w as a prerequisite.

‡ A fee of $1 is charged for this course.

‡‡ A fee of $3 is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
146f‡‡	Advanced Physiology Laboratory (2 cred.; jr., sr., grad.; may be taken with or after 141)	Ar	Ar	104Bo	Mr. Moyer
147w‡‡	Advanced Physiology Laboratory (2 cred.; jr., sr., grad.; may be taken with or after 142)	Ar	Ar	104Bo	Mr. Moyer
148s‡‡	Advanced Physiology Laboratory (2 cred.; jr., sr., grad.; may be taken with or after 143)	Ar	Ar	104Bo	Mr. Miller
154f‡	Applied Spectroscopy in Biology (3 to 5 cred.; jr., sr., grad.; prereq. 20 cred. in chem. or biochem.)				
	Lect.	Ar	MWF	1Bo	Mr. Miller
	Lab.	Ar	MWF		
155w‡	Advanced Spectroscopy in Biology (3 to 5 cred.; jr., sr., grad.; prereq. 154)	Ar	Ar	Ar	Mr. Miller
197f-198w-199s‡	Problems (3 to 5 cred. per qtr.; jr., sr., grad.; prereq. 20 cred. and permission of instructor)	Ar	Ar	Ar	Ar

For graduate courses given during 1940-41 consult the department.

PLANT PATHOLOGY AND BOTANY

Students in this college may elect courses in Plant Pathology and Botany by arrangement with the department. See the program of the College of Agriculture, Forestry, and Home Economics in this bulletin.

CHEMISTRY

INSTITUTE OF TECHNOLOGY

Major adviser in the College of Science, Literature, and the Arts.—Professor Sneed.

Major sequence in the College of Science, Literature, and the Arts.—Analytical Chemistry 1-2; Organic Chemistry 51-52-153; Physical Chemistry 101-102-103.

(Prerequisites: Inorganic Chemistry 13 with its prerequisites; physics, with the prerequisite mathematics.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Palmer O. Johnson.

Requirements for a teacher's certificate.—Major recommendation: Inorganic Chemistry 9-10, 12; Analytical Chemistry 7; Organic Chemistry 51-52 and 10 additional credits in chemistry.

Minor recommendation: Inorganic Chemistry 9-10, 12; Analytical Chemistry 7 and 6 additional credits in chemistry.

For a specialized curriculum in natural science see the Bulletin of the College of Education.

Note.—Analytical Chemistry 1-2 and all courses numbered above 50 count as Senior College courses.

‡ A fee of $1 is charged for this course.
‡‡ A fee of $3 is charged for this course.

Inorganic Chemistry

No.	Title	Hour	Day	Bldg.	Instructor
1f‡-2w†‡	General Inorganic Chemistry (For architecture, predental, premedical, medical technology, physical education for women, agriculture, forestry, and home economics students) (4 cred. per qtr.; no prereq.)				
	1f-2w (For predental, premedical, medical technology, and physical education for women students)				
	Lect.	VI	MWF	225C	Mr. Pervier
		VI	Th	225C	
	Quiz	VI	T	Ar	
	Lab.	VII, VIII, IX	T	290C	
	1f-2w (For architecture, agriculture, forestry, and home economics students)				
	Lect.	VI	MWF	100C	
	Quiz (fall)	VII	F	Ar	
	Lab. (fall)	VII, VIII, IX	M	210C	
	Quiz (winter)	VII	M	Ar	
	Lab. (winter)	VII, VIII, IX	F	210C	
3s‡	Semi-micro Qualitative Chemical Analysis (For agriculture, forestry, and home economics students) (4 cred.; prereq. 2)				
	Lect.	VII	MWF	325C	Mr. Barber
	Lab.	VIII, IX	MW	210C	
4f‡-5w†‡	General Inorganic Chemistry (8 cred.; for premedical students only; prereq. entrance cred. in chem.)				
	Lect.	VII	MWF	325C	Mr. Reyerson
	Lab.	VII, VIII, IX	T	210C	
	Quiz	VI	T	100C	
4f‡-5w†‡	General Inorganic Chemistry (8 cred.; primarily for predental and medical technology students; prereq. entrance cred. in chem.)				
	Lect.	VII	MWF	225C	Mr. Maynard
	Lab.	VII, VIII, IX	Th	210C	
	Quiz	VI	Th	100C	
6f‡-7w†‡	General Inorganic Chemistry (10 cred.; all; no prereq. A continuation of this course is 12s)				
	Lect.	II	MWF	325C(f)	
				225C(w)	Miss Cohen
	Quiz	I	Th	410C	
	Lab. Sec. 1	I, II	TS	210C	
		II	Th	210C	
	2	I, II, III	T	210C	
		II, III	Th	210C	
8s	This course has been renumbered 12.				
9f‡-10w†‡	General Inorganic Chemistry (10 cred.; all; prereq. entrance cred. in chem.)				
	Lect.	II	MWF	100C	Mr. Sneed
	Lab. Sec. 1	I, II	TThS	290C	
	2	I, II, III	ThS	290C	
9f‡-10w†‡	General Inorganic Chemistry (10 cred.; open only to agriculture, forestry, and home economics students; prereq. entrance cred. in chem.)				
	Lect.	VII	MWF	100C	Mr. Klug
	Lab.	VIII, IX	MWF	110C	
9w‡-10s†‡§	General Inorganic Chemistry (10 cred.; all; prereq. entrance cred. in chem.)				
	Lect. Sec. 1	III	MWF	325C	Miss Cohen
	2	III	MWF	410C(w)	Mr. Taylor
				225C(s)	
	Lab. Sec. 1	VI, VII	MWF	210C	
	2	VI, VII	MWF	290C	
11f*‡	Qualitative Chemical Analysis (4 cred.; primarily for premedical and predental students; prereq. Course 2 or 5)				
	Lect.	IV	MWF	225C	Miss Cohen
	Lab.	VI, VII, VIII, IX	F	210C	

* See the * footnote on page 31.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $2 per quarter is charged for this course.

§ Students who have failed in 1f, 4f, 6f, or 9f may register in section 2 for this course without further prerequisite.

No.	Title	Hour	Day	Bldg.	Instructor
11s*‡	Qualitative Chemical Analysis (4 cred.; for premedical, predental, and medical technology students; prereq. 2 or 5)				
	Lect. Sec. 1 (For those who took Inorg. Chem. 2)	VI	MWF	225C	Mr. Pervier
	Lab.	VI, VII, VIII, IX	T	290C	
	Lect. Sec. 2 (For those who took Inorg. Chem. 5)	VII	MWF	325C	Mr. Reyerson
	Lab.	VI, VII, VIII, IX	T	210C	
		or			
		VI, VII, VIII, IX	Th	210C	
12f*‡-13w‡¶	Qualitative Chemical Analysis (10 cred.; all; prereq. 10)				
	Fall Lect.	I	TThS	225C	Mr. Taylor
	Lab.	I, II, III	MW	290C	
	Winter Lect.	VI	WF	325C	Mr. Taylor
	Quiz	VI	M	410C	
	Lab.	VII, VIII, IX	WF	290C	
		VII, VIII	M	290C	
12s*‡¶	Qualitative Chemical Analysis (See 12f-13w)				
	Lect. Sec. 1 (For those who have completed Course 10)	II	MWF	100C	Mr. Sneed
	Lab.	I, II, III	ThS	290C	
	Lect. Sec. 2 (For those who have completed Course 7)	II	MWF	225C	Miss Cohen
	Lab.	I, II	TThS	210C	
		or			
		I, II, III	TTh	210C	
13f‡	Qualitative Chemical Analysis (See 12f-13w; prereq. 12 or the old Course 8)				
	Lect.	VI	MW	325C	Mr. Heisig
	Quiz	VI	F	335EE	
	Lab.	VII, VIII, IX	WF	290C	
		VII, VIII	M	290C	
101s	History of Chemistry (2 cred.; sr., grad.; prereq. Org. Chem. 52 or consent of instructor)				
		IV	T	Ar	Miss Cohen
		and one hr ar			
102s‡	Semi-micro Qualitative Analysis (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2)				
		Ar	Ar	290C	Mr. Barber
103f	The Chemistry of the Solid State (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2, Org. Chem. 52)				
		II	TThS	115C	Mr. Klug
104w	Atomic Structure and the Chemical Bond (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2, Org. Chem. 52)				
		II	TThS	115C	Mr. Taylor
105s	Co-ordination Compounds (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2, Org. Chem. 52)				
		II	TThS	115C	Mr. Maynard
109w‡-110s‡	Synthetic Inorganic Chemistry (3 to 5 cred. per qtr.; jr., sr., grad.; prereq. 13)				
		Ar	Ar	Ar	Mr. Heisig
117s‡§	Glass Blowing (1 cred.; jr., sr., grad.; no prereq.)				
		VII, VIII, IX	W	10C	Mr. Taylor

For other courses in Inorganic Chemistry see the Bulletin of the Institute of Technology.

* Course 12 (or the old Course 8) may be substituted for Course 11 by premedical and predental students who have completed Course 6-7. No student may receive credit for both Course 12 (or the old Course 8) and Course 11.

‡ A fee of $2 per quarter is charged for this course.

§ Carries credit only for juniors and seniors majoring in natural science.

¶ Students who have completed the old Course 8 should omit Course 12.

Analytical Chemistry

No.	Title	Hour	Day	Bldg.	Instructor
1w‡-2s*‡	Quantitative Analysis (10 cred.; soph., jr., sr.; prereq. Inorg. Chem. 13)				
	Lect.	VI	M	325C	Mr. Geiger
	Quiz	VI	F	410C	
	Rec.	VI or VII	W	111C	
	Lab. Sec. 1 Any 9 hrs. selected from	VI-IX	MWF	310C	
	2 (winter)	I-IV	T	310C	
		I-III	Th	310C	
		I-II	S	310C	
	2 (spring)	I-IV	T	310C	
		VII-IX	T	310C	
		I-II	Th	310C	
7f‡	Quantitative Analysis (4 cred.; primarily for premedical students; prereq. any course in qualitative chemistry)				
	Sec. 1 and 2				
	Lect.	VI	F	325C	Mr. Geiger
	Rec. (Limit 35 in each sec.)	VI or VII	W	111C	
	Quiz	VI	M	410C	
	Lab. Any other 8 hrs. selected from	VI-IX	MWF	310C	
	Sec. 3				
	Lect.	VI	T	325C	Mr. Meehan
	Rec.	VI	Th	325C	
	Lab.	VII, VIII, IX	TTh	310C	
		I, II, III	S	310C	
		or			
		II, III, IV	S	310C	
7s‡	Quantitative Analysis (4 cred.; primarily for premedical students; prereq. any course in qualitative chemistry)				
	Lect.	VI	T	325C	Mr. Meehan
	Rec.	VI	Th	325C	
	Lab.	VII, VIII, IX	TTh	310C	
		I, II, III	S	310C	
		or			
		II, III, IV	S	310C	
103f‡	Quantitative Inorganic Microanalysis (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2)	Ar	Ar	Ar	Mr. Sandell
104s‡	Microchemistry (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2)	Ar	Ar	Ar	Mr. Sandell
122f‡	Advanced Analytical Chemistry—A condensed review of modern fundamentals of gravimetric and volumetric analysis. (1 or 2 cred.; jr., sr., grad.; prereq. quantitative chemistry; 1 lecture, 1 recitation, and 3 to 6 laboratory hours to be arranged)				Mr. Geiger
123f‡	Advanced Analytical Chemistry (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2 or permission of instructor)				
	Lect.	Ar	Ar	Ar	Mr. Meehan
	Lab.	Ar	Ar	310C	
127w‡	Optical Methods in Analytical Chemistry (2 to 3 cred.; jr., sr., grad.; prereq. Phys. Chem. 103)				
	Lect.	Ar	Ar	Ar	Mr. Meehan
	Lab.	Ar	Ar	310C	Mr. Meehan
131f	Application of Indicators (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2 and Phys. Chem. 101-102-103)				
	Lect.	VI	MW	315C	Mr. Kolthoff
	Lab.	Ar	Ar	Ar	
132w‡	Electrometric Titrations (3 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2 and Phys. Chem. 101-102-103)				
	Lect.	VI	MW	315C	Mr. Kolthoff
	Lab.	Ar	Ar	Ar	

* Course 2s may precede 1w, if desired.

‡ A fee of $2 per quarter is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
140w‡	Water Analysis (2 cred.; jr., sr., grad.; prereq. Anal. Chem. 1-2)	Ar	Ar	Ar	Mr. Sandell

Organic Chemistry

1f‡-2w†‡	Elementary Organic Chemistry (8 cred.; primarily for premedical and predental students; prereq. Inorg. Chem. 11)				
	Lect. (all secs.)	I	MWF	100C	Mr. Arnold
	Lab. conference (all secs.)	II	T	225C	Mr. Arnold
	Quiz (all secs.)	I	T	Ar	Ar
	Lab. Sec. 1	VI-IX	T	390C	
	2	VI-IX	W	390C	
	3	I-IV	S	390C	
1w‡-2s†‡	Elementary Organic Chemistry (See 1f-2w)				
	Lect. (all secs.)	IV	MWF	100C	Mr. Koelsch
	Lab. conference (all secs.)	V	T	100C	Mr. Koelsch
	Quiz (all secs.)	IV	T	Ar	Ar
	Lab. Sec. 1	VI-IX	W	390C	
	2	VI-IX	Th	390C	
	3	I-IV	S	390C	
51f‡-52w†‡-153s‡	Elementary Organic Chemistry (5 cred. per qtr.; open to all except premedical, predental, and pharmacy students; required of all chemical engineers, chemists, and S. L. and A. majors; prereq. 15 cred. in college chemistry. Course 153 is prerequisite to all other advanced courses in organic chemistry)				
	Lect.	III	MWF	100C	Mr. Lauer(f,w), Mr. Smith(s)
	Lab. conference	III	ThS	325C	Mr. Arnold
	Lab. Sec. 1	II, III, IV	T	390C	
		VI, VII, VIII	T	390C	
	2	VI, VII, VIII	TTh	390C	
	3	VII, VIII, IX	WF	390C	
54f-55w†-156s	Elementary Organic Chemistry—Lectures only. The lectures are the same as those in Course 51f-52w-153s, together with general discussions of organic laboratory practice. (3 cred. per qtr.; open to all except premedical, predental, and pharmacy students and students majoring in chemistry; prereq. 15 cred. in college chemistry)	III	MWThF	100C	Mr. Lauer(f,w), Mr. Smith(s)
105f-106w-107s	Advanced Organic Chemistry (3 cred. per qtr.; jr., sr., grad.; prereq. 153)	I	MWF	225C	Mr. Smith

For advanced courses in Organic Chemistry see the Bulletin of the Institute of Technology.

Physical Chemistry

101f-102w-103s	Physical Chemistry—A general survey of the subject (9 cred.; jr., sr., grad.; prereq. two years college chemistry, one year college physics. A knowledge of calculus is advisable)				
	Lect.	IV	MWF	325C	Mr. MacDougall
	Rec. Sec. 1	IV	S	325C	
	2	IV	S	410C	
104f‡-105w‡-106s‡	Physical Chemistry Laboratory (To accompany or follow Course 101-102-103; 1 or 2 cred. per qtr.)				
	Lab. conference (for students registered for 2 cred. per qtr.)				
	Sec. 1	VI	W	410C	Mr. Livingston
	2	VI	T	410C	Mr. Livingston
	Lab. Sec. 1	VI, VII, VIII	M		
		VII, VIII	W	190C	
	2	VII, VIII	T		
		VI, VII, VIII	Th	190C	
	3	VI, VII, VIII	F	190C	

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $2 per quarter is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
107f‡-108w‡	Elementary Physical Chemistry (4 cred. per qtr.; for premedical students only; prereq. two years college chemistry, one year college physics)				
	Lect.	III	MWF	225C	Ar
	Rec.	VIII	T	ArC	Mr. Hull
	Lab. Sec. 1	I-III	T	190C	
	2	I-III	Th	190C	
116f-117w-118s	Advanced Physical Chemistry (9 or 12 cred.; jr., sr., grad.; prereq. 103 and calculus)	II	TThS	215C	Ar
128f-129w-130s	Colloid Chemistry (2 cred. per qtr.; sr., grad.; prereq. 103)	Ar	Ar	ArC	Mr. Reyerson
131f‡-132w‡-133s‡	Colloid Chemistry Laboratory (Cred. ar.; sr., grad.; prereq. 129 or 130)	Ar	Ar	Ar	Mr. Reyerson
161f-162w	Radioactivity (3 cred. per qtr.; jr., sr., grad.; prereq. 103)	IV	MWF	115C	Mr. Hull
180f,181w,182s	General Survey of Colloid Chemistry, Colloids in Industry, Colloids in Biology and Medicine (See the Bulletin of the Institute of Technology)	IV	MWF	215C	Mr. Freundlich

AGRICULTURAL BIOCHEMISTRY

Students in this college may elect courses in Agricultural Biochemistry by arrangement with the division. See the program of the College of Agriculture, Forestry, and Home Economics in this bulletin.

CHILD WELFARE

Adviser in the College of Science, Literature, and the Arts.—Professor Anderson.

Major advisers in the College of Education.—Professors Anderson and Foster.

For a specialized curriculum in Nursery School and Kindergarten Education, see the Bulletin of the College of Education.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
10s	Introduction to Child Study (2 cred.; 3rd qtr. fr., soph.; no prereq.)	VI	TTh	100Pt	Mrs. Faegre
40w§	Child Training (3 cred.; soph., jr., sr.; prereq. Psy. 1-2)	IV and one hr. ar.	MW	106Pt	Mrs. Foster

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

80f	Child Psychology (3 cred.; jr., sr.; prereq. Psy. 1-2)				
	Lect.	II	MW	202Pt	Mr. Anderson
	Rec. Sec. 1	II	F	Ar	
	2	III	F	Ar	
	3	I	Th	Ar	
80w	Child Psychology (See 80f)	IV	MWF	202Pt	Ar
80s	Child Psychology (See 80f)				
	Lect.	II	TTh	202Pt	Mr. Anderson
	Rec. Sec. 1	II	S	Ar	
	2	VII	F	Ar	

‡ A fee of $2 per quarter is charged for this course.

§ Offered fall and spring as Home Economics Education 90. See the program of the College of Education in another part of this bulletin.

No.	Title	Hour	Day	Bldg.	Instructor
82s	Later Childhood and Adolescence (3 cred.; prereq. 40 or 80 or equiv.)	II	MWF	202Pt	Mrs. Faegre
130f	Motor, Linguistic, and Intellectual Development of the Child (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)	I	MWF	202Pt	Mr. Anderson
131w	Personality, Emotional, and Social Development of the Child (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)	I	MWF	202Pt	Mr. Anderson
133w-134s†	Measurement of Child Personality (4 cred.; sr., grad.; prereq. 10 cred. in psy. or ed. psy. and Ed. Psy. 60, or Biometry 101, and permission of instructor)	VI	TTh	202Pt	Miss Goodenough
140f	Behavior Problems (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)	I, II	S	202Pt	Miss Goodenough
141w-142s	Practicum in Behavior Problems (Cred. ar.; sr., grad.; prereq. 140, and permission of instructor)	Ar	Ar	201Pt	Miss Goodenough
170s	Parent Education (2 cred.; sr., grad.; prereq. 15 cred. in child welfare or home economics or education or psychology or sociology or preventive medicine)	VI	MF	202Pt	Mrs. Foster, Mrs. Faegre
190s	Principles of Mental Measurement of Young Children (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)	II	TTh	100Pt	Miss Goodenough

For Graduate Students Only

230f-231w-232s	Seminar in Recent Literature	Ar	Ar	202Pt	Mr. Anderson
233f-234w-235s	Research in Child Development	Ar	Ar	Ar	Mr. Anderson and others
236f-237w-238s	Seminar in Human Development—Fall: Infant; Winter: Child; Spring: Adolescent	VI, VII	F	204EPt	Miss Goodenough
250f-251w-252s	Seminar in Nursery Education	VII	TTh	202Pt	Mrs. Foster
260w	Seminar in Physical Growth	Ar	Ar	226IA	Miss Boyd
261f-262w-263s	Statistical and Laboratory Work in Physical Growth	Ar	Ar	226IA	Miss Boyd
270f-271w-272s	Readings in Child Development	Ar	Ar	101Pt	Mr. Anderson and others
273f	Techniques of Parent Education	VI, VII	M	202Pt	Ar
274w	Field Work in Parent Education	Ar	Ar	204EPt	Ar
290f-291w†	Mental Examination of Preschool Children	III	MWF	202Pt	Miss Goodenough

Note.—See also Courses Ed. T. 55-59, 75, 76A-76B-76C, 77A-77B-77C, and Ed. C. I. 130, offered by the Institute of Child Welfare, and listed under Methods and Directed Teaching and Curriculum and Instruction in the program of the College of Education.

CLASSICS

Major adviser in the College of Science, Literature, and the Arts.—Professor Ogle.

Major sequences in the College of Science, Literature, and the Arts.—

GREEK

The elementary course 1f-2w-3s and twenty-seven credits in courses numbered above 50.

LATIN

Any three of the courses with numbers between 50 and 100; and one of the following combinations: (a) Any six courses numbered above 100; (b) any three courses numbered above 100; and Greek 51, 52, 53 or History 50-51-52.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Cram.

Requirements for a teacher's certificate in Latin.—Major recommendation: Course 73f-74w-75s and any two of the courses with numbers between 50 and 100, and three courses with numbers over 100, including 111f-112w-113s.

Minor recommendation: Course 73f-74w-75s and any two of the courses with numbers between 50 and 100.

To secure a recommendation from the department to take Special Methods and Directed Teaching in Latin a student must make a grade of C or better in Course 73f-74w-75s.

GREEK

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w†	Beginning Greek (10 cred.; all; no prereq.)	IV	MTWFS	114F	Mr. Heller
3s	Selections from Attic Prose (5 cred.; all; prereq. 1-2)	IV	MTWFS	114F	Mr. Heller

Senior College Courses

Courses 51, 52, 53, 73 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

51f	Lucian (3 cred.; jr., sr.; prereq. 1-2-3)	III	MWF	112F	Mr. Heller
52w	Homer (3 cred.; jr., sr.; prereq. 1-2-3)	III	MWF	112F	Mr. Heller
53s	Plato, Apology and Selections (3 cred.; jr., sr.; prereq. 1-2-3)	III	MWF	112F	Mr. Heller
73s	New Testament (3 cred.; jr., sr.; prereq. any two of 51,52,53)	Ar	Ar	118F	Mr. Ogle
101	*Tragedy* (3 cred.; jr., sr., grad.; prereq. any three of 51,52,53,73) *(Not offered)*				
102	*Comedy* (3 cred.; jr., sr., grad.; prereq. any three of 51,52,53,73) *(Not offered)*				
103	*Lyric Poetry* (3 cred.; jr., sr., grad.; prereq. any three of 51,52,53,73) *(Not offered)*				
111f	History: Herodotus (3 cred.; jr., sr., grad.; prereq. any three of 51,52,53,73)	Ar	Ar	112F	Mr. Heller
112w	History: Thucydides (3 cred.; jr., sr., grad.; prereq. any three of 51,52,53,73)	Ar	Ar	112F	Mr. Heller
113s	Hellenistic Literature (3 cred.; jr., sr., grad.; prereq. any three of 51,52,53,73)	Ar	Ar	112F	Mr. Ogle
121-122-123†	*Advanced Composition* (9 cred.; jr., sr., grad.; prereq. 24 credits in Greek) *(Not offered)*				
131	*Philosophy: Advanced Plato* (3 cred.; jr., sr., grad.; prereq. any two courses numbered above 100) *(Not offered)*				
132	*Philosophy: Aristotle's Ethics* (3 cred.; jr., sr., grad.; prereq. 131 or any two courses numbered above 100) *(Not offered)*				
171f,172w,173s	Independent Reading Course (3 cred. per qtr.; prereq. two courses with numbers above 100; open to students of exceptional ability with the consent of the instructor)	Ar	Ar	112F	Mr. Heller

For Graduate Students Only

201f-202w-203s	Graduate Seminar: Greek Literary Bibliography and Criticism (9 cred.)	Ar	Ar	Ar	Mr. Heller

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

211-212-213 *Graduate Seminar: Greek Epic* (9 cred.) *(Not offered)*
221-222-223 *Graduate Seminar: Greek Drama and Lyric Poetry* (9 cred.) *(Not offered)*
231-232-233 *Graduate Seminar: Greek Philosophy* (9 cred.) *(Not offered)*

Courses for Which No Knowledge of Greek Is Required

(See page 38)

LATIN

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w†	Beginning Latin (10 cred.; all; no prereq.)	IV	MTWFS	110F	Mr. Cram
3s	Caesar (5 cred.; all; prereq. 1-2, or 1 yr. of high school Latin)	IV	MTWFS	110F	Mr. Cram
11f	Vergil I (5 cred.; all; prereq. 1-2, 3, or 2 yrs. of high school Latin)	III	MTWThF	110F	Mr. Cram
12w	Vergil II (5 cred.; all; prereq. 11, or 3 yrs. of high school Latin)	III	MTWThF	110F	Mr. Cram

Senior College Courses

Courses 51, 52, 53, 63, 73-74-75, 81-82-83 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

51f	Pliny's Letters (3 cred.; jr., sr.; prereq. 12, or 3 or 4 yrs. of high school Latin)	II	TThS	109F	Mr. Ogle
52w	Horace (3 cred.; jr., sr.; prereq. 51 or 63)	II	TThS	109F	Mr. Ogle
53	*Suetonius, Selected Lives* (3 cred.; jr., sr.; prereq. 51 or 52 or 63) *(Not offered)*				
63s	Plautus and Terence (3 cred.; all; prereq.¶ 12, or 4 yrs. of high school Latin)	II	TThS	109F	Mr. Ogle
73f-74w-75s†	Prose Composition (3 cred.; all; prereq. 12, or 4 yrs. of high school Latin)	I	T	114F	Mr. Cram
81-82-83	*Survey of Roman Literature* (9 cred.; jr., sr.; prereq. any one of Courses 51,52,53,63) *(Not offered)*				
111f-112w-113s†	Advanced Prose Composition (3 cred.; jr., sr., grad.; prereq. 73-74-75)	I	T	109F	Mr. Ogle
121	*Advanced Vergil* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
131	*Juvenal* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
133s	Vulgar Latin (Development of Latin into Romance) (3 cred.; jr., sr., grad.; open to advanced students of Latin or a Romance language with the consent of instructor)	II	MWF	109F	Mr. Ogle
142w	Tacitus (3 cred.; jr., sr., grad.; prereq.*)	II	MWF	109F	Mr. Ogle
151f	Advanced Cicero (3 cred.; jr., sr., grad.; prereq.*)	II	MWF	109F	Mr. Ogle
152	*Lucretius* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
171f,172w,173s	Independent Reading Course (3 cred. per qtr.; prereq.*; open to students of exceptional ability with the consent of department)	Ar	Ar	118F	Ar

* Any two of the courses with numbers between 50 and 100.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

¶ A student who enters in the spring quarter with three years of high school Latin may, by special permission, take Course 63s.

For Graduate Students Only

No.	Title	Hour	Day	Bldg.	Instructor
201-202-203	*Graduate Seminar: Cicero* (9 cred.) *(Not offered)*				
211-212-213	*Graduate Seminar: The Latin Epic* (9 cred.) *(Not offered)*				
221-222-223	*Graduate Seminar: Lyric Poetry* (9 cred.) *(Not offered)*				
231f-232w-233s	Graduate Seminar: Latin Historiography (9 cred.)	VIII, IX	T	108F	Mr. Ogle
241f-242w-243s	Graduate Seminar: Introduction to Classical Philology (9 cred.)	VIII, IX	Th	110F	Mr. Cram

Courses for Which No Knowledge of Greek or Latin Is Required

17s	Greek and Latin Elements in English (2 cred.; soph., jr., sr.; no prereq.)	III	TTh	109F	Mr. Cram
31f,32w‖	Greek and Latin Drama (2 cred. per qtr.; soph., jr., sr.; no prereq.)	III	TTh	114F	Mr. Ogle
42w	Greek Mythology—The origin and development of myths (2 cred.; soph., jr., sr.; no prereq.)	I	WF	114F	Mr. Heller
43s	Ancient Mythology in Relation to Literature and Art (2 cred.; soph., jr., sr.; no prereq.)	I	WF	114F	Mr. Heller
92-93†§	*Classical Literary Tradition* (4 cred.; jr., sr.; no prereq.) *(Not offered)*				
106w§	General Linguistics (3 cred.; jr., sr., grad.; prereq. any two courses in a foreign language numbered above 50)	IV	MWF	109F	Mr. Ogle
107s§	Cultural Aspects of Language (3 cred.; jr., sr., grad.; prereq. any two courses in a foreign language numbered above 50)	IV	MWF	109F	Mr. Ogle

COMPARATIVE PHILOLOGY AND LINGUISTICS

See Linguistics and Comparative Philology, page 66.

DRAWING AND DESCRIPTIVE GEOMETRY

INSTITUTE OF TECHNOLOGY

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
41-42-43f,w,s	Technical Drawing—(a) General course in the theory and practice of freehand drawing. Principles of perspective, sketching, rendering, conventions, lettering, and industrial drawing. (b) Modification of the above course of particular interest to dental, medical, and scientific students. (6 cred.; all; no prereq.)				
	Sec. 1	I, II	MWF	411C	Mr. Doseff
	2	VI, VII	MWF		
	3	VIII, IX	MWF		
44f,w,s	Lettering—A practical course in plain lettering. (1 cred.; all; no prereq.)				
	Sec. 1	IV	T	21E(fall) 21E(winter) 107E(spring)	
	2	II	Th	227E(fall) 206E(winter) 205E(spring)	
45f,w,s	Alphabets—Construction and analysis of various types of letters and their arrangement. Exercises and reference work. (2 cred.; soph., jr., sr.; no prereq.)	III	TS	7E	

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

§ This course can be used as part of a minor only by students who are majoring in Classics.

‖ Students may enter either quarter.

Senior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
64w	Graphic Arts—Field, development, and application in art and industry. Design and composition. Discussion of materials, style, and technique. (3 cred.; jr., sr.; prereq. 15 cred. in econ.)	IV	MWF	206E	Mr. Doseff

Course 64w is one of three courses related in general subject-matter of special interest to students of journalism and advertising. The other two, listed elsewhere in this bulletin, are Journalism 65f, "Graphic Arts: Processes," and Business Administration 194s, "Advanced Advertising Procedure."

81-82-83f,w,s	Advanced Drawing—Principles of design—traditional and modern. Layouts, composition, and illustration. Black and white and color. Scientific modeling. (3 cred. per qtr.; prereq. 43 or equiv.)	Ar	Ar	Ar	Mr. Doseff
86-87f,w,s†	Anatomical Drawing (3 cred. per qtr.; prereq. 43 or equiv.)	Ar	Ar	Ar	Mr. Doseff

Other courses offered by the Department of Drawing and Descriptive Geometry and listed in the Bulletin of the Institute of Technology are open to students of this college only by special permission of the Students' Work Committee.

ECONOMICS

For courses, major advisers, and major sequences in Economics, see the program of the School of Business Administration, in another part of this bulletin.

EDUCATION

The following courses in Education are regularly open to students of the College of Science, Literature, and the Arts:

Art Education (Courses in Design)

ArtEd.14-15-16	Introduction to Art Education
ArtEd.14A-15A-16A	Introduction to Art Laboratory
ArtEd.1-2-3	Fundamental Experiences in Design
ArtEd.20-21-22	Fundamental Experiences in Design (Continued)

Art Education (Courses in Representation)

ArtEd.4-6-8	Drawing from Still Life and Pose
ArtEd.24-26-28	Drawing from Still Life and Pose (Continued)
ArtEd.61,62,63	Painting in Relation to Architectural, Industrial, and Dramatic Demands
ArtEd.66,67,68	Painting. (A continuation of 61,62,63)
ArtEd.124E-125E-126E	Advanced Painting

Music Education

Mu.Ed.1	Music Orientation
Mu.Ed.63	Band Conducting
Mu.Ed.65	Instrumentation
Mu.Ed.68	Conducting of Instrumental Music and Survey of Materials
Mu.Ed.70	Accompanying and Sight Reading

Educational Psychology

Ed.Psy.60	Introduction to Statistical Methods
Ed.Psy.116-117	Statistical Methods in Education
Ed.Psy.141	Group Aptitude Testing
Ed.Psy.142	Individual Aptitude Testing

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

For hours, days, credits, prerequisites, etc., see the Education section of this Combined Class Schedule.

Other courses in Education may be taken by students of the College of Science, Literature, and the Arts only by special permission of the Students' Work Committee and the consent of the College of Education. Requests for the special permission should be submitted by Junior College students to Assistant Dean Bussey in 106 Folwell Hall and by Senior College students to Assistant Dean Thomas in 219 Folwell Hall.

ENGLISH

Major advisers in the College of Science, Literature, and the Arts.—Associate Professor McDowell; Assistant Professors Carr and Jackson.

Major sequence in the College of Science, Literature, and the Arts.—

A total of at least 32 credits for the entire sequence, comprising the following:

A. Course 75, Chaucer; 55-56, Shakespeare; 62, Milton.

B. Additional credits in Senior College courses, of which at least twelve must be from courses numbered 100 or above.

(Prerequisites: Courses 21-22 or 22-23.§)

Composition 65 is recommended as an excellent course for majors in English.

Major advisers in the College of Education.—Professor Dora Smith; Associate Professor Nichols.

Requirements for a teacher's certificate.—

	Credits
a. English as a major subject:	
English 22-23. Introduction to Literature	10
English 55-56. Shakespeare	6
English 73-74. American Literature	6
Composition 27-28. Advanced Writing	6
Speech	6
Additional credits, all of which must be secured in courses numbered 100 or above	6
Total credits	40
b. English as a minor subject:	
English 22-23. Introduction to Literature	10
English 55-56. Shakespeare	6
English 73-74. American Literature	6
Composition 27-28. Advanced Writing	6
Total credits	28

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
Af-Bw-Cs	Freshman English. See Composition, page 43.				
21f-22w-23s¶‖	Introduction to Literature—21f: Marlowe, Spenser, Bacon, Browne, Milton, and Bunyan; 22w: Dryden, Pope, Swift, Addison and Steele, Johnson, Boswell, Fielding, and Sheridan; 23s: Wordsworth, Byron, Shelley, Keats, Lamb, Carlyle, Browning, and Arnold (15 cred.; all; prereq.*)				
	Sec. 1	III	MTWThF	301F	Mr. Thomas
	2	VI	MTWThF	301F	Miss Jackson

* English A-B-C or Composition 4-5-6 or exemption from requirement.

§ Course 22-23 is required for a teacher's certificate.

¶ Students may enter any quarter. Students must take either 21 and 22 or 22 and 23 to receive credit. Two quarters are required as prerequisite for a major sequence; the second and third quarters are required for a teacher's certificate. Three quarters are recommended.

‖ Students may enter any quarter.

No.	Title	Hour	Day	Bldg.	Instructor
37f-38w-39s‖	Twentieth-Century Literature—Readings in British and American literature since the 1890's, arranged by types of discourse—37f: The literature of opinion, biography, travel, etc., with some reading in the short story; 38w: Poetry and drama; 39s: The novel since Thomas Hardy. This course is intended, as a general introduction to the intelligent reading of literature, for students in all colleges, and not particularly for those meaning to specialize in English (9 cred.; soph., jr., sr.; prereq.*)	VII	MWF	301F(fall)	Mr. Conklin
				301F(winter)	Mr. Sanford
				166Ph(spring)	Mr. Beach
40w-41s‖	The Bible As Literature (6 cred.; all; prereq.*)	IV	MWF	311½F	Mr. Dunn

Senior College Courses

Courses 52-53, 55-56, 58-59, 61, 62, 63, 73-74, 75, 76, 77-78, 86 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

52f-53w†‖	The English Novel—52f: The reading of novels by Defoe, Fielding, Fanny Burney, Jane Austen, Scott, Thackeray; 53w: The reading of novels by Dickens, Charlotte and Emily Brontë, George Eliot, Trollope, Meredith (6 cred.; jr., sr.; prereq.§)	VI	MWF	204F	Mr. Hillhouse
55f-56w†	Shakespeare—Course 55: The reading of *The Comedy of Errors, The Two Gentlemen of Verona, The Taming of the Shrew, The Merchant of Venice, Much Ado About Nothing, Twelfth Night,* with collateral reading. *Midsummer Night's Dream, The Tempest,* to be read independently. Course 56: The reading of *Richard II, Henry IV,* 1 and 2, *Henry V, Richard III, Julius Caesar, Hamlet, Macbeth,* with collateral reading (6 cred.; jr., sr.; prereq.§)				
	Sec. 1	I	TThS	204F	Mr. Hessler
	2	II	TThS	9F	Miss Atkins
	3	VI	MWF	114F	Miss Carr(f), Miss Atkins(w)
	4	VI	MWF	321F	Mr. Brown(f), Mr. Flanagan(w)
	5	VII	MWF	205F	Mr. Dunn
55w-56s†	Shakespeare—(See 55f-56w)				
	Sec. 1	III	TThS	306F	Mr. Hillhouse
	2	VI	MWF	205F	Mr. Dunn(w), Miss Carr(s)
55s	Shakespeare (1st qtr. of 55-56. See 55f-56w)				
	Sec. 1	I	TThS	213F	Mr. Hessler
	2	II	MWF	114F	Mr. Brown
58f-59w†	Nineteenth-Century Prose (6 cred.; jr., sr.; prereq.§)	II	TThS	204F	Mr. Nichols
61f	American Pronunciation (3 cred.; jr., sr.; prereq.§)	IV	MWF	205F	Mr. Ruud
62f	Milton (4 cred.; jr., sr.; prereq. 21-22 or 55-56)	I	MTThF	205F	Mr. Stoll
63w	American Usage (3 cred.; jr., sr.; prereq.§)	IV	MWF	205F	Mr. Ruud
73f-74w†	American Literature (6 cred.; jr., sr.; prereq.§)	II	MWF	301F	Mr. McDowell
75f	Chaucer (4 cred.; jr., sr.; prereq.§)	III	MTThF	305F	Miss Carr
75w	Chaucer (See 75f)	VI	MTWF	303F	Miss Carr
75s	Chaucer (See 75f)	III	MTThF	305F	Mr. Dunn

* English A-B-C or Composition 4-5-6 or exemption from requirement.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

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

‖ Students may enter any quarter.

No.	Title	Hour	Day	Bldg.	Instructor
76s	American Literature since 1885 (3 cred.; jr., sr.; prereq. 73-74)	II	MWF	305F	Mr. McDowell
77-78	*Classic Myths and the Classic Tradition in English Poetry* (6 cred.; jr., sr.; prereq.§) *(Not offered)*				
81-82†	*Survey of Middle English* (6 cred.; jr., sr.; prereq.§) *(Not offered)*				
86s	Forms of English Verse (3 cred.; jr., sr.; prereq.§)	VII	MWF	303F	Miss Jackson
97f-98w-99s†	Independent Reading Course (9 cred.; jr., sr.; prereq. permission of department)	Ar	Ar	Ar	Mr. Dunn(f), Mr. Hessler(w), Mr. Nichols(s)
100f	Old English (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	II	TWThF	302F	Mr. Ruud
102w	Old English Poetry (3 cred.; jr., sr., grad.; prereq. 100)	II	MWF	302F	Mr. Ruud
103s	Beowulf (3 cred.; jr., sr., grad.; prereq. 100)	II	MWF	302F	Mr. Ruud
105-106†	*Eighteenth-Century Poetry* (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				
107w-108s†	Eighteenth-Century Prose (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	VII	MWF	204F	Mr. Moore
109f-110w†	Romantic Poets (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	III	TThS	204F	Mr. Beach
111-112†	*Seventeenth-Century Prose* (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				
113f	American Short Story (3 cred.; jr., sr., grad.; prereq. 73-74)	III	MWF	204F	Mr. McDowell
115w-116s†	The Development of English Prose Style (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	VI	MWF	306F	Mr. Brown
123f-124w-125s†	Technique of the Novel (9 cred.; sr., grad.; prereq. 6 cred. above 50 and permission of instructor)	4:00-6:00	T	205F	Mr. Beach
126f-127w†	Drama, 1660-1880 (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	VII	MWF	306F	Mr. Hillhouse(f), Mr. Nichols(w)
129s	Modern Drama: 1880 to Present (4 cred.; jr., sr., grad.; prereq. 55-56 or 126-127)	II	MTThF	204F	Mr. Stoll
133	*Ballads* (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				
135	*Spenser* (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				
136s	Advanced Shakespeare (4 cred.; jr., sr., grad.; prereq. 55-56)	I	MTThF	205F	Mr. Stoll
137f	Late Eighteenth-Century Poetry—Principal figures are Crabbe, Cowper, Burns, and Blake (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	IV	MWF	204F	Mr. Moore
140s	Advanced Chaucer (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50, including 75)	IV	MTWF	205F	Mr. Ruud
141-142-143	*Historical Grammar* (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50, including 75 or 81-82) *(Not offered)*				
146w-147s†	Medieval Romances: Stories of Thebes and Troy, of Alexander, of Charlemagne, and of English Heroes (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50, including 75 or 81-82)	VII	MWF	305F	Miss Carr
148-149†	*Arthurian Romances* (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				
150w	Victorian Poetry (except Browning and Tennyson) (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	II	MTThF	205F	Mr. Stoll
151s	Recent Poetry (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	III	TWThF	204F	Miss Jackson

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

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

No.	Title	Hour	Day	Bldg.	Instructor
152	*Pre-Elizabethan Drama* (3 cred.; jr., sr., grad.; prereq. 55-56) *(Not offered)*				
153	*Seventeenth-Century Lyrists* (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				
154w-155s†‖	American Novel (6 cred.; jr., sr., grad.; prereq. 73-74, or 52-53)	III	MWF	303F	Mr. McDowell
156s	The American Drama to 1880 (3 cred.; jr., sr., grad.; prereq. 73-74)	VI	MWF	303F	Mr. Nichols
157f-158w†	Elizabethan Non-Dramatic Literature (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50, including 55-56 or 170)	I	MWF	303F	Mr. Brown
159	*Colonial Literature in America* (3 cred.; jr., sr., grad.; prereq. 73-74) *(Not offered)*				
160	*History of the English Language* (2 cred.; jr., sr., grad.; prereq. 6 cred. above 50, including 100) *(Not offered)*				
162f	Restoration Non-Dramatic Literature (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	VII	MWF	204F	Mr. Moore
163w-164s†	Restoration Drama (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	IV	MWF	204F	Mr. Moore
165	*The Historical Study of Modern English* (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				
167-168	*English Literary Criticism* (6 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				
169f	Browning and Tennyson (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	II	MTThF	205F	Mr. Stoll
170	*Elizabethan Drama (except Shakespeare)* (4 cred.; jr., sr., grad.; prereq. 55-56) *(Not offered)*				
225f-226w-227s†	Elizabethan Drama	4:00-6:00	W	312Lib	Mr. Stoll
228f-229w-230s†	Eighteenth-Century Novel	4:00-6:00	Th	312Lib	Mr. Moore
240f-241w-242s†	The Canterbury Tales	4:00-6:00	M	312Lib	Mr. Ruud
253f-254w-255s†	American Romanticism I: New England	4:00-6:00	F	312Lib	Mr. McDowell
256f-257w-258s†	Spenser and Milton	10:30-12:30	S	312Lib	Mr. Brown

COMPOSITION

Major advisers in the College of Science, Literature, and the Arts.—Associate Professor Nichols; Assistant Professor Phelan.

Major sequence in the College of Science, Literature, and the Arts.—Either 67-68 or 69-70-71; and 81-82-83; and 91-92-93; and 15 credits in Senior College courses in English to be chosen under the direction of a major adviser from a list of recommended courses.

(Prerequisites: Course 27 and two of the following: 28, 29, 65; also English 21-22 or 22-23.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Important note.—No student may register for any course in Freshman English without having taken a placement test. Assignment to a particular course in Freshman English will depend on the student's record in the placement test.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‖ Students may enter any quarter.

Assignments to all sections in Freshman English and composition are contingent upon the student's presence in class at the first scheduled meeting. A student who is absent from the first meeting of the course forfeits his place in the section.

Freshman English is a 15-credit course consisting of 9 credits of literature and 6 credits of composition. Composition 4-5-6 is a 9-credit course in composition. Either course satisfies the requirement in English for graduation or for admission to the Senior College. Students who have already completed one or more quarters of Freshman English in another college should consult Professor Hillhouse, 221 Folwell Hall, before registering.

Any student who receives an A in composition in Course A or B or 4 or 5 may, upon recommendation of his instructor, be exempted from any further requirement in English.

Any student who receives an A or B in Course 4 or 5 may, upon recommendation of his instructor, elect the following quarter of A-B-C.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
Af-Bw-Cs	Freshman English (15 cred.; all; prereq. placement test)				
		I	MTWThF	Ar	Ar
		II	MTWThF		
		III	MTWThF		
		IV	MTWFS		
		VI	MTWThF		
		VII	MTWThF		
Aw-Bs	Freshman English (2 qtrs. of A-B-C. See Af-Bw-Cs)				
		I	MTWThF	Ar	Ar
Cf	Freshman English (3rd qtr. of A-B-C. See Af-Bw-Cs)				
		VI	MTWThF	Ar	Ar
4f-5w-6s	Freshman Composition (9 cred.; all; prereq. placement test)				

Composition 4-5-6 is in the main a three-hour recitation course. A few sections of 4f-5w, however, are offered with a two-hour laboratory period instead of one of the recitation periods. The time here is used in planning and writing themes (which are ordinarily prepared outside of class) with the help of the instructor. Such sections are for students who wish to take advantage of this sort of help. The laboratory work will not continue into the spring quarter.

Sections of Course 4-5-6 with writing laboratory

Sec. 1	Rec.	I	MW	Ar	Ar
	Lab.*	I, II	F		
Sec. 2	Rec.	II	MF		
	Lab.*	I, II	W		
Sec. 3	Rec.	III	MW		
	Lab.*	III, IV	F		
Sec. 4	Rec.	IV	MF		
	Lab.*	III, IV	W		
Sec. 5	Rec.	VI	MW		
	Lab.*	VI, VII	F		
Sec. 6	Rec.	VII	MF		
	Lab.*	VI, VII	W		

Sections of Course 4-5-6 without writing laboratory

Sec. 1	I	MWF	Ar	Ar
2	II	MWF		
3	III	MWF		
4	IV	MWF		
5	V	MWF		

* In the spring quarter a third recitation will be substituted for the laboratory work at an hour fitting into the sequence of the other two recitations. For instance, for Sec. 1, the spring quarter schedule will be I MWF.

No.	Title	Hour	Day	Bldg.	Instructor
4f-5w-6s	Freshman Composition—Continued				
	Sec. 6	VI	MWF		
	7	VII	MWF		
	8	I	TThS		
	9	II	TThS		
	10	III	TThS		
4w-5s	Freshman Composition (2 qtrs. of 4-5-6. See 4f-5w-6s)				
	Sec. 1	II	TThS	Ar	Ar
	2	V	MWF		
4s	Freshman Composition (1st qtr. of 4-5-6. See 4f-5w-6s)				
	Sec. 1	III	TThS	Ar	Ar
	2	V	MWF		
6f	Freshman Composition (3rd qtr. of 4-5-6. See 4f-5w-6s)				
		VII	MWF	Ar	Ar
27f-28w§	Advanced Writing—In the first half of this course the writing is exposition, with stress on logical organization; in the second it consists of description and narration (6 cred.; all; prereq. A-B-C or 4-5-6 or exemption from requirement)				
	Sec. 1 (fall, winter)	I	TThS	Ar	Mrs. del Plaine
	2 (fall, winter)	II	MWF	Ar	Mr. Hessler
	2a (fall, winter)	II	TThS	Ar	Mr. Bouvier
	2b (fall only)	II	TThS	Ar	Mr. Coon
	3 (fall, winter)	III	MWF	Ar	Mr. Flanagan
	3a (fall only)	III	MWF	Ar	Mr. Clark
	4 (fall, winter)	IV	MWF	Ar	Miss Atkins
	4a (fall, winter)	IV	MWF	Ar	Miss Scallon
	5 (fall, winter)	VI	MWF	Ar	Miss Christie
	5a (fall only)	VI	MWF	Ar	Mr. Briggs
27w-28s§	Advanced Writing. (See 27f-28w)				
	Sec. 1	I	MWF	Ar	Mr. Clark(w), Mr. Briggs(s)
	2	II	MWF	Ar	Mr. Coon(w), Mrs. Phelan(s)
	2a	II	MWF	Ar	Mrs. McFadyen
27s§	Advanced Writing (1st qtr. of 27-28. See 27f-28w)				
	Sec. 1	I	MWF	Ar	Mrs. del Plaine
	2	II	MWF	Ar	Mr. Flanagan
28f§	Advanced Writing (2nd qtr. of 27-28. See 27f-28w)				
		II	MWF	Ar	Mr. Nichols
29s§	Advanced Writing—The nature of the writing is left as far as possible to the choice of the students. The instructor will divide the class into several groups according to the types of writing students wish to do (3 cred.; all; prereq. 27)				
	Sec. 1	II	MWF	Ar	Mr. Hessler
	2	IV	MWF	Ar	Miss Atkins
36s	Technical Writing. Consult the Bulletin of the Institute of Technology.				

Senior College Courses

Course 65 is open to Junior College students who have an average grade of at least C in the prerequisite courses.

Courses 67-68, 69-70-71, 81-82-83 are open to Junior College students who have an average of at least B in two quarters of Courses 27-28, 29, 65.

Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

65s	The Writing of Term Papers and Theses (3 cred.; jr., sr.; prereq. A-B-C or 4-5-6 and 6 additional cred. in English, or 10 cred. in Eng. 21-22-23)				
		Ar	Ar	Ar	Mr. Dunn

§ To receive credit for any part of this course a student must complete 27-28 or 27-29.

No.	Title	Hour	Day	Bldg.	Instructor
67f-68w†	Problems of Style (6 cred.; jr., sr.; prereq. average of B in two qtrs. of 27-28, 29, 65)	IV	MWF	304F	Mrs. Phelan
69f-70w-71s†	Short Story Writing (6 cred.; jr., sr.; prereq. average of B in two qtrs. of 27-28, 29, 65)	VIII, IX	W	304F	Mrs. Phelan
81f-82w-83s	Essay Writing (6 cred.; jr., sr.; prereq. average of B in two qtrs. of 27-28, 29, 65)	III	TTh	304F	Mr. Nichols
91f-92w-93s†	Seminar in Writing (9 cred.; sr.; prereq. 9 cred. in Senior College courses and permission of instructor)	VII, VIII	Th	304F	Mrs. Phelan

FINE ARTS

Major adviser in the College of Science, Literature, and the Arts.—Professor Schmeckebier.

The courses offered by the Department of Fine Arts are planned to develop critical understanding and practical skill in the arts through the various interrelated cultural aspects of history and criticism of style, knowledge of techniques, as well as practical design and studio work. They are offered not only as a field of specialized or professional training, but also are intended to serve the related fields of the humanities, i.e., history, literature, and philosophy, as well as journalism, the social sciences, and education.

The basic introductory course is Fine Arts 1-2-3 which the student is expected to take as early as possible, preferably in the freshman or sophomore year. In it are combined the elementary principles of style and technique in the arts of painting, sculpture, architecture, and the minor arts, with a systematic survey of their development from earliest times through the present day.

Subsequent courses are arranged in two sequences in accordance with the historical or practical interests of the student:

Sequence A is concerned primarily with the historical and critical study of the various stylistic periods, artists, and important works. The selection of courses required and suggested for this sequence offers the student not only a broad acquaintance with the fields of the humanities either as an end in itself or as a foundation for further study, but also affords practical training in art criticism and writing, library, museum, and education work in the arts.

Sequence B is intended for students desiring a practical acquaintance with the various artistic processes as well as technical skill in drawing and studio design. Here, too, the opportunities for direct application to contemporary problems of industrial and commercial design are available to the students in a limited number of courses.

In both elementary and advanced courses the extensive facilities of the University and the Twin Cities are planned as an integral part of the curriculum. These include: the current exhibitions shown at the University Gallery, the collection of prints, reproductions, and art reference pamphlets in the Fine Arts Reading Room of the gallery, the original works of art on exhibit in the Minneapolis Institute of Arts, the Walker Art Center, the St. Paul Gallery of Art, and the studio facilities of the University Department of Art Education, and the Institute of Technology.

Major sequences in the College of Science, Literature, and the Arts.—

Sequence A. Art History. Requirements for students majoring in the history and theory of art are Course 1-2-3 (Introduction to Art) and 33 credits in courses numbered above 50. Strongly recommended, but not required, are 6 or more credits of studio work, a reading knowledge of at least one foreign language, and basic courses in history and

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

literature. At the end of the senior year majors are required to take a comprehensive examination covering the general history of art, a knowledge of the techniques and principles of the various art mediums, and a special knowledge of one particular period of art (Ancient, Medieval, Renaissance, Baroque, or Modern).

Sequence B. Practical Studio Work. Requirements for students majoring in practical art are: Courses 1, 2, 3 (Introduction to Art); 9 credits in art history courses with numbers above 70; and 27 credits in Senior College practical art courses given by the Departments of Architecture, Art Education, and Drawing and Descriptive Geometry. For a list of these courses see pages 23, 39, 38 of this bulletin.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Introduction to Art: Modern Art—Modern architecture, painting, and sculpture in Europe and America, with a critical analysis of the various schools, the theories, and the principle works of contemporary art. Particular emphasis is placed upon the study of important architectural monuments in St. Paul and Minneapolis as well as the original works of art in the Minneapolis Art Institute, the Walker Art Center, and the St. Paul Gallery of Art. These, together with the current exhibitions and art reproductions in the University Gallery, are the working laboratories of the course (3 cred.; all; no prereq.)	III and 1 hr. ar.	TTh	JAud	Mr. Schmeckebier
2w	Introduction to Art: Ancient and Medieval Art—A general history of painting, sculpture, and architecture from prehistoric times through the Egyptian, Greek, and Roman styles to the end of the Romanesque and Gothic periods of Medieval Europe (3 cred.; all; no prereq.)	III and 1 hr. ar.	TTh	JAud	Mr. Schmeckebier
3s	Introduction to Art: Renaissance and Baroque Art—The history of painting, sculpture, and architecture from the early Renaissance in Italy to the French Revolution (3 cred.; all; no prereq.)	III and 1 hr. ar.	TTh	JAud	Mr. Schmeckebier

Senior College Courses

Courses 51-52-53 and 71-72-73 are open to sophomores who have completed 9 credits in Fine Arts with an average grade of C. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

51f-52w-53s†	History of Architecture—This is the same course as Arch. 51-52-53. It is intended to give both students of architecture and those interested in cultural history a comprehensive knowledge of the historic styles and important architectural monuments. Emphasis is placed not only on the various problems of architectural design, but also upon the structural methods, social uses, and esthetic effects of the great buildings of the past. Course 51f deals primarily with ancient architecture (Egyptian, Mesopotamian, Greek, and Roman); 52w with the Medieval period (Early Christian, Byzantine, Romanesque, and Gothic); and 53s traces the development of Renaissance, Baroque, and Modern architecture (9 cred.; jr., sr.; prereq. consent of instructor)	IV	MWF	320E	Mr. Lesley
57-58-59	*Art in the Americas (Not offered)*				
61f-62w-63s	Tutorial Work—This is the same course as Arch. 61-62-63. (2 cred. per qtr.; for students majoring in architecture or in fine arts, Sequence A only; prereq. consent of instructor)	Ar	Ar	Ar	Mr. Schmeckebier, Mr. Lesley

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

No.	Title	Hour	Day	Bldg.	Instructor
71f	Modern Art: Classicism and Romanticism—The development of sculpture and painting from the period of the French Revolution to about 1850 in France, Germany, Spain, and England, as well as parallel developments in America (3 cred.; jr., sr.; prereq. 1-2-3 or 51-52-53)	VI	MWF	2J	Mr. Lesley
72w	Modern Art: Realism and Impressionism—Painting and sculpture in Europe during the second half of the nineteenth century with particular emphasis on the various schools of Paris, their influence and parallels in England, Germany, and the United States (3 cred.; jr., sr.; prereq. 1-2-3 or 51-52-53)	VI	MWF	2J	Mr. Lesley
73s	Modern Art: Contemporary Art in Europe and America—The development of painting in Europe from Post-Impressionism (Cezanne, Van Gogh, Gauguin) through contemporary Surrealism, together with the related movements in the United States (3 cred.; jr., sr.; prereq. 1-2-3 or 51-52-53)	VI	MWF	2J	Mr. Lesley
141f	Art in Egypt and the Near East—The development of architecture, painting, sculpture, and the minor arts of vase painting, mosaic, and metal work in Egypt, Mesopotamia (Hittite, Sumerian, Babylonian, and Assyrian), and Persia. Particular emphasis will be placed on the history and exploitation of the various archeological sites as well as on the methods of archeological research (3 cred.; jr., sr., grad.; prereq. 9 cred. in fine arts, or 9 cred. in hist. or lit. with consent of instructor)	II	MWF	2J	Mr. Lesley
142w	Greek Art—A study of the various Aegean styles (Minoan, Helladic) and particularly the evolution of Greek architecture and sculpture from the archaic through the Classic and Hellenistic periods (3 cred.; jr., sr., grad.; prereq. 9 cred. in fine arts, or 9 cred. in hist. or lit. with consent of instructor)	II	MWF	2J	Mr. Lesley
143s	Etruscan and Roman Art—Architecture, painting, and sculpture from the early Etruscan period through Rome of the Republic and Imperial epochs and the period of Constantine (3 cred.; jr., sr., grad.; prereq. 9 cred. in fine arts, or 9 cred. in hist. or lit. with consent of instructor)	II	MWF	2J	Mr. Lesley
151	*Early Medieval Art (Offered in alternate years. Not offered in 1940-41)*				
152	*Carolingian and Romanesque Art (Offered in alternate years. Not offered in 1940-41)*				
153	*Gothic Art (Offered in alternate years. Not offered in 1940-41)*				
154f	Italian Painting and Sculpture of the Early Renaissance—The development of painting and sculpture in Italy from Masaccio and Ghiberti to Donatello and the great painters of the fifteenth century in Florence, Rome, and Venice (3 cred.; jr., sr., grad.; prereq. 9 cred. in fine arts, or 9 cred. in hist. or lit. with consent of instructor)	IV	MWF	2J	Mr. Schmeckebier
155w	Great Masters of the High Renaissance—A study of the sources and the important works of Leonardo de Vinci, Raphael, Michelangelo, Titian, and Correggio, with a survey of their influence on the Renaissance art of Spain, France, and Flanders (3 cred.; prereq. 9 cred. in fine arts, or 9 cred. in hist. or lit. with consent of instructor)	IV	MWF	2J	Mr. Schmeckebier
156s	Renaissance Art in Northern Europe—The development of painting and sculpture in Flanders, Northern France, and Germany from the Van Eycks to Albrecht Durer and Hans Holbein. Particular emphasis will be given to the evolution of the graphic arts in the fifteenth century, their influence and contribution to the culture of the Renaissance (3 cred.; jr., sr., grad.; prereq. 9 cred. in fine arts, or 9 cred. in hist. or lit. with consent of instructor)	IV	MWF	2J	Mr. Schmeckebier
163f-164w-165s	Museum Science and Management (This course may be taken only by special permission from Mr. Schmeckebier. Credits, hours, and days to be arranged)				

For Graduate Students Only

201f-202w-203s	Seminar—Special problems in American art (3 cred. per qtr.; prereq. 18 cred. in Senior College courses in fine arts or consent of instructor)	Ar	Ar	Ar	Mr. Schmeckebier

FRENCH

See Romance Languages, page 94.

GEOGRAPHY

Major adviser in the College of Science, Literature, and the Arts.—Professor Davis.

Major sequence in the College of Science, Literature, and the Arts.—Twenty-seven credits from Geography 53, 71, 101, 102, 110, 111, 120, 133, 241, 251, 252, 253; Economics 172, 176; Geology 110; History 80-81-82; Botany 131. At least 20 credits must be in Geography.

(Prerequisites: Courses 11 and 41; Geology 1-2 and A-B, or 1-3 and A-C, or 8; Economics 6-7).

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Davis.

Requirements for a teacher's certificate.—Major recommendation: a minimum of 28 credits from the following courses in Geography: 11, 41, 47, 53, 71, 101, 102, 110, 111, 120, 133, 241, 251, 252, 253.

An additional 5 credits from the following courses in Geology: 1-2, 1-3, or 8.

Minor recommendation: 18 credits from the following courses in Geography: 11 or 41, 53, 71, 101, 102, 110, 120.

For a specialized curriculum in social studies, see the Bulletin of the College of Education.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
11f*	Human Geography—A study of environmental factors as they limit human activities. Current problems in the use of our natural resources are used as illustrative material (5 cred.; soph., jr., sr.; no prereq.)				
	Sec. 1	II	MTWThF	103Bu	Mr. Davis
	2	III	MTWThF	103Bu	Mr. Brown
11w*	Human Geography (See 11f)				
	Sec. 1	I	MTWThF	103Bu	Mr. Davis
	2	II	MTWThF	103Bu	Mr. Davis
	3	III	MTWThF	103Bu	Mr. Brown
11s*	Human Geography (See 11f)				
	Sec. 1	II	MTWThF	103Bu	Mr. Davis
	2	III	MTWThF	103Bu	Mr. Brown
41f*	Geography of Commercial Production—Types of production and their geographic basis. Emphasis on the production of commodities of commercial significance. (5 cred.; soph., jr., sr.; no prereq.; Course 11 recommended)				
	Sec. 1	VI	MTWThF	103Bu	Mr. Dicken
	2	VII	MTWThF	103Bu	
41w*	Geography of Commercial Production (See 41f)				
	Sec. 1	VII	MTWThF	133Ph	
	2	VI	MTWThF	103Bu	Mr. Dicken
41s*	Geography of Commercial Production (See 41f)				
	Sec. 1	VII	MTWThF	150Ph	
	2	VI	MTWThF	103Bu	Mr. Dicken
47w	Geography of Minnesota (3 cred.; soph., jr., sr.; prereq. 11 or 41)				
		VII	MWF	103Bu	Mr. Dicken

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

* Registration is limited. Written permission from the Junior College office, 106 Folwell Hall, is necessary for admission, except to the VII hour sections of 41w and 41s.

No.	Title	Hour	Day	Bldg.	Instructor
53s	Historical Geography of North America (3 cred.; jr., sr.; prereq. 11, or 15 cred. in history)	I	TThS	103Bu	Mr. Brown
71f	Geography of North America (3 cred.; jr., sr.; prereq. 11)	IV.	MWF	103Bu	Mr. Dicken
101w	Geography of Europe (3 cred.; jr., sr., grad.; prereq. 8 cred.)	IV	MWF	103Bu	Mr. Dicken
102s	Trade Routes and Trade Centers (3 cred.; jr., sr., grad.; prereq. 41)	IV	MWF	103Bu	Mr. Dicken
110f	Geography of South America (3 cred.; jr., sr., grad.; prereq. 8 cred.)	I	TThS	103Bu	Mr. Brown
111	*Cartography and Graphic Representation* (3 cred.; jr., sr., grad.; prereq. 10 cred.) *(Not offered)*				
120s	Geography of Asia (3 cred.; jr., sr., grad.; prereq. 10 cred.)	I	MWF	103Bu	Mr. Davis
133w	Climatology (3 cred.; jr., sr., grad.; prereq. 10 cred. incl. 11)	V	MWF	103Bu	Mr. Brown

Primarily for Graduate Students

241	*Field Course (Not offered)*				
251f	Seminar	Ar	Ar	Ar	Mr. Davis
252w	Seminar	Ar	Ar	Ar	Mr. Davis, and staff
253s	Seminar	Ar	Ar	Ar	Mr. Davis, and staff
301f,w,s	Research Problems	Ar	Ar	Ar	Mr. Davis, Mr. Brown, Mr. Dicken

GEOLOGY AND MINERALOGY

Major adviser in the College of Science, Literature, and the Arts.—Associate Professor Thiel.

Major sequences in the College of Science, Literature, and the Arts.—No major sequence in geology should be undertaken without at least two quarters of college chemistry. A course in college physics and a course in surveying (preferably Civil Engineering 17) are required. (For courses in surveying see the Bulletin of the Institute of Technology.) Course 23 should be taken as early as possible. One field trip is required of all students majoring in geology.§

Sequence A. For general geology, federal and state surveys, etc. Courses 91-92-93, 101, 111, 112, 121, (124 and 125) or (144 and 145), 151-152-153.

Sequence B. For petroleum geologist. Courses 91-92-93, 101, 105, 112, 119, (144 and 145) or (124 and 125), 151-152-153.

Sequence C. For mining geologist and mineralographer. Courses 110, 111, 119, 121, 124, 125, 144, 145, 166-167.

Sequence D. For paleontologist. Courses 91-92-93, 101, 103-104, 105, 107-108, 151-152-153. (General zoology is recommended.)

Sequence E. For mineralogist. Courses 61, 105, 106, 110, 111, 121, 131-132, 166-167.

Sequence F. For petrographer. Courses 105, 106, 110, 111, 121, 124, 131-132, 140-141.

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Associate Professor Thiel.

§ Girls may take trip only when there are enough for a separate section. They should consult the major adviser.

For a specialized curriculum in natural science see the Bulletin of the College of Education.

For a specialized curriculum in Geophysics see the Bulletin of the Institute of Technology.

Junior College Courses

There are three beginning courses in geology: Course 1-2 (with or without the laboratory course A-B); Course 1-3 (with or without the laboratory course A-C); Course 8, which is a one-quarter course, without laboratory, for those who do not take geology to meet a laboratory science requirement.

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w*†	General Geology (Dynamic and Historical)—A synoptical treatment of the materials of the earth and of geologic processes, together with a study of the history of the earth and its inhabitants as recorded in the rocks (6 cred.; all; no prereq.)				
	Lect.	II	TThS	210P	Mr. Thiel
	Rec.	II	F	210P	Mr. Thiel
Af‡-Bw‡§	General Geology Laboratory (Dynamic and Historical) (4 cred.; all; with or after 1-2)				
	Schedule for Af Sec. 1	I, II	MW	22P	Ar
	2	VI, VII	MW	22P	Ar
	Schedule for Bw Sec. 1	I, II	MW	22P	Ar
	2	VI, VII	TTh	22P	Ar
1f-3w*†	General Geology (Dynamic and Economic)—A synoptical treatment of the materials of the earth and the origin, distribution, and occurrence of metals, nonmetals, coal, and petroleum (6 cred.; all; no prereq.)				
	Lect.	III	TThS	110P	Mr. Emmons
	Rec.	III	F	110P	Mr. Emmons
Af‡-Cw‡§	General Geology Laboratory (Dynamic and Economic) (4 cred.; all; with or after 1-3)				
		III, IV	MW	22P	Ar
1w-2s*†	General Geology (Dynamic and Historical) (See 1f-2w)				
	Lect.	IV	MWF	110P	Ar
	Rec.	IV	T	110P	Ar
Aw‡-Bs‡§	General Geology Laboratory (Dynamic and Historical) (See Af-Bw)				
		VI, VII	WF	22P	Ar
1w-3s*†	General Geology (Dynamic and Economic) (See 1f-3w)				
	Lect.	III	MWF	218P(w), 110P(s)	Ar
	Rec.	III	S	218P(w), 110P(s)	Ar
Aw‡-Cs‡§	General Geology Laboratory (Dynamic and Economic) (See Af-Cw)				
		I, II	TTh	20P	Ar
1s*	General Geology (Dynamic) (1st qtr. of 1-2 or 1-3. See 1f-2w or 1f-3w)				
	Sec. 1 Lect.	III	MWF	218P	Ar
	Rec.	III	Th	218P	Ar
	2 Lect.	VII	MWF	110P	Ar
	Rec.	VIII	M	110P	Ar
As‡§	General Geology Laboratory (Dynamic) (1st qtr. of A-B or A-C. See Af-Bw or Af-Cw)				
	Sec. 1	III, IV	TS	22P	Ar
	2	VIII. IX	WF	22P	Ar
2f*	General Geology (Historical) (2nd qtr. of 1-2. See 1f-2w)				
	Lect.	III	MWF	218P	Mr. Hanley
	Rec.	III	Th	218P	
Bf‡§	General Geology Laboratory (Historical) (2nd qtr. of A-B. See Af-Bw)				
	Lab.	III, IV	TS	20P	Ar
4s	Geology of Minnesota (5 cred.; all; prereq. 1 or 8 and consent of instructor)				
		IV	MTWFS	210P	Mr. Thiel

* For a three-quarter sequence, Course 2 may be followed by Course 3 or 4 and Course 3 by Course 2 or 4.

† To receive credit for any part of this course a student must complete the parts preceding the dagger, except that students in Forestry may take 1 and A for 5 credits without completing 2 and B.

‡ A fee of $1 is charged for this course.

§ Course A-B or Course A-C must be completed if geology is offered as the required laboratory science.

No.	Title	Hour	Day	Bldg.	Instructor
8f‖	Introductory Geology—A short introductory course as an elective. Principles of earth sculpture; topographic changes and their causative agents; dynamic, structural, and historic geology (5 cred.; all; no prereq.)				
	Sec. 1	I	MTWThF	2P	Ar
	2	IV	MTWFS	210P	Mr. Thiel
8w‖	Introductory Geology (See 8f)				
		IV	MTWFS	2P	Mr. Thiel
8s‖	Introductory Geology (See 8f)				
	Sec. 1	II	MTWThF	2P	Mr. Thiel
	2	VI	MTWThF	2P	Ar
23f‡-24w†‡	Elements of Mineralogy (8 cred.; soph., jr., sr.; prereq. a course in chemistry)				
	Schedule for 23f Lect.	I	TThS	210P	Mr. Gruner
	Rec.	IV	W	110P	
	Lab. Sec. A	III, IV	TS	100P	
	B	VI, VII	TTh	100P	
	Schedule for 24w Lect.	I	TThS	210P	Mr. Gruner
	Rec.	VIII	M	210P	
	Lab. Sec. A	III, IV	TS	100P	
	B	VI, VII	MW	100P	

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

51f	Elements of Paleontology (5 cred.; jr., sr.; prereq. 1 and Zool. 1-2-3)				
	Lect.	II	MWF	105P	Mr. Stauffer
	Lab.	I, II	ThS	105P	
61f	Blowpipe Analysis (3 cred.; jr., sr.; prereq. 24)				
	Lect.	II	TThS	100P	Mr. Gruner
	Lab.	VII-VIII	F	100P	
		IX	Th	100P	
91f-92w-93s	Index Fossils of North America (9 cred.; jr., sr.; prereq. 2, 3, or 51)				
	Schedule for 91f Lect.	VI	F	105P	Mr. Stauffer
	Lab.	VI, VII	MW	105P	
	Schedule for 92w and 93s Lect.	I	F	105P	Mr. Stauffer
	Lab.	VI, VII	MW	105P	
100*	Field Work in Northern Minnesota—July 15 to 30, approximately. Students interested in this field trip should consult the department (3 cred.; jr., sr.; prereq. 105)				
				Ar	Mr. Gruner, Mr. Thiel
101f-102w	Sedimentation (6 cred.; jr., sr., grad.; prereq. 24)				
	Schedule for 101f Lect.	VIII	MW	210P	Mr. Thiel
		IX	F	210P	
	Schedule for 102w Lect.	VI	T	208P	Mr. Thiel
	Lab.	VII, VIII	TTh	208P	
103w-104s	Micropaleontology (6 cred.; jr., sr., grad.; prereq. 51 or 91)				
		II, III	TThS	103P	Mr. Stauffer
105s	Rock Study (3 cred.; jr., sr., grad.; prereq. 24)				
	Lect.	I	TS	210P	Mr. Grout
	Lab.	I-II	Th	200P	
106f	Petrography (3 cred.; jr., sr., grad.; prereq. 105)				
	Sec. 1	I, II	Th	200P	Mr. Grout
		VI, VII	M	200P	
	2	VI-VII	WF	200P	Mr. Grout
107f-108w-109s	Paleontologic Practice (9 cred.; jr., sr., grad.; prereq. 91-92-93)				
		Ar	Ar	105P	Mr. Stauffer

* A more comprehensive report will be required for Graduate School credit.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 is charged for this course.

‖ Not open to students who have had Course 1. Does not satisfy the Junior College requirement for science. Cannot be followed by Course 1 for credit. May be followed by Course 2 with instructor's permission.

No.	Title	Hour	Day	Bldg.	Instructor
110f	Economic Geology (3 cred.; jr., sr., grad.; prereq. 24)				
		I	TThS	110P	Mr. Schwartz
111w	Ore Deposits (3 cred.; sr., grad.; prereq. 2, 3, or 51, and 105)				
		I	TThS	110P	Mr. Emmons
112s	Geology of Petroleum (3 cred.; sr., grad.; prereq. 111)				
		I	TThS	110P	Mr. Emmons
118w	Principles of Geomorphology—Principles of physiography of the lands, or geomorphology. A study of the form and structure of plains-plateaus, volcanoes, and the different types of mountains. The normal or fluvial, glacial, marine, and arid cycles of erosion and the resulting land forms. (3 cred.; jr., sr., grad.; prereq. 2 or 3 or 13)				
		III	MWF	220P	Mr. Hanley
119s	Geomorphology of the United States—A regional study of the United States by geomorphic or physiographic units. The development of the surface features as affected by rock structure and geologic history. Discussion of the principal problems presented by each area. (3 cred.; jr., sr., grad.; prereq. 2 or 3 or 13)				
		II	TThS	220P	Mr. Hanley
120s	Glacial Geology—Nature and process of glacial action. Land forms resulting from alpine and continental glaciers. Characters and distribution of Pleistocene and earlier glacial deposits. (3 cred.; jr., sr., grad.; prereq. 2 or 3 or 13)				
		I	TThS	220P	Mr. Hanley
121f	Crystallography (3 cred.; jr., sr.; prereq. Math. 7 and Inorg. Chem. 6-7-8 or 9-10)				
		Ar	Ar	100P	Mr. Gruner
124w	Metamorphic Geology (3 cred.; jr., sr., grad.; prereq. 2, 3, or 51, and 105)				
		II	MWF	218P	Mr. Schwartz
125s	Structural Geology (3 cred.; jr., sr., grad.; prereq. 2, 3, or 51, and 105)				
		II	MWF	210P	Mr. Schwartz
131w-132s	Advanced Petrology (8 cred.; jr., sr., grad.; prereq. 106)				
	Schedule for 131w Lect.	III	TThS	210P	Mr. Grout
	Rec.	VI	M	210P	
	Lab.	VI, VII	ThF	200P	
	Schedule for 132s Lect.	III	TThS	210P	Mr. Grout
	Rec.	VI	M	210P	
	Lab.	VI, VII	ThF	200P	
137f	Testing Economic Minerals (3 cred.; jr., sr., grad.; prereq. 2, 3, or 51, and 105)				
	Lect.	Ar	Ar	100P	Mr. Gruner
	Lab.	Ar	Ar	100P	
140w-141s	Applied Petrography (6 cred.; jr., sr., grad.; prereq. 131)				
	Schedule for 140w Lect.	II	F	200P	Mr. Grout
	Lab.	I, II	MW	Ar	
	Schedule for 141s Lect.	II	F	200P	
	Lab.	I, II	MW	Ar	
144f	Interpretation of Geologic Maps—Study and problems in construction and interpretation of various types of geologic maps. Recognition of structural and stratigraphic relations. (4 cred.; jr., sr., grad.; prereq. 105)				
		VI,VII,VIII,IX	WF	220P	Mr. Hanley
145w	Interpretation of Topographic Maps—Application of the principles of geomorphology to the interpretation of topographic maps. Practice in the recognition of land forms. Determination of underground structures and evolution of topography from surface contours. (2 cred.; jr., sr., grad.; prereq. 2 or 3 or 13)				
		VI,VII,VIII,IX	W	220P	Mr. Hanley
150*	Field Geology (Black Hills)—June 15 to July 15, approximately (Jr., sr., grad.; prereq. 125)				
		Ar	Ar	Ar	Mr. Schwartz
151f-152w-153s	Advanced General Geology (9 cred.; jr., sr., grad.; prereq. 2, 3, or 51)				
		III	MWF	210P	Mr. Stauffer
161w	Crystal Structure (3 cred.; jr., sr., grad.; prereq. 121, elem. phys. and anal. geom.)				
		Ar	Ar	Ar	Mr. Gruner
166f,w-167w,s	Mineralography (6 cred.; sr., grad.; prereq. 111, 131)				
		Ar	Ar	207P	Mr. Schwartz
170f,w,s	Geologic Problems (3 cred.; jr., sr., grad.; prereq. permission of major adviser)				
		Ar	Ar	Ar	Ar

* A maximum of 6 credits will be granted after field report is completed. The course will not be given for fewer than six students.

GEOPHYSICS

See Physics, page 82.

GERMAN

Major adviser in the College of Science, Literature, and the Arts.—Professor Burkhard.

Major sequence in the College of Science, Literature, and the Arts.—Eighteen credits from Group A or Group B, and 15 additional credits in courses numbered 50 or above.

A. Courses 50-51-52, 53-54-55, 56-57, 58, 70, 80.

B. Courses 60, 61, 62, 63, 64, 65, 68, 70, 77.

Major adviser in the College of Education.—Professor Burkhard.

Requirements for a teacher's certificate.—Major recommendation: Courses 50-51-52, 53-54-55, 56-57, 58, 68, and 15 additional credits in courses numbered 50 or above.

Minor recommendation.—Courses 50-51-52, 58, and 8 additional credits in courses numbered 50 or above.

Sequences of courses for academic students.—Without entrance German: Courses 1, 2, 3, 4, other courses numbered 50 or above. With one year of entrance German: Courses 2, 3, 4, other courses numbered 50 or above. With two years of entrance German: Courses 3, 4, other courses numbered 50 or above. With three years of entrance German: Course 4 and other courses numbered 50 or above. With four years of German: courses numbered 50 or above.

Sequence of courses for premedical students.—Without entrance German: Courses 1, 2, 3, and 30-31-32 or 33-34. With one year of entrance German: Courses 2, 3, and 30-31-32 or 33-34. With two years of entrance German: Courses 3, and 30-31-32 or 33-34. With three years of entrance German: Courses 30-31-32 or 33-34.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Beginning A (5 cred.; all; no prereq.)				
		I	MTWThF	212F	Ar
		II	MTWThF	213F	Ar
		III	MTWThF	213F	Ar
		IV	MTWFS	212F	Ar
		VI	MTWThF	207F	Ar
1w	Beginning A (See 1f)				
		I	MTWThF	306F	Ar
		II	MTWThF	209F	Ar
1s	Beginning A (See 1f)				
		II	MTWThF	101F	Ar
		VI	MTWThF	209½F	Ar
2f	Beginning B (5 cred.; all; prereq. 1 or one year of high school German)				
		III	MTWThF	113F	Ar
		VI	MTWThF	110F	Ar
2w	Beginning B (See 2f)				
		I	MTWThF	212F	Ar
		II	MTWThF	213F	Ar
		III	MTWThF	213F	Ar
		IV	MTWFS	212F	Ar
		VI	MTWThF	207F	Ar
2s	Beginning B (See 2f)				
		I	MTWThF	306F	Ar
		II	MTWThF	209F	Ar

No.	Title	Hour	Day	Bldg.	Instructor
3f§	Beginning C (5 cred.; all; prereq. 2 or two years of high school German)				
		I	MTWThF	213F	Ar
		VII	MTWThF	209F	Ar
	(Premed. students only)§	II	MTWThF	209½F	Ar
	(Premed. students only)§	IV	MTWFS	209½F	Ar
3w	Beginning C (See 3f)				
		III	MTWThF	113F	Ar
		VI	MTWThF	110F	Ar
3s	Beginning C (See 3f)				
		I	MTWThF	212F	Ar
		II	MTWThF	213F	Ar
		III	MTWThF	213F	Ar
		IV	MTWFS	212F	Ar
		VI	MTWThF	207F	Ar
4f	Intermediate German (5 cred.; all; prereq. 3 or three years of high school German)				
		II	MTWThF	212F	Ar
		III	MTWThF	212F	Ar
4w	Intermediate German (See 4f)				
		I	MTWThF	213F	Ar
		VII	MTWThF	209F	Ar
4s	Intermediate German (See 4f)				
		III	MTWThF	113F	Ar
		VI	MTWThF	110F	Ar
24f-25w-26s	Chemical German (9 cred.; chemists, miners; no prereq.)				
		IV	MWF	113F	Ar
24af-25aw-26as	Chemical German (12 cred.; pharmacists and agricultural students; no prereq.)				
		IV	MTWF	124F	Ar
27f-28w-29s	Chemical Prose (9 cred.; chemists, pharmacists, miners; prereq. two years of high school German or one year of college German)				
		IV	MWF	209F	Ar
30f-31w-32s	Medical German (9 cred.; premed.; prereq. 3)				
		II	MWF	207F	Ar
		IV	MWF	213F	Ar
33w-34s	Medical German (10 cred.; premed.; prereq. 3)				
		II	MTWThF	209½F	Ar
		IV	MTWFS	209½F	Ar
40	This course has been renumbered 60.				

Senior College Courses

Senior College courses with numbers less than 100 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

50f-51w-52s	Composition (6 cred.; jr., sr.; prereq. 4)				
		I	MW	207F	Mr. Holske
53f-54w-55s	Conversation (3 cred.; jr., sr.; prereq. 52)				
		I	TTh	207F	Mr. Holske
56f-57w	Essay Writing (6 cred.; jr., sr.; prereq. 52)				
		III	TThS	207F	Mr. Pfeiffer
58s	German Pronunciation (2 cred.; jr., sr.; prereq. 4)				
		III	TTh	207F	Mr. Meessen
59s	German Pronunciation and Diction (Open only to candidates for the German play.) (1 or 2 cred.; jr., sr.; prereq. 4)				
		Ar	Ar	Ar	Ar
60f	Narrative Prose (3 or 5* cred.; all; prereq. 4 or four years of high school German) (Formerly Course 40, Rapid Reading)				
		II*	MWF	227F	Mr. Downs

* This course may be taken as a 5-credit course only by students who have an average of B in preceding German courses. Those who take it for 5 credits will meet with the instructor at extra hours to be arranged.

§ For premedical students the winter quarter continuation of 3f is 33w.

No.	Title	Hour	Day	Bldg.	Instructor
60w	Narrative Prose (See 60f)	II*	MWF	212F	Mr. Downs
60s	Narrative Prose (See 60f)	VII*	MWF	209½F	Mr. Downs
61s	Lyrics and Ballads (3 or 5* cred.; jr., sr.; prereq. 60 or 3 cred. above 60)	III*	TThS	209F	Mr. Holske
62s	Nineteenth-Century Prose (3 or 5* cred.; jr., sr.; prereq. 60 or 3 cred. above 60)	II*	MWF	212F	Mr. Pfeiffer
63f	Classic Drama (3 or 5* cred.; jr., sr.; prereq. 60 or 4 with a grade of B)	IV*	MWF	207F	Mr. Meessen
64w	Nineteenth-Century Drama (3 or 5* cred.; jr., sr.; prereq. 60 or 3 cred. above 60)	IV*	MWF	207F	Mr. Meessen
65s	Modern Drama (3 or 5* cred.; jr., sr.; prereq. 60 or 3 cred. above 60)	IV*	MWF	207F	Mr. Meessen
68w	Survey of German Literature (3 or 5* cred.; jr., sr.; prereq. 6 cred. above 59)	III*	MWF	209½F	Mr. Burkhard
70f	Early German Literature (3 cred.; jr., sr.; prereq. 6 cred. above 59)	III	MWF	207F	Mr. Munro
77s	Faust I (3 cred.; jr., sr.; prereq. 64 and 3 additional cred. above 59)	III	MWF	209½F	Mr. Burkhard
80w	History of the German Language (3 cred.; jr., sr.; prereq. 6 cred. above 59)	VI	MWF	209F	Mr. Downs
110-111-112	*Introduction to Germanic Philology* (9 cred.; sr., grad.; prereq. 68 and 6 cred. above 59) *(Not offered)*				
115-116-117	*Middle High German Literature* (9 cred.; sr., grad.; prereq. 120 and 11 cred. above 59) *(Not offered)*				
118	*Germanic Heroic Poetry* (3 cred.; sr., grad.; prereq. 68 and 9 cred. above 59) *(Not offered)*				
119s	Germanic Mythology (Identical with Scandinavian 182) (3 cred.; sr., grad.; prereq. 6 cred. above 59)	III	TThS	212F	Mr. Reichardt
120f-121w-122s	Proseminar. History of German Literature (9 cred.; sr., grad.; prereq. 68 and 9 cred. above 59)	II	TThS	207F	Mr. Reichardt, Mr. Holske, Mr. Pfeiffer
140-141-142	*Early High German Literature, 1500-1700* (9 cred.; sr., grad.; prereq. 121 and 11 cred. above 59) *(Not offered)*				
143f-144w-145s	The Classical Period: Goethe (9 cred.; sr., grad.; prereq. 121 and 11 cred. above 59)	VIII, IX, X	M	Ar	Mr. Holske
150-151-152	*Die Novelle* (9 cred.; sr., grad.; prereq. 122 and 11 cred. above 59) *(Not offered)*				
153f-154w-155s	Austrian Drama (9 cred.; sr., grad.; prereq. 122 and 11 cred. above 59)	VIII, IX, X	T	301Lib	Mr. Burkhard
160-161-162	*Lyric Poetry* (9 cred.; sr., grad.; prereq. 68 and 11 cred. above 59) *(Not offered)*				
163f-164w-165s	German and English Literary Relations, 17th, 18th, 19th Centuries (9 cred.; sr., grad.; prereq. 68 and 11 cred. above 59)	VIII, IX, X	F	328Lib	Mr. Pfeiffer
173-174-175	*The Modern Novel, 1890-1930* (9 cred.; sr., grad.; prereq. 122 and 11 cred. above 59) *(Not offered)*				
180-181-182	*The Romantic School in Germany* (9 cred.; sr., grad.; prereq. 122 and 11 cred. above 59) *(Not offered)*				
192	*Gothic—Introduction to Germanic Linguistics* (Identical with Scandinavian 192) (4 cred.; sr. with completed major sequence, grad.) *(Not offered)*				
193	*Gothic Texts* (2 cred.; sr., grad.; prereq. 192) *(Not offered)*				
194	*Old Saxon* (3 cred.; sr., grad.; prereq. 192) *(Not offered)*				

* This course may be taken as a 5-credit course only by students who have an average of B in preceding German courses. Those who take it for 5 credits will meet with the instructor at extra hours to be arranged.

No.	Title	Hour	Day	Bldg.	Instructor
195w′	Introduction to Old Norse Language and Literature (Identical with Scandinavian 195) (4 cred.; sr., grad.; prereq. 192)	VI	MWThF	209½F	Mr. Reichardt
196s′	Eddic Poetry (Identical with Scandinavian 196) (3 cred.; sr., grad.; prereq. 195)	VII	MWF	209F	Mr. Reichardt
209f-210w-211s	Old High German (9 cred.; sr., with completed major sequence, grad.)	VI	MWF	212F	Mr. Reichardt
218f-219w-220s	Seminar: Old Saxon Language and Literature (9 cred.; grad.)	Ar	Ar	Ar	Mr. Reichardt
253-254-255	*Nineteenth-Century Drama: Kleist, Grillparzer, Hebbel* (9 cred.; grad.; prereq. 122 and 11 cred. above 59) *(Not offered)*				

GREEK

See Classics, page 35.

HISTORY

Major advisers in the College of Science, Literature, and the Arts.—Professor Blegen; Associate Professors Osgood and Steefel.

Major sequence in the College of Science, Literature, and the Arts.—Students will take the equivalent of at least two nine-credit courses numbered from 50 to 100. These will normally come in the junior year. In the senior year students, if they have maintained to the end of the junior year an honor point average of 1.5 in all work, will take at least one course numbered 150 or above; all other majors in history will take an additional number of courses with numbers 50 to 100 in the senior year, but will not take courses numbered 150 or above. Normally a history major will consist of Senior College courses aggregating at least 27 credits.

(Prerequisites: Course 1-2-3 (twelve credits) or the old Course 1-2 (ten credits) or 4-5-6 or 14-15-16, and 20-21-22. For students who have had an acceptable course in American history elsewhere, the requirement of 20-21-22 may be waived upon recommendation of the major adviser.)

Major adviser in the College of Education.—Professor Krey.

Requirements for a teacher's certificate.—Major recommendation: a minimum of 45 credits; at least 18 credits must be in Senior College courses.

Minor recommendation: a minimum of 18 credits of which at least 9 credits must be in Senior College courses.

No major recommendation to teach history will be given unless the candidate has taken the general course in American history, History 20-21-22, or equivalent.

(Prerequisites: Course 1-2-3 (twelve credits) or the old Course 1-2 (ten credits) or 4-5-6 or 14-15-16, and 20-21-22. For students who have had an acceptable course in American history elsewhere, the requirement of 20-21-22 may be waived upon recommendation of the major adviser.)

Students will take at least two of the courses numbered from 50 to 100. These will normally come in the junior year. In the senior year students, if they have maintained to the end of the junior year an honor point average of 1.5 in all work, will take at least one course numbered 150 or above; all other majors in history will take an additional number of survey courses in the senior year, but will not take courses numbered 150 or above.

For a specialized curriculum in social studies see the Bulletin of the College of Education.

Students planning to do advanced work in history should get a reading knowledge of French and German in their early undergraduate years.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w-3s†	European Civilization (12 cred.; all; no prereq.)				
	Lect.	II	TThS	BuAud	Mr. Burt
	Rec. Secs.*	I	M	202EdH	
		I	W	202EdH	
		I	F	202EdH	
		II	M	202EdH	
		II	W	202EdH	
		II	F	202EdH	
		III	M	202EdH	
		III	W	202EdH	
		III	F	202EdH	
		IV	M	202EdH	
		IV	W	202EdH	
		IV	F	202EdH	
		VI	M	202EdH	
		VI	W	202EdH	
		VI	F	202EdH	
		VII	M	202EdH	
		VII	W	202EdH	
		VII	F	202EdH	
		VI	T	202EdH	
		VI	Th	202EdH	
		VII	T	202EdH	
		VII	Th	202EdH	
1w-2s	European Civilization (2 qtrs. of 1-2-3. See 1f-2w-3s)				
	Lect.	II	MWF	206Pt	Mr. Deutsch
	Rec. Secs.*	I	T	209EdH	
		I	Th	209EdH	
		II	T	209EdH	
		II	Th	209EdH	
		III	T	209EdH	
		III	Th	209EdH	
		VI	T	209EdH	
		VII	Th	209EdH	
3f	European Civilization (3rd qtr. of 1-2-3. See 1f-2w-3s)				
	Lect.	II	MWF	206Pt	Mr. Deutsch
	Rec. Secs.*	I	T	209EdH	
		II	T	209EdH	
		II	Th	209EdH	
		III	T	209EdH	
		VI	T	112Bu	
4f-5w-6s†	English History—England since prehistoric times (9 cred.; all; no prereq.)				
	Lect.	II	MW	BuAud	Mr. Burt
	Rec. Secs.*	I	F	209EdH	
		II	F	209EdH	
		II	Th	202EdH	
		III	F	209EdH	
		IV	W	9F	
		VI	F	210P	
11f-12w-13s†	Medieval History—300-1560 (9 cred.; for music and architecture students only; no prereq.)				
		IV	MWF	221Bu	Miss Thompson
14f-15w-16s†	Ancient Civilization (9 cred.; all; no prereq.)				
	Lect.	VII	TTh	211Bu	Mr. Jones
	Rec. Secs.*	VII	W	209EdH	
		VII	F	209EdH	
		II	S	209EdH	

* Recitation sections in Courses 1f, 1w, 3f, 4f, 14f, and 17s will not meet until after the first lecture.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

No.	Title	Hour	Day	Bldg.	Instructor
17s	Social and Economic History of Modern Europe—Since 1500 (5 cred.; 3rd qtr. fr., soph, jr., sr.; no prereq. Not open to students who have taken Econ. 1)				
	Lect.	II	TThS	206Pt	Mr. Heaton
	Rec. Secs.*	I	MW	209EdH	
		II	MW	209EdH	
		VII	TTh	112Bu	
20f-21w-22s†	American History (9 cred.; soph., jr., sr.; no prereq.)				
	Sec. 1	I	MWF	209Bu	Mrs. Tyler
	2	I	MWF	111Bu	Mr. Stephenson
	3	VII	MWF	112Bu	Mr. Osgood
	4	VII	MWF	14P	Mr. Blegen

Senior College Courses

Except where otherwise stated, there are no prerequisites for the courses numbered 50 to 100. The examination at the end of the course will cover the work of the three terms, and no final grade will be assigned until the whole course is completed. In exceptional cases students may enter the winter quarter, but in that event must read to cover the work of the first quarter.

Course 70-71-72 is open to prelegal sophomores who have completed Course 4-5-6 or Course 1-2-3 or the old Course 1-2 (ten credits) with a grade of at least C, and also to prelegal sophomores who have an average grade of C in all their work, even if that work includes no course in history. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

50f-51w-52s†	History of Greece to 200 B.C. (9 cred.; jr., sr.)				
		I	TThS	112Bu	Mr. Jones
50a-51a-52a†	*History of Rome and the Byzantine Empire* (9 cred.; jr., sr.) *(Not offered)*				
53f-54w-55s†	Medieval European History—300-1300 (9 cred.; jr., sr.)				
		III	MWF	112Bu	Mr. Krey
53a-54a-55a†	*Renaissance and Reformation—1300-1648* (9 cred.; jr., sr.) *(Not offered)*				
56f-57w-58s†	Early Modern European History—1559-1815 (9 cred.; jr., sr.)				
		IV	MWF	111Bu	Mr. Steefel
59-60-61†	*Europe in the Nineteenth Century* (9 cred.; jr., sr.) *(Not offered)*				
62f-63w-64s†	European Expansion (9 cred.; jr., sr.)				
		II	MWF	111Bu	Mr. Willson
65w-66s†	Europe in the Twentieth Century (6 cred.; jr., sr.)				
		I	MWF	2P	Mr. Deutsch
67w-68s†	United States since Reconstruction (6 cred.; jr., sr.)				
		VII	MWF	221Bu	Mr. Stephenson
70f-71w-72s†	English Constitutional History (9 cred.; open to prelegal soph. with at least a C average in Courses 20-21-22, 1-2-3, or in all their college work, and to all jrs. and srs.)				
		I	MWF	211Bu	Mr. Willson
		I	MWF	112Bu	Miss Thompson
73-74-75†	*England since 1485* (9 cred.; jr., sr.) *(Not offered)*				
76f-77w-78s†	History of Canada and Canadian-American Relations (9 cred.; jr., sr.)				
		III	TThS	221Bu	Mr. Burt
80f-81w-82s†	Introduction to Economic History (9 cred.; jr., sr.)				
		I	TThS	111Bu	Mr. Heaton
83f-84w-85s†	American Economic History (9 cred.; jr., sr.)				
		III	TThS	211Bu	Mr. Loehr
83aw	American Agricultural History (3 cred.; soph., jr., sr., open only to students in the College of Agriculture, Forestry, and Home Economics; no prereq.)				
		I	MWF	102Hr	Mr. Loehr
86f-87w-88s†	The American Colonies (9 cred.; jr., sr.)				
		II	MWF	112Bu	Mrs. Tyler

* Recitation sections in Courses 1f, 1w, 3f, 4f, 14f, and 17s will not meet until after the first lecture.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

No.	Title	Hour	Day	Bldg.	Instructor
90f-91w-92s†	West in American History (9 cred.; jr., sr.)	III	TThS	111Bu	Mr. Osgood
90af-91aw-92as†	Minnesota and the Northwest (9 cred.; jr., sr.)	II	TThS	111Bu	Mr. Blegen
93f-94w-95s†	American Diplomatic History (9 cred.; jr., sr.)	III	MWF	221Bu	Mr. Shippee
93af-94aw-95as†	Survey of Latin American History (9 cred.; jr., sr.)	II	TThS	112Bu	Mr. Jones

Courses numbered 150 to 200 are open to seniors, and to graduate students upon recommendation of advisers; prerequisites are appropriate lecture courses and consent of the department.

150-151-152†	*Selected Readings in Ancient History—Greek Archeology* (9 cred.; sr., grad.) *(Not offered)*				
153f-154w-155s†	Selected Readings in Medieval and Renaissance History (9 cred.; jr., sr., grad.)	VIII, IX	W	328Lib	Mr. Krey, Miss Thompson
156f-157w-158s†	Selected Readings in Modern European History (9 cred.; sr., grad.)				
	Twentieth-Century Europe	VIII, IX	M	328Lib	Mr. Deutsch
	Nineteenth-Century Europe	VIII, IX	Th	301Lib	Mr. Steefel
170f-171w-172s†	Selected Readings in English History (9 cred.; sr., grad.)				
	England in Later Middle Ages	VIII, IX	Th	328Lib	Miss Thompson
	Tudor and Stuart England	VIII, IX	Th	314Lib	Mr. Willson
176f-177w-178s†	Selected Readings in Canadian History (9 cred.; sr., grad.)	I, II	Th	219Bu	Mr. Burt
180f-181w-182s†	Selected Readings in Economic History—European economic development before 1700 (9 cred.; sr., grad.)	VI, VII	T	111Bu	Mr. Heaton
183f-184w-185s†	Selected Readings in American Economic History (9 cred.; sr., grad.)	VI, VII	Th	111Bu	Mr. Loehr
190f-191w-192s†	Selected Readings in American History (9 cred.; sr., grad.)				
	The Slavery Controversy	VI, VII	T	328Lib	Mr. Stephenson
	Civil War and Reconstruction	VI, VII	W	328Lib	Mrs. Tyler
	West, after 1865	VIII, IX	W	339Lib	Mr. Osgood
	The Later Nineteenth Century and After	VIII, IX	F	339Lib	Mr. Shippee
	Social Aspects of American History, with Special Reference to the Northwest	VIII, IX	T	Ar	Mr. Blegen

HOME ECONOMICS

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

The courses in Home Economics which are listed below are open to students of the College of Science, Literature, and the Arts. Other courses may be taken by arrangement with the department. The hours and days at which the classes meet are announced in the College of Agriculture, Forestry, and Home Economics section of this bulletin. For Science, Literature, and the Arts students, the prerequisites are as they are given here.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

Course Numbers, Titles, and Descriptions

2f,s Introduction to Textiles—Textile fibers and their properties as related to fabric properties; yarn and fabric structure and design; problems in selection of textile materials for clothing and household furnishings. Laboratory work with representative fabrics. (No prereq.)

3f,w,s Clothing Construction A—Laboratory practice in designing and planning, cutting, fitting, and applying suitable techniques in making garments of cotton and silk or rayon fabrics; care and use of sewing machines; interpretation and adaptation of commercial patterns. (No prereq.)

4f,w,s Clothing Construction B—Laboratory practice in costume modeling; preparation of dress form; application of tailored technique to silk, rayon, or wool fabrics; garments constructed include a remodeling problem. (Prereq. Course 3)

21f,w,s-22f,w,s Color and Design I, II—The principles of color and design related to selecting and designing costumes and selecting, arranging, and designing house furnishings. (No prereq. for Course 21; but 21 is a prereq. for 22)

30s Introduction to Nutrition—Designed for students wishing a discussion of the application of principles of nutrition to selection of food. (No prereq.)

34f Nutrition Problems—Consideration of nutrition problems most commonly met by adults and children in typical families. (Prereq. Course 30 or equiv.)

40f,w,s Food Preparation—Development of technique and application of fundamental science principles to cookery processes. Establishment of good standards for food products. (Prereq. two qtrs. of chem.)

55f,w,s Related Art Problems—Problems worked out relating to costume and house furnishing design. (Prereq. Course 21-22)

56Af-56Bs Applications of Color and Design—Principles of design and color applied to selection, cost, and arrangement in fields of costume, dress, and household fabrics and household furnishings. (No prereq. for Course 56A; but 56A is a prereq. for 56B)

120f,w,s Art History and Appreciation—Historical development of painting, sculpture, architecture, decoration, furniture, and costumes, with special emphasis on design and influence upon modern styles. (Jr., sr., grad. only; no prereq.)

180f,w,s Home Planning and Furnishing—A study for the homemaker who aims at more intelligent planning and furnishing of the home. House plans, selection and arrangement of equipment and furnishings from the point of view of beauty and good home management. (Prereq. Courses 21, 55)

HOW TO STUDY

No.	Title	Hour	Day	Bldg.	Instructor
1f§	How To Study (2 cred.; prereq. permission of instructor. See footnote §)				
	Sec. 1	I	MWF	104J	Mr. Baker
	2	II	MWF	104J	and others
	3	VII	MWF	104J	
1w§	How To Study (See 1f)				
	Sec. 1	I	MWF	104J	Mr. Baker
	2	II	MWF	104J	and others
1s§	How To Study (See 1f)				
	Sec. 1	I	MWF	104J	Mr. Baker
	2	II	MWF	104J	and others

HUMAN ANATOMY

MEDICAL SCHOOL

For complete list of courses, see the Bulletin of the Medical School.

Students in this college may elect courses in human anatomy other than Course 3 (see the Bulletin of the Medical School) only by arrangement with the head of the Department of Anatomy.

§ Registration is limited. Written permission from the instructor is necessary for admission. For Course 1f, students should inquire at 106 Folwell Hall; for Courses 1w and 1s, at 112 Psychology Building.

No.	Title	Hour	Day	Bldg.	Instructor
3f,s	Elementary Anatomy (3 cred.; primarily for nurses; all; no prereq.)				
	Lect.	VI	T	Ar	Mr. Blount
	Lab. and rec.	VI, VII, VIII	Th	Ar	

HUMAN PHYSIOLOGY

See Physiology, page 83.

ITALIAN

See Romance Languages, page 94.

JOURNALISM

Major advisers in the College of Science, Literature, and the Arts.—Professors Casey, Barnhart, and Nafziger; Associate Professor Charnley; Assistant Professors Ford and Kildow.

Major sequence in the College of Science, Literature, and the Arts.—Courses 51, 52 (for men), 55, 69 or 73-74, 101 (for men), 109-110, 140-141-142, and 9 additional credits to be chosen in conference with the adviser. Students of marked ability may substitute for these 9 additional credits in journalism Senior College courses in other departments with the approval of the major adviser in journalism. Women students who do not elect Courses 52 and 101 must substitute other journalism courses of equivalent hours.

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

The additional credits will be arranged to prepare students for the following types of journalistic work: (1) metropolitan journalism—news, editorial, business management, advertising, circulation, or press association work; (2) small daily and weekly journalism—editing and management; (3) journalism-advertising; (4) magazine writing, magazine editing—editorial direction and business management of trade, technical, and professional journals; (5) radio writing; (6) agricultural journalism—consult minor sequence requirements below and the Bulletin of the College of Agriculture, Forestry, and Home Economics; (7) teacher training in journalism—consult minor sequence requirements below and the Bulletin of the College of Education.

Freshmen who are interested in journalism or those who think that they may enter the department at a later time are urged to discuss their course programs with members of the journalism staff.

Students must have maintained a C average in all work to enter any journalism course, except by consent of the chairman of the department.

(Prerequisites: Courses 13, 14-15; or 12, 15; and Composition 27-28.) In addition to these prerequisites, the following Junior College courses are recommended as providing, in most cases, the best foundation for a major in journalism: Political Science 1-2-3, 7 and 25; Sociology 1 and 6; Psychology 1-2; 9 credits in history; Economics 6-7 (especially recommended for students specializing in journalism-business management and journalism-advertising).

Several courses offered by the Department of Journalism are of general interest. Among them are Courses 5, 103, 111, and 130-131-132.

Adviser for students in all colleges.—Professor Casey.

Minor sequence.—For students in the College of Agriculture, Forestry, and Home Economics, the Institute of Technology, and the School of Business Administration: Courses 13, 41, 69, and 6 additional credits in Senior College journalism courses, to be chosen in conference with the adviser. Courses 78, 110, 111, and 112 are recommended.

Minor sequence in the College of Education.—Courses 13, 41, 69, 82, and at least 3 additional credits in Senior College journalism courses.

Course Ed. T. 74 offered by the Department of Journalism and listed under "Methods and Directed Teaching" in the program of the College of Education (in this bulletin) is also required in this sequence.

Note.—Sociology 116 and Agricultural Journalism 50-51-52 and 53 carry credit in the department.

Fees.—Students registered for any journalism course, except Course 5, are required to pay a general fee of $1 a quarter, regardless of the number of courses pursued. Courses 41, 51-52, 55, and 58 require laboratory fees in addition to the equipment fee of $1.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
5s	The American Newspaper—A survey of the history, organization, and methods of contemporary journalism and an analysis of the relation of newspapers to their readers (3 cred.; soph. with average of C, jr., sr., not open to Journalism majors; no prereq.)				
		II	TThS	420MurH	Mr. Ford
12w¶	Newspaper Reporting (5 cred.; substantially equivalent to 13, 14; soph., jr., sr. with average of C; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from English requirement, and consent of instructor)				
	Lect.	VI	MW	308MurH	Mr. Kildow
	Lab.	VI, VII, VIII	TTh	212MurH	
13f	Introduction to Reporting (for majors) (3 cred.; soph., jr., sr., with average of C; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from English requirement)				
	Sec. 1	VI, VII, VIII	MW	212MurH	Mr. Charnley,
	2	I, II, III	TTh	212MurH	Mr. Kildow,
	3	VII, VIII, IX	TTh	212MurH	and staff
13f	Introduction to Reporting (for minors) (3 cred.; soph., jr., sr., with average of C; prereq. Eng. A-B-C or Comp. 4-5-6 or exemption from English requirement)				
		I	MWF	308MurH	Mr. Ford
14w-15s†	Newspaper Reporting (for majors) (6 cred.; soph., jr., sr.; prereq. for 14, C average in 13 and in all work, or consent of instructor, and Comp. 27-28§; for 15, C average in 13-14 or 12 and in all work, or consent of instructor, and Comp. 27-28§)				
	Sec. 1 (winter)	VI, VII, VIII	MW	212MurH	Mr. Charnley
	2 (winter)	I, II, III	TTh	212MurH	and staff
	Sec. 1 (spring)	VI, VII, VIII	MW	212MurH	Mr. Charnley,
	2 (spring)	I, II, III	TTh	212MurH	Mr. Nafziger,
	3 (spring)	VII, VIII, IX	TTh	212MurH	and staff
41w‡‡	Editing for Nonmajors (Not open to S. L. and A. students) (3 cred.; jr., sr.; prereq. 12 or 13)				
	Lect.	IV	MW	420MurH	Mr. Ford
	Lab. Sec. 1	VIII, IX	T	207MurH	
	2	VI, VII	W	207MurH	
	3	VI, VII	Th	207MurH	
	4	VIII, IX	F	207MurH	

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡‡ A fee of $1 is charged for this course.

§ May be taken at the same time.

¶ This course is intended only for winter quarter transfer students and others who for exceptional reasons cannot take 13 and 14. It should be followed by 15.

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

No.	Title	Hour	Day	Bldg.	Instructor
51f‡-52w‡	News Editing (6 cred.; jr., sr.; prereq. 15)				
	Lect.	II	M	308MurH	Ar
	Lab.	Fall quarter			
	Sec. 1	VIII, IX	M	206MurH	Mr. Kildow
	2	II, III	T	206MurH	Mr. Kildow
	3	VII, VIII	T	206MurH	Ar
	4	II, III	Th	206MurH	Mr. Kildow
	5	VII, VIII	Th	206MurH	Ar
	6	VI, VII	F	206MurH	Mr. Nafziger
	Lab.	Winter quarter			
	Sec. 1	VI, VII	M	206MurH	Mr. Nafziger
	2	VIII, IX	T	206MurH	Mr. Kildow
	3	VIII, IX	W	206MurH	Mr. Kildow
	4	VII, VIII	Th	206MurH	Mr. Kildow
	5	VI, VII	F	206MurH	Ar
	6	III, IV	S	206MurH	Ar
51s‡	News Editing (3 cred.; jr., sr.; prereq. 12 or 14)				
	Lect.	IV	M	308MurH	Mr. Kildow
	Lab. Sec. 1	VII, VIII	M	206MurH	Mr. Nafziger
	2	II, III	T	206MurH	Mr. Nafziger
	3	VII, VIII	Th	206MurH	Mr. Kildow
55f,w,s‡‡	Advertising and Newspaper Typography (3 cred.; jr., sr.; prereq. 15)				
	Lect.	VII	M	311MurH	Mr. Barnhart
	Lab. Sec. 1	VIII, IX	MW	315,320MurH	
	2	VI, VII	TTh	315,320MurH	
	3	I, II	WF	315,320MurH	
	4	VI, VII	WF	315,320MurH	
58w‡	Advanced Typography (2 cred.; jr., sr.; prereq. 55 and consent of instructor)				
		Ar	Ar	315,320MurH	Mr. Barnhart
60-61-62	*The Weekly Newspaper* (9 cred.; jr., sr.; prereq. 15) *(Not offered)*				
65f*	Graphic Arts: Processes—Discussion of reproduction processes—letter press, planography, intaglio; also engravings, inks, paper stock, bindings, and miscellaneous printing operations. (3 cred.; jr., sr.; prereq. consent of major adviser in the Department of Journalism or in the School of Business Administration)				
		IV	MWF	105MurH	Mr. Barnhart
68s	Problems in Radio Writing (3 cred.; jr., sr.; prereq. 52 for men, 51 for women, and consent of instructor)				
		VI	MWF	302MurH	Mr. Charnley
69s	Newspaper and Magazine Articles (3 cred.; jr., sr.; prereq. 15 or 41)				
		I	MWF	105MurH	Mr. Kildow
70	*Business and Specialized Journalism* (3 cred.; jr., sr.; prereq. 15 or 69, or consent of instructor) *(Not offered)*				
73f-74w	Magazine Writing and Editing (6 cred.; jr., sr.; prereq. for 73, 15; for 74, 73 and consent of instructor)				
		VI	MWF	302MurH	Mr. Charnley
EdT74	Teachers Course in Journalism (This course is listed among the College of Education courses in another part of this bulletin. It is not regularly open to Science, Literature, and Arts students)				
75s	Law of the Press (2 cred.; jr., sr.; prereq. 51-52) (Open only to major students in journalism who have not taken Course 15 here)				
		IV	MW	302MurH	Mr. Charnley

* This course 65f is one of the three related courses of special interest to students of journalism and advertising. The other two, listed elsewhere in this bulletin, are Drawing 64w, "Graphic Arts" and Business Administration 194s, "Advanced Advertising Procedure."

‡ A fee of $2 is charged for this course.

‡‡ A fee of $3 is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
76f	Critical Writing (3 cred.; jr., sr.; prereq. 15)	II	TThS	311MurH	Mr. Ford
78s	Press Relations (3 cred.; jr., sr.; prereq. 69 or 73)	II	MWF	308MurH	Ar
82s	Supervision of School Publications (3 cred.; jr., sr.; prereq. 41 or 51-52)	VI	MWF	420MurH	Mr. Kildow
93f§	Daily and Weekly Editorial Administration (3 cred.; jr., sr.; prereq. 51-52)	I	TThS	308MurH	Mr. Barnhart
94w§	Daily and Weekly Newspaper Advertising (3 cred.; jr., sr.; prereq. 51-52)	I	TThS	308MurH	Mr. Barnhart
95s§	Daily and Weekly Circulation and Newspaper Management (3 cred.; jr., sr.; prereq. 51-52)	I	TThS	308MurH	Mr. Barnhart
96	*The Journalism of Finance and Commerce* (3 cred.; jr., sr.; prereq. 15 and 10 cred. in economics or business administration) *(Not offered)*				
99f,w,s	Readings in Journalism (Cred. ar., not to exceed 3; jr., sr.; prereq. consent of the chairman of the department)				Staff
101w	The Reporting of Public Affairs (3 cred.; jr., sr., grad.; prereq. 51-52 and 9 cred. in political science)	III	TThS	311MurH	Mr. Nafziger
103s	Literary Aspects of Journalism (3 cred.; jr., sr., grad.; prereq. Eng. 21-22 or 22-23)	IV	MWF	311MurH	Mr. Ford
104s	Advanced Newspaper Advertising (2 cred.; jr., sr., grad.; prereq. 52, 94, and consent of instructor)	VIII	TTh	420MurH	Mr. Barnhart
109w-110s	History of Journalism (6 cred.; jr., sr., grad.; prereq. 15)				
	Lect.	III	MW	105MurH	Mr. Ford
	Rec. Sec. 1	III	Th	420MurH	
	2	III	F	420MurH	
111f	Foreign News Sources—How the world's news is gathered and disseminated; the press and foreign affairs; the foreign press (3 cred.; jr., sr., grad.; prereq. 41 or 51 and a history or political science course in international relations, or consent of instructor)	III	MWF	311MurH	Mr. Nafziger
112w	Current Newspaper Problems (3 cred.; jr., sr., grad.; prereq. 109-110 or 111)	II	TThS	302MurH	Mr. Ford
114	*The Influence of the Newspaper* (3 cred.; jr., sr., grad.; prereq. 15 or 41) *(Not offered)*				
130f-131w†-132s	The Press and Public Opinion (9 cred.; jr., sr., grad.; prereq. 15 cred. in the social studies and psychology)	II	MWF	311MurH	Mr. Casey
140f-141w-142s†	Contemporary Affairs (9 cred.; sr., grad.; prereq. 109-110 and 20 cred. in the social studies)				
	Lect.	VI	TTh	105MurH	Mr. Casey, Mr. Nafziger, Mr. Charnley
	Rec. Sec. 1	IV	T	420MurH	Mr. Nafziger
	2	VII	T	302MurH	Mr. Charnley
	3	IV	T	311MurH	Mr. Casey

For Graduate Students Only

205f,w,s	Topics in International News Communications (3 cred.; seminar for grad. students; prereq. consent of chairman of department)	Ar	Ar	405MurH	Mr. Nafziger
210f,w,s	Research in Newspaper Problems (2 cred.; seminar course for grad. students; prereq. consent of department)	Ar	Ar	405MurH	Mr. Casey

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

§ Two quarters of Courses 93, 94, 95 must be completed before credit is received for any quarter.

LATIN

See Classics, page 35.

LIBRARY METHODS

Note.—For the special course in library training see the Bulletin of the College of Science, Literature, and the Arts. For professional courses in library instruction see the program of the Division of Library Instruction, pages 10-11.

No.	Title	Hour	Day	Bldg.	Instructor
1f,w,s§	Use of Books and Libraries—Use of catalog, reference books, indexes, and bibliographies, for personal and class purposes. Preparation of reference lists. (2 cred.; fr., soph. only; no prereq.)				
	Sec. 1	II	MW	3Lib	Mr. Russell, Miss Moen
	2	IV	MW	3Lib	Mr. Shove, Miss Davenport
	3	VI	MW	5Lib	Miss Davenport, Miss Ogden

LINGUISTICS AND COMPARATIVE PHILOLOGY

Major adviser in the College of Science, Literature, and the Arts.—Professor Ogle.

Major sequence in the College of Science, Literature, and the Arts.—Normally a major will consist of 27 credits in the courses, carrying Senior College credit, listed below, chosen after consultation with adviser.

No.	Title	Hour	Day	Bldg.	Instructor
	ANTHROPOLOGY				
105f	Elements of Language—A survey of speech sounds followed by practice in phonetic recording. Analysis of phonetic patterns in language. Practical work in dictation of Chippewa, Dakota, Finnish, and other languages (3 cred.; jr., sr., grad.; prereq. 41 or 10 cred. of any language)	II	MWF	6WeH	Mr. Mandelbaum
	CLASSICS				
106w	General Linguistics (3 cred.; jr., sr., grad.; prereq. any two courses numbered above 50 in a foreign language)	IV	MWF	109F	Mr. Ogle
107s	Cultural Aspects of Language (3 cred.; jr., sr., grad.; prereq. any two courses numbered above 50 in a foreign language)	IV	MWF	109F	Mr. Ogle
133s	Vulgar Latin (Development of Latin into Romance) (3 cred.; jr., sr., grad.; open to advanced students of Latin or a Romance language with the consent of the instructor)	II	MWF	109F	Mr. Ogle
	ENGLISH				
61f	American Pronunciation (3 cred.; jr., sr.; prereq.*)	IV	MWF	205F	Mr. Ruud
63w	American Usage (3 cred.; jr., sr.; prereq.*)	IV	MWF	205F	Mr. Ruud
100f	Old English (4 cred.; jr., sr., grad.; prereq. 6 cred. above 50)	II	TWThF	302F	Mr. Ruud

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

§ For students in the College of Science, Literature, and the Arts. Others must obtain a special card from the Junior College office, 106 Folwell Hall.

No.	Title	Hour	Day	Bldg.	Instructor
102w	Old English Poetry (3 cred.; jr., sr., grad.; prereq. 100)	II	MWF	302F	Mr. Ruud
103s	Beowulf (3 cred.; jr., sr., grad.; prereq. 100)	II	MWF	302F	Mr. Ruud
165	*The Historical Study of Modern English* (3 cred.; jr., sr., grad.; prereq. 6 cred. above 50) *(Not offered)*				

FRENCH

171f-172w-173s†	History of French Language (3 cred.; jr., sr., grad.; prereq. one year of Latin or permission of instructor)	VIII	Th	203F	Mr. LeCompte

GERMAN

80w	History of the German Language (3 cred.; jr., sr.; prereq. 6 cred. above 60)	VI	MWF	209F	Mr. Downs
110-111-112	*Introduction to Germanic Philology* (9 cred.; sr., grad.; prereq. 68 and 6 cred. above 60) *(Not offered)*				
192	*Gothic—Introduction to Germanic Linguistics* (Identical with Scandinavian 192) (4 cred.; sr. with completed major sequence, grad.) *(Not offered)*				
193	*Gothic Texts* (2 cred.; sr., grad.; prereq. 192) *(Not offered)*				
194	*Old Saxon* (3 cred.; sr., grad.; prereq. 192 *(Not offered)*				

SCANDINAVIAN

185	*History of Scandinavian Languages* (3 cred.; sr., grad.; prereq. Scand. 4-5-6 or 10-11-12 or at least one Germanic language) *(Not offered)*				
195w	Introduction to Old Norse Language and Literature (Identical with German 195) (4 cred.; sr., grad.; prereq. 192 or permission of instructor)	VI	MWThF	209½F	Mr. Reichardt
196s	Eddic Poetry (Identical with German 196) (3 cred.; sr., grad.; prereq. 195)	VII	MWF	209F	Mr. Reichardt

LINGUISTICS

121f-122w-123s†	Introduction to Arabic Grammar and Reading (9 cred.; jr., sr., grad.; prereq. two courses above 50 in any foreign language)	Ar	Ar	Ar	Mr. Cline
131f-132w	Introduction to Sanscrit (4 cred.; sr. with permission of instructor, grad.; prereq. at least two Senior College courses in any Indo-European language)	Ar	Ar	Ar	Mr. Reichardt

For Graduate Students Only

CLASSICS

241f-242w-243s	Introduction to Classical Philology (9 cred.)	VIII, IX	Th	110F	Mr. Cram

FRENCH

201f-202w-203s	Old French Phonology and Morphology (6 cred.)	Ar	Ar	203F	Mr. LeCompte
204f-205w-206s	Reading in Old French Literature (6 cred.)	Ar	Ar	203F	Mr. LeCompte
207f-208w-209s	Old Provençal (6 cred.)	Ar	Ar	203F	Mr. LeCompte

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

GERMAN

No.	Title	Hour	Day	Bldg.	Instructor
209f-210w-211s	Old High German (9 cred.; sr. with completed major sequence, grad.)	VI	MWF	212F	Mr. Reichardt
218f-219w-220s	Old Saxon Language and Literature (9 cred.; grad.)	Ar	Ar	Ar	Mr. Reichardt

SPANISH

241-242-243 *Old Spanish Philology* (6 cred.) *(Not offered)*

MATHEMATICS

Major advisers in the College of Science, Literature, and the Arts.—Professors Brink, Hart, and Jackson.

Major sequence in the College of Science, Literature, and the Arts.—Courses 50, 51, 62, 105; and either 15 additional credits in Senior College courses, other than 70, or 6 additional credits in Senior College courses, other than 70, together with 10 credits of Physics 101-103-105 or 9 credits of Biostatistics (Preventive Medicine and Public Health 110, 120, 130, 140).

(Prerequisites: Mathematics 6, 7, 30.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Associate Professor Underhill.

Requirements for a teacher's certificate.—Major recommendation: entrance credit in solid geometry or its equivalent; Courses 6, 7, 30, 50, 51, and 8 additional credits in courses numbered above 51.

Minor recommendation: entrance credit in solid geometry or its equivalent. Course 50 and 3 additional credits in courses numbered above 50.

Mathematics 20 is strongly recommended as an elective, to be taken preferably in the freshman or sophomore year, in connection with either a major or minor recommendation.

Placement tests.—In each of Courses 1, 6, and 8, a placement test will be given at some time within the first two weeks of the quarter. Any student who fails in the test in Course 1 may be required to drop the course and to review his elementary mathematics before taking college mathematics. Any student who offers less than one year of high school higher algebra as a substitute for Course 1 and who fails the placement test given in Course 6 or 8, will be required to take Course 1 before taking more advanced mathematics. A student who has had a complete year of elementary algebra, and a corresponding course in higher algebra for one-half year, should be able to pass the placement test in Course 6 or 8.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f*	Higher Algebra (5 cred.; all; prereq. one yr. of elem. algebra§; open for credit to any student offering not more than one-half yr. of high school higher algebra for entrance)				
	Sec. 1	I	MTWThF	JAud	Ar
	2	III	MTWThF	105F	Ar
	3	VI	MTWThF	105F	Ar

In choosing one of the sections of this course the student should be guided by the schedule of hours for its winter quarter continuation. The fall-winter sequences are: At I hour, 1f-6w and 1f-8w; at III hour, 1f-6w; at VI hour, 1f-6w.

* Prebusiness students who elect mathematics to meet the requirement of 10 credits in mathematics or laboratory science, should take 1 and 8 if they have not had high school higher algebra, and 8 and 20 if they have had high school higher algebra.

§ Read the announcement about placement tests which precedes the heading Junior College Courses.

No.	Title	Hour	Day	Bldg.	Instructor
1w*	Higher Algebra (See 1f)				
	Sec. 1	IV	MTWFS	104F	Ar
	2	VI	MTWThF	105F	Ar
	In choosing one of the sections of this course the student should be guided by the schedule of hours for its spring quarter continuations. The winter-spring sequences are: At IV hour, 1w-6s; at VI hour, 1w-6s and 1w-8s.				
1s*	Higher Algebra (See 1f)	I	MTWThF	301F	Ar
6f	Trigonometry (5 cred.; all; prereq. plane geometry and Course 1 or high school higher algebra§; open for credit to students offering high school trigonometry for entrance)				
	Sec. 1	II	MTWThF	105F	Ar
	2	III	MTWThF	104F	Ar
6w	Trigonometry (See 6f)				
	Sec. 1	I	MTWThF	105F	Ar
	2	III	MTWThF	104F	Ar
	3	VI	MTWThF	104F	Ar
6s	Trigonometry (See 6f)				
	Sec. 1	IV	MTWFS	104F	Ar
	2	VI	MTWThF	105F	Ar
7f¶	College Algebra (5 cred.; all; prereq. 6, or high school trigonometry if approved by the department chairman)				
		I	MTWThF	105F	Miss Carlson
7w¶	College Algebra (See 7f)				
	Sec. 1	II	MTWThF	105F	Ar
	2	III	MTWThF	105F	Ar
7s¶	College Algebra (See 7f)				
		III	MTWThF	101F	Ar
8f*¶	Commerce Algebra (5 cred.; prebus. stud.*; prereq. 1, or high school higher algebra§)				
		VII	MTWThF	JAud	Ar
8w*¶	Commerce Algebra (See 8f)	I	MTWThF	JAud	Ar
8s*¶	Commerce Algebra (See 8f)	VI	MTWThF	104F	Ar
20w*	Mathematics of Investment (5 cred.; all; prereq. 8, or 6 and 7)				
		VII	MTWThF	JAud	Ar
20s*	Mathematics of Investment (See 20w)				
		I	MTWThF	JAud	Ar
21s	Introduction to the Mathematics of Life Insurance (3 cred.; all; prereq. 20)				
		VII	MWF	105F	Mr. Hart
30f	Analytic Geometry (5 cred.; all; prereq. 6 and 7 or 6 and 8)				
		I	MTWThF	104F	Mr. Underhill
30w	Analytic Geometry (See 30f)	I	MTWThF	104F	Miss Carlson
30s	Analytic Geometry (See 30f)				
	Sec. 1	II	MTWThF	105F	Ar
	2	III	MTWThF	104F	Ar
G.E.70f,w,s	The Slide Rule (1 cred.; all; prereq. Math. 6 or 8) (For the schedule of hours and days see General Engineering 70 in the bulletin of the Institute of Technology)				

Senior College Courses

Courses 50, 51, 105 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

50f	Calculus I (5 cred.; jr., sr.; prereq. 30)				
		III	MTWThF	101F	Mr. Hart
50w	Calculus I (See 50f)	I	MTWThF	102F	Mr. Underhill
50s	Calculus I (See 50f)	I	MTWThF	105F	Miss Carlson
51w	Calculus II (5 cred.; jr., sr.; prereq. 50)				
		III	MTWThF	101F	Mr. Hart
51s	Calculus II (See 51w)	I	MTWThF	102F	Mr. Underhill

* Prebusiness students who elect mathematics to meet the requirement of 10 credits in mathematics or laboratory science, should take 1 and 8 if they have not had high school higher algebra, and 8 and 20 if they have had high school higher algebra.

§ Read the announcement about placement tests which precedes the heading Junior College Courses.

¶ No student may receive credit for both Courses 7 and 8.

No.	Title	Hour	Day	Bldg.	Instructor
60f	Synthetic Metric Geometry (3 cred.; jr., sr.; prereq. 30)	VII	MWF	104F	Miss Gibbens
62w	Introduction to the Theory of Equations (3 cred.; jr., sr.; prereq. 50)	VII	MWF	104F	Miss Gibbens
70	*History of Elementary Mathematics* (3 cred.; jr., sr.; prereq. 30) *(Not offered)*				
102f-103w	Advanced Analytic Geometry (6 cred.; jr., sr., grad.; prereq. 51)	II	MWF	104F	Mr. Bussey
105f	Intermediate Calculus (5 cred.; jr., sr., grad.; prereq. 51)	II	MTWThF	101F	Mr. Underhill
105s	Intermediate Calculus (See 105f)	III	MTWThF	102F	Mr. Hart
106f	Differential Equations (3 cred.; jr., sr., grad.; prereq. 51)	IV	MWF	105F	Mr. Underhill
107w-108s	Advanced Calculus (6 cred.; jr., sr., grad.; prereq. 105)	IV	MWF	105F	Mr. Underhill
109	*Theory of Numbers* (3 cred.; jr., sr., grad.; prereq. 51) *(Not offered)*				
115	*Differential Geometry* (3 cred.; jr., sr., grad.; prereq. 136) *(Not offered)*				
118f-119w-120s	Vectors and Matrices (9 cred.; jr., sr., grad.; prereq. 51)	VIII	MTF	105F	Mr. Jackson
121f-122w-123s	Mathematical Theory of Statistics (9 cred.; jr., sr., grad.; prereq. 51)	Ar	Ar	Ar	Mr. Jackson
131	*Advanced Algebraic Theory* (3 cred.; jr., sr., grad.; prereq. 62 or 105) *(Not offered)*				
136s	Solid Analytic Geometry (3 cred.; jr., sr., grad.; prereq. 51)	II	MWF	104F	Mr. Bussey
137s	Advanced Theory of Equations (3 cred.; jr., sr., grad.; prereq. 51, 62)	VII	MWF	104F	Miss Gibbens
140	*Projective Geometry* (3 cred.; jr., sr., grad.; prereq. 136) *(Not offered)*				
142	*Theory of Invariants* (3 cred.; jr., sr., grad.; prereq. 131 or 137) *(Not offered)*				
144-145-146	*Topics in Analysis* (9 cred.; jr., sr., grad.; prereq. 51) *(Not offered)*				
149	*Introduction to Group Theory* (3 cred.; jr., sr., grad.; prereq. 51, 62) *(Not offered)*				

For Graduate Students Only

206f-207w-208s	Theory of Functions (9 cred.; grad.; prereq. 108)	II	TThS	104F	Mr. Brink
245f-246w-247s	Advanced Theory of Functions (9 cred.; grad.; prereq. 208)	Ar	Ar	Ar	Mr. Hart

NOTE.—Some of the courses listed in the Graduate School Bulletin are open to properly qualified juniors and seniors. For further information consult the chairman of the Department of Mathematics.

MILITARY SCIENCE AND TACTICS

See the program of Military Science and Tactics, page 12.

MUSIC

To secure the degree of bachelor of arts with major in music, a student must fulfill the requirements of both the Junior and Senior Colleges as stated in the Bulletin of the College of Science, Literature, and the Arts, securing 144 credits in courses other than practical music (piano, voice, etc., Courses 11 to 27). During the first two years he will register for English A-B-C or Composition 4-5-6, unless exempt from the requirement in English; foreign language; History 11-12-13; Psychology 1-2 and 4-5; and the following courses in music: 1-2-3, 4-5-6, 7-8, 34-35-36.

He must earn thirty credits in practical music selected from Courses 11 to 27, the number of credits in his major instrument to be determined by the department.

Major advisers in the College of Science, Literature, and the Arts.—Professor Scott; Associate Professor Hull.

Major sequences in the College of Science, Literature, and the Arts.—

A. Courses 50-51-52, 53-54-55, 56-57-58, 60-61-62 or 63-64-65, 76.
B. Courses 56-57-58, 60-61-62 or 63-64-65, 73-74-75, 76, 77-78-79.
C. Courses 56-57-58, 60-61-62 or 63-64-65, 70-71-72, 80-81-82.

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Courses recommended for students who have a minor rather than a major interest in music—

A. Practical Music.
Courses 1, 4-5, 34-35-36, and twelve credits in practical music (Courses 11 to 27) in the Junior College plus ten credits in practical music (Courses 11 to 27) in the Senior College.
B. History and Criticism
Courses 1, 4-5, 34-35-36, 76, and 53-54-55 or 50-51-52 or 56-57-58.
C. Ensemble
Two years' work (12 credits) or equivalent in practical music (Courses 11 to 27), Courses 34-35-36, 76, 60-61-62 or 63-64-65, 40-41-42 or 43-44-45.

For a special curriculum in Music Education see the College of Education Bulletin. For courses in Music Education see the program of the College of Education in this bulletin.

Entrance requirements, according to the instrument selected.—

Piano: Any major or minor scale in octaves, thirds, sixths, or tenths, M.M., quarter notes = 108; Bach Invention or dance from one of the suites; a sonata by Haydn or Mozart; a modern composition of equal difficulty with the sonata.

Voice: Sing on pitch with correct phrasing and musical intelligence standard songs in good English (the simpler classics recommended). Demonstrate ability to read a simple song at sight and have a knowledge of the rudiments of music. Have a promising voice. Some knowledge of piano is urgently recommended.

Violin: Major and minor scales, arpeggios; the simpler Kreutzer Etudes; a sonata by Handel, Haydn, Mozart, or Schubert; a more modern work displaying special technique peculiar to the violin.

Organ: Same as for piano.

A student wishing to register in the music course must first pass an examination in practical music before a committee of the faculty of the Music Department. This applies also to academic students who wish to elect courses in practical music.

Fees.—

Music 11 to 27 inclusive, Mu.Ed. 225:

1. One individual lesson per week, 2 credits	$25.00
2. Two individual lessons per week, 4 credits	50.00
3. Class lessons in Courses 11C, 12C, 2 credits	15.00

Music A-B-C and D-E-F:

1. One individual lesson per week, no credit	25.00

Practical music.—Students may enter courses in practical music (private lessons) any quarter.

Courses numbered from 11 to 27, inclusive, carry either 2 or 4 credits a quarter and must be repeated until the requirement in practical music has been met.

No student may count for graduation more than 36 credits in practical music.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
Mu.Ed.1f	Music Orientation (No cred.; fr. majoring in music; no prereq.)				
		V	TTh	4Mu	Mr. Ferguson, Mrs. Nohavec, and others
1f	Ear Training (2 cred.; all; there is no prerequisite for this course, but no student should register for it until he has made arrangements for a placement test in the office of the Department of Music)				
	Sec. 1*	I	MTWTh	3Mu	Miss Malcolm
	2	III	MTWTh	3Mu	Miss Malcolm
	3	VI	MTWTh	3Mu	Miss Kendall
	4	VI	MTWTh	103Mu	Miss Malcolm
2w-3s	Ear Training (2 cred.; continuation of 1)				
	Sec. 1	III	MW	3Mu	Miss Malcolm
	2	VI	MW	3Mu	Miss Kendall
	3	VI	MW	103Mu	Miss Malcolm
1w	Ear Training (See 1f)	II	MTWTh	3Mu	Miss Kendall
2s	Ear Training (See 2w)	II	TTh	3Mu	Miss Kendall
3f	Ear Training (See 3s)	II	TTh	3Mu	Miss Kendall
4w-5s	Harmony (6 cred.; all; prereq. 1)				
	Sec. 1	II	MWF	103Mu	Mr. Scott
	2	VII	MWF	103Mu	Mr. Scott
4s	Harmony (See 4w)	I	MWF	3Mu	Miss Malcolm
5f	Harmony (See 5s)	VII	MWF	3Mu	Miss Malcolm
6f	Harmony (continued) (3 cred.; all; prereq. 4-5)				
		III	MWF	103Mu	Mr. Scott
7w-8s†	Counterpoint (6 cred.; soph., jr., sr.; prereq. 4-5-6)				
		III	MWF	103Mu	Mr. Ferguson
29f	The Physical Basis of Music—Consideration of pitch, intensity, and quality of musical tones. Problems of resonance. Influences of amplifying systems on musical sounds. Physiological and psychological factors pertaining to music. Musical scales and their temperament. Study of musical instruments and the voice. Auditorium problems in ensemble playing (3 cred.; all; no prereq.) (Same as Phys. 15f)				
		VII	MWF	166Ph	Mr. Pepinsky
30w	Physics of Tone Color and Tone Production—Differentiation of tone quality of musical instruments and the voice. Variations of timbre with pitch range and intensity. Masking effects of instruments in combination. Mechanics of tone production and influences of interpretive values. Studies in the vibrato (3 cred.; all; prereq. Phys. 15 or 13) (Same as Phys. 17w)				
		VII	MWF	166Ph	Mr. Pepinsky
31f-32w-33s¶	Music Appreciation—Cultivation of better understanding of music heard today. The course is designed for students with a general interest in music rather than for those majoring in music (6 cred.; all; no prereq.)				
		VII	TTh	MuAud	Mr. Scott, Mr. Killeen, Mr. Pepinsky, and others
34f-35w-36s¶	History of Music (6 cred.; soph., jr., sr.; no prereq.)				
	Lect.	II	MW	MuAud	Mr. Ferguson
	Rec. (optional)	II	F		
37f-38w-39s	Keyboard Harmony (3 cred.; all; prereq. 4-5)				
		II	TTh	103Mu	Mr. Jennings

* Section 1 is for students not majoring in music.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

¶ Students may enter any quarter.

Courses in Practical Music

For a statement about credits and prerequisites for courses in practical music other than Courses 40-41-42 and 43-44-45, see page 71.

Af-Bw-Cs‡§	Piano (No cred.; for students without entrance requirements in piano; no prereq.)	Ar	Ar	Mu	Ar
Df-Ew-Fs‡§	Voice (No cred.; for students without entrance requirements in voice; no prereq.)	Ar	Ar	Mu	Ar
11f,w,s‡	Piano—Individual Lessons	Ar	Ar	Mu	Ar
11Cf,w,s†‡	Piano—Class Lessons*				
	Sec. 1	I	MW	Mu	Ar
	2	II	MW	Mu	Ar
	3	II	TTh	Mu	Ar
	4	III	TTh	Mu	Ar
	5	VI	TTh	Mu	Ar
12f,w,s‡	Voice—Individual Lessons	Ar	Ar	Mu	Ar
12Cf,w,s†‡	Voice—Class Lessons*				
	Sec. 1	VI	MWF	Mu	Ar
	2	VII	MWF	Mu	Ar
13f,w,s‡	Violin	Ar	Ar	Mu	Ar
14f,w,s‡	Viola	Ar	Ar	Mu	Ar
15f,w,s‡	Cello	Ar	Ar	Mu	Ar
16f,w,s‡	Double Bass	Ar	Ar	Mu	Ar
17f,w,s‡	Flute	Ar	Ar	Mu	Ar
18f,w,s‡	Oboe	Ar	Ar	Mu	Ar
19f,w,s‡	Clarinet	Ar	Ar	Mu	Ar
20f,w,s‡	Bassoon	Ar	Ar	Mu	Ar
21f,w,s‡	Trumpet	Ar	Ar	Mu	Ar
22f,w,s‡	French Horn	Ar	Ar	Mu	Ar
23f,w,s‡	Trombone	Ar	Ar	Mu	Ar
24f,w,s‡	Tuba	Ar	Ar	Mu	Ar
25f,w,s‡	Percussion	Ar	Ar	Mu	Ar
26f,w,s‡	Harp	Ar	Ar	Mu	Ar
27f,w,s‡	Organ	Ar	Ar	Mu	Ar
40f-41w-42s¶§§	Orchestra (6 cred.; all; prereq. consent of director)	7:30 p.m.	TW	NMA	Mr. Pepinsky
43f-44w-45s¶**	University Chorus (3 cred.; all; prereq. consent of director)				
	Sec. 1 (On the Minneapolis campus)	7:00-9:00 p.m.	T	BuAud	Mr. Killeen
	2 (A special section, on the University Farm campus, for students in the College of Agriculture, Forestry, and Home Economics)	4:30-6:00 p.m.	Th	AdmAud(UF)	

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

No.	Title	Hour	Day	Bldg.	Instructor
50f-51w-52s	Music of the Eighteenth Century (6 cred.; jr., sr.; prereq. 35)	VIII, IX	TTh	104Mu	Mr. Pepinksy

* Science, Literature, and the Arts major students must take individual rather than class lessons in their major instrument. Music Education majors will take individual lessons in their major and class lessons in their minor instrument. No student may take class lessons for more than 6 credits. Classes in piano will be composed of 4 students; classes in voice may be composed of 6 students.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ See statement of fees, page 71.

§ May be taken only with the consent of director.

¶ Students may enter any quarter.

** Students may receive credit for two years of chorus.

§§ Students majoring in music may earn twelve credits in orchestra.

No.	Title	Hour	Day	Bldg.	Instructor
53f-54w-55s	Romantic Movement (6 cred.; jr., sr.; prereq. 35)				
		VII	WF	104Mu	Miss Kendall
56f-57w-58s†	Bach and Beethoven (9 cred.; sr.; prereq. 34-35-36)				
		VI, VII	TTh	104Mu	Mr. Ferguson
59s	Technique of Voice (2 cred.; jr., sr.; prereq. 4-5, 29, and 6 cred. in Course 12 or 12C)				
		VI	TTh	4Mu	Mr. Killeen
60f-61w-62s	Instrumental Ensemble (6 cred.; jr., sr.)				
		VI	TTh	103Mu	Mr. Pepinsky
		and			
		III	S	103Mu	
63f-64w-65s	Vocal Ensemble (6 cred.; jr., sr.; prereq. 6 cred. in Course 12 or 12C)				
		II	TTh	104Mu	Miss Hull
66f-67w-68s	Advanced Vocal Ensemble (6 cred.; jr., sr.; prereq. consent of instructor)				
		Ar	Ar	104Mu	Mr. Killeen
69s	Advanced Physical Analysis of Musical Sounds (3 cred.; jr., sr.; prereq. Phys. 17, Math. 51) (Same as Physics 59)				
		VII	MWF	133Ph	Mr. Pepinsky
70f-71w-72s†	Normal Piano (6 cred.; jr.; prereq. 2 years piano)				
		I	MWF	103Mu	Miss Kendall
73f-74w-75s	Advanced Harmony (6 cred.; jr.; prereq. 4-5-6)				
		IV, V	T	103Mu	Mr. Scott
76f	Form and Analysis (3 cred.; jr., sr.; prereq. 4-5 and Psy. 1-2)				
		II	MWF	103Mu	Mr. Pepinsky
77f-78w-79s	Composition-Orchestration (6 cred.; jr., sr.; prereq. 4-5-6, 7-8)				
		Ar	Ar	Ar	Mr. Ferguson
80f-81w-82s†	Advanced Normal Piano (6 cred.; sr.; prereq. 70-71-72)				
		VIII	MWF	103Mu	Miss Kendall
83f-84w-85s	Advanced Composition (6 cred.; sr.; prereq. 77-78-79)				
		Ar	Ar	Ar	Mr. Ferguson
90f-91w-92s	Advanced Instrumental Ensemble (6 cred.; sr.; prereq. 60-61-62)				
		VI	MWF	104Mu	Mr. Pepinsky
95f-96w-97s	Piano Seminar (No cred.; open only upon recommendation of the Music Department to a limited number of students regularly enrolled in the University)				
		VIII	W	104Mu	Mr. Mitropoulos
200f-201w-202s	Basis of Musical Expression (9 cred.; grad.; prereq. 56-57-58)				
		VII, VIII	W	Ar	Mr. Ferguson
	Conference hour	Ar	Ar	Ar	
	Seminar	VIII, IX	F	104Mu	
205f-206w-207s	Composition in Larger Forms (9 cred.; grad.; prereq. 83-84-85)				
		Ar	Ar	Ar	Mr. Ferguson
209f-210w-211s	Advanced Topics in Musical Analysis (9 cred.; grad.; prereq. 76)				
		Ar	Ar	Ar	Mr. Pepinsky
	Seminar	VIII, IX	F	104Mu	

MUSIC EDUCATION

See Education, page 39

NAVAL SCIENCE AND TACTICS

See the program of Naval Science and Tactics, page 14

NORWEGIAN

See Scandinavian, page 99

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

ORIENTATION

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w-3s	Man in Nature and Society—An integrated survey course in which the student is introduced to the subject-matter of the natural and social sciences. One of the aims of the course is to aid the student in making an intelligent selection for his college career (9 cred.; entering fr.; no prereq.)				
	Lect.	I	F	BoAud	Mr. Sirich,
	Sec. 1	I	MWF	9F	Miss Shaw,
	2	III	MWF	9F	and others
	3	VII	MWF	9F	
4w	Introduction to Natural Science (equivalent to the first half of 1f-2w-3s) (5 cred.; entering fr.; no prereq.)	VII	MTWThF	6F	Ar
4s	Introduction to Natural Science (See 4w)	III	MTWThF	5F	Mr. Carlson

PHILOSOPHY

Major advisers in College of Science, Literature, and the Arts.—Professor Conger; Assistant Professors Castell and Everett.

Major sequence in the College of Science, Literature, and the Arts.—Courses 50-51-52 and others, to make a total of at least 27 credits in Senior College courses. Students who take Courses 50-51-52 and 50A-51A-52A must complete at least six credits in courses numbered above 100; those who take 50-51-52 alone must complete at least twelve credits in courses numbered above 100.

(Prerequisite for major sequence, Course 1.)

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College. In particular, Pol. Sci. 164-165-166 may be offered to make up a major in philosophy if the major adviser approves.

Most of the courses in philosophy are designed to be in one way or another "integrative"—to take data from other courses and from various fields of interest and ask how they fit together and what their significance is for man and his work. For a list of recommended related courses in other departments consult philosophy instructors or see the bulletin board outside 323 Folwell Hall.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
2f-1w-3s	Logic, Problems of Philosophy, Ethics—A special sequence of courses in philosophy for prelegal freshmen. Only by special permission of the instructor will students be admitted to 1w-3s without 2f, or to 3s without 1w (5 cred. per qtr.; prelegal fr.; no prereq.)	VI	MTWThF	101L	Mr. Castell, Mr. Feigl, Mr. Everett, Mr. Oliver, Mr. Ahlén
2f-1w-3s	Logic, Problems of Philosophy, Ethics—A special sequence of courses in philosophy for a limited number of freshmen* who are not prelegal students. (5 cred. per qtr.; fr. only*; no prereq.)	VI	MTWThF	200Pt	Mr. Everett and others

Courses 2 (Logic), 1 (Problems of Philosophy), and 3 (Ethics) may be taken singly, but the classes are scheduled so that they may be taken in the order 2f-1w-3s or

* Courses 1, 2, and 3 are open in any quarter to a limited number of freshmen with the approval of the Junior College office, 106 Folwell Hall.

2w-1s without change of hour. Students registering in any of them may consult instructors for suggestions concerning sections where emphasis is placed on special problems, e.g., social or political questions, scientific methods, evolution, religion.

No.	Title	Hour	Day	Bldg.	Instructor
1f	Problems of Philosophy—An elementary survey of certain problems of life and knowledge, constituting an introduction to systematic philosophy (5 cred.; open to some fr.* and to soph., jr., sr.; no prereq.)				
	Sec. 1	III	MTWThF	321F	Mr. Oliver
	2	VI	MTWThF	322F	Mr. Conger
1w	Problems of Philosophy (See 1f)				
	Sec. 1	IV	MTWFS	301F	Mr. Conger
	2	VII	MTWThF	322F	Mr. Norborg
1s	Problems of Philosophy (See 1f)				
	Sec. 1	I	MTWThF	322F	Mr. Conger
	2	II	MTWThF	321F	Mr. Norborg
2f	Logic—A study of the difference between logical and fallacious reasoning; types of fallacies; rules of a good definition; syllogisms; proof; hypothesis; generalization; probability (5 cred.; open to some fr.* and to soph., jr., sr.; no prereq.)				
	Sec. 1	IV	MTWFS	322F	Ar
	2	VII	MTWThF	322F	Mr. Norborg
2w	Logic (See 2f)				
	Sec. 1	I	MTWThF	322F	Mr. Oliver
	2	II	MTWThF	321F	Ar
2s	Logic (See 2f)				
	Sec. 1	III	MTWThF	2P	Mr. Oliver
	2	VI	MTWThF	322F	Ar
3f	Ethics—Problems of life treated in terms of (1) contemporary social, political, and economic forces, and (2) the character of the individual; psychological and philosophical foundations of morality; the reconstruction of morality (5 cred.; open to some fr.* and to soph., jr., sr.; no prereq.)				
	Sec. 1	I	MTWThF	322F	Mr. Norborg
	2	II	MTWThF	200Pt	Mr. Everett
3w	Ethics (See 3f)				
	Sec. 1	III	MTWThF	200Pt	Mr. Everett
	2	VI	MTWThF	211Bu	Mr. Everett
3s	Ethics (See 3f)				
	Sec. 1	IV	MTWFS	301F	Mr. Feigl
	2	VII	MTWThF	200Pt	Mr. Everett
10s	Science and Religion (2 cred.; soph., jr., sr.; no prereq.)	III	TTh	321F	Mr. Norborg
20f	Social Philosophy—A study of conflicting social philosophies of today; liberalism vs. authoritarianism; evaluation of various social, political, and economic institutions in terms of ethical ideals; other problems of social morality; social reconstruction; social utopias (3 cred.; soph., jr., sr.; no prereq.)	IV	MWF	200Pt	Mr. Everett
20w	Social Philosophy (See 20f)	II	MWF	200Pt	Mr. Brameld
20s	Social Philosophy (See 20f)	II	MWF	200Pt	Mr. Everett

Senior College Courses

Course 70 is open to prelegal sophomores who have an average grade of at least C in all their work and in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

50f-51w-52s§	General History of Philosophy (9 cred.; jr., sr.; no prereq.)	III	MWF	322F	Mr. Castell

* Courses 1, 2, and 3 are open in any quarter to a limited number of freshmen with the approval of the Junior College office, 106 Folwell Hall.

§ Students may enter any quarter.

No.	Title	Hour	Day	Bldg.	Instructor
50Af-51Aw-52As§	Readings in Philosophical Classics (6 cred.; jr., sr.; no prereq.)	III	TTh	322F	Mr. Castell
53	*This course has been renumbered 112 (Not offered)*				
55	This course has been renumbered 114.				
59f	Esthetics—A study of modern theories of art. Topics include the nature and status of art standards; the relation of art theories to the social background, to current psychological theories, and to art practice (3 cred.; jr., sr.; no prereq.) (Formerly Course 103)	VI	MWF	303F	Ar
61	This course has been renumbered 153.				
62	*This course has been renumbered 154 (Not offered)*				
70s*	Modern Philosophies of Social Reform—Social philosophy as theory of social criticism. Central position of law and property in a theory of social criticism. Examination of democracy, laissez-faire, revolution, collective responsibility, communism, and fascism as concepts in modern social criticism. (3 cred.; prelegal soph., jr., sr.; prereq. 6 cred. in phil. or 10 cred. in soc. sci.)	IV	MWF	322F	Mr. Castell
81	*Business Ethics* (3 cred.; jr., sr. in School of Business Administration and other jr., sr. who have earned 9 cred. in Senior College courses in econ.) *(Not offered)*				
100	This course has been renumbered 180.				
101	This course has been renumbered 181.				
102	This course has been renumbered 182.				
103	This course has been renumbered 59.				

Advanced Courses in the History of Philosophy

106w-107s	Philosophy of Plato (6 cred.; jr., sr., grad.; prereq. 6 cred. including Course 50) (Formerly Course 135-136)	VIII	MWF	321F	Mr. Norborg
111f	Empiricism—Philosophies of Locke, Berkeley, Hume (3 cred.; jr., sr., grad.; prereq. 6 cred.)	I	MWF	321F	Mr. Oliver
112	*Kant* (3 cred.; jr., sr., grad.; prereq. 6 cred.) *(Not offered)* (Formerly Course 53)				
113	*Scandinavian Philosophy* (3 cred.; jr., sr., grad.; prereq. 10 cred.) *(Not offered)* (Formerly Course 120)				
114f	American Philosophy from Puritanism to Pragmatism—A study of Puritanism, the Revolutionary period, transcendentalism, evolutionism, idealism, and pragmatism (3 cred.; jr., sr., grad.; especially for students of American history and literature) (Formerly Course 55)	IV	MWF	321F	Mr. Castell
115w	Contemporary Philosophy—A study of current systematic and critical philosophies, especially realism, pragmatism, and positivism, as represented by their principal exponents (3 cred.; jr., sr., grad.; prereq. 6 cred.)	III	MWF	321F	Mr. Oliver
116s	Philosophy of John Dewey—A survey of the ethical, social, educational, and logical contributions made to modern thought by this distinctively American thinker (3 cred.; jr., sr., grad.; prereq. 6 cred.)	IV	MWF	321F	Mr. Oliver
120	*This course has been renumbered 113. (Not offered)*				
123s	Comparative Philosophy—A survey of the principal Oriental philosophies, Hindu, Buddhist, Taoist, and Confucian, with special attention to comparisons and contrasts with Western systems (3 cred.; jr., sr., grad.; prereq. 6 cred.)	VI	MWF	321F	Mr. Conger
124	*This course has been renumbered 165 (Not offered)*				
135-136	This course has been renumbered 106-107.				
141	This course has been renumbered 155.				

* No student may receive credit for both Philosophy 70 and Political Science 161-162.

§ Students may enter any quarter.

Advanced Courses in Other Fields

No.	Title	Hour	Day	Bldg.	Instructor
147s	Advanced Logic (3 cred.; jr., sr., grad.; prereq. 6 cred. in phil. including Course 2)	III	MWF	321F	Mr. Feigl
151	This course has been renumbered 170.				
153w	Philosophy of Science—The historical development of the logical concepts of science, especially substance, causality, space, time, and magnitude (3 cred.; jr., sr., grad.; prereq. 2) (Formerly Course 61)	IV	MWF	321F	Mr. Feigl
154	*Logic of Science*—The scope and purpose of modern scientific method; its logical structure; recent developments in logical theory and their effects upon the use of logic in the sciences (3 cred.; jr., sr., grad.; prereq. 153, or 2 and 20 cred. in one natural science) *(Not offered)* (Formerly Course 62)				
155w	Metaphysics (5 cred.; jr., sr., grad.; prereq. 6 cred.) (Formerly Course 141)	VI	MTWThF	322F	Mr. Conger
161-162-163	This course has been renumbered 191-192-193.				
165	*Political and Social Ethics* (3 cred.; jr., sr., grad.; prereq. 6 cred.) *(Not offered)* (Formerly Course 124)				
170f	Philosophy of History—A survey of the mythological, religious, naturalistic, totalitarian, and economic interpretations of history, and a critical analysis of the historical categories: time, succession, causality, continuity, freedom, revolution, and progress (3 cred.; jr., sr., grad.; prereq. 6 cred. in phil. or 10 cred. in hist.) (Formerly Course 151)	VIII	MWF	321F	Mr. Norborg
180f	History of Religions (3 cred.; jr., sr., grad.; prereq. 6 cred.) (Formerly Course 100)	II	MWF	304F	Mr. Conger
181w	Psychology of Religion (3 cred.; jr., sr., grad.; prereq. 6 cred.) (Formerly Course 101)	II	MWF	304F	Mr. Conger
182s	Philosophy of Religion (3 cred.; jr., sr., grad.; prereq. 6 cred.) (Formerly Course 102)	II	MWF	304F	Mr. Conger
191f-192w-193s	Seminar in Philosophy—Topics to be announced (9 cred.; sr., grad.; prereq. 20 cred. in phil. and consent of instructor) (Formerly Course 161-162-163)	Ar	Ar	Ar	Mr. Feigl, Mr. Conger, Mr. Castell, Mr. Oliver

For Graduate Students Only

250-251-252 *Graduate History of Philosophy* (3 cred. per qtr.; no prereq.) *(Not offered)*

PHYSICAL EDUCATION FOR MEN

See the program of Physical Education for Men, in the College of Education section of this bulletin.

PHYSICAL EDUCATION FOR WOMEN

See the program of Physical Education for Women, page 15.

PHYSICS

Major adviser in the College of Science, Literature, and the Arts.—Associate Professor Valasek.

Major sequence in the College of Science, Literature, and the Arts.—Courses 101-

103-105, plus 6 additional credits in Senior College courses, and Mathematics 50, 51, and 105.

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

The physics included in specialized curriculum leading to the degree "B.S. in physics," offered in the Institute of Technology, will be accepted as a major sequence in this college.

Major adviser in the College of Education.—Professor Buchta.

Requirements for a teacher's certificate.—Course 7-8-9. This is a general course in physics extending through three quarters.

Major recommendation: The above general course and in addition Courses 52, 107-109-111 and six credits selected from 110-112, 124, 134, 144.

Minor recommendation: The above general course plus six credits selected from Courses 52, 107-109-111, 134, 144.

For a specialized curriculum in natural science see the Bulletin of the College of Education.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w†-3s	Introduction to Physical Science—Lectures and experimental demonstrations of the principles underlying physical phenomena (9 cred.; all; prereq. high school algebra and plane geometry)				
		III	MWF	166Ph	Mr. Buchta
1af-2aw†-3as‡	Introduction to Physical Science—with laboratory included. Fulfills the laboratory-science group requirement in Science, Literature, and the Arts (12 cred.; all; prereq. high school algebra and plane geometry)				
	Lect.	III	MWF	166Ph	Mr. Buchta
	Lab. Sec. 1	I, II	Th	Ar	Mr. Miller
	2	VIII, IX	F	Ar	
4f-5w-6s‡	General Physics (primarily for premedical students)—Mechanics, heat, sound, light, and electricity. Laboratory work is an integral part of course (15 cred.; all; prereq. higher algebra and trigonometry, the equivalent of Math. 1 and 6)				
	Lect. and quiz	I	MTWThF	133Ph	Mr. Buchta
	Lab. Sec. 1	VI, VII	M		Mr. Miller
	2	VIII, IX	M		and assistants
	3	VIII, IX	T		
	4	VI, VII	Th		
	5	VIII, IX	F		
	6	III, IV	S		
4s-5f-6w‡	General Physics (See 4f-5w-6s)				
	Lect. and quiz	III	MTWThF	133Ph	Mr. Schmitt
	Lab. Sec. 1	VIII, IX	M	Ar	Mr. Miller
	2	VI, VII	Th		and assistants
	3	VIII, IX	F		
	4	I, II	S		
	5	III, IV	S		
7f-8w-9s‡	General Physics (primarily for students majoring in physics, mathematics, or chemistry and for students in the Institute of Technology)—Mechanics, heat, sound, light, and electricity. Laboratory work is an integral part of the course (15 cred.; all; prereq. M.&M. 12 or Math. 6 or equiv.)				
	Schedule for 7f				
	Lect. Sec. 1	III	MTWF	150Ph	Mr. Nier
	2	II	MWThF	150Ph	Mr. Williams
	3	VI	MWThF	150Ph	Mr. Hill
	Quiz Sec. 1	IX	Th	150Ph	
	2	IX	M	150Ph	
	3	IX	T or Th	150Ph	
	Lab. See page 80.				

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $2 per quarter is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
7f-8w-9s‡	General Physics—*Continued*				
	Schedule for 7f—*Continued*				
	Lab. Sec. 1	I, II	M	Ar	Mr. Miller
	2	III, IV	M		and assistants
	3	VI, VII	M		
	4	VIII, IX	M		
	5	I, II	T		
	6	III, IV	T		
	7	VI, VII	T		
	8	VIII, IX	T		
	9	I, II	W		
	10	III, IV	W		
	11	VI, VII	W		
	12	VI, VII	Th		
	13	VIII, IX	Th		
	14	I, II	F		
	15	VI, VII	F		
	16	I, II	S		
	17	III, IV	S		
	Schedule for 8w				
	Lect. Sec. 1	III	MWFS	150Ph	Mr. Nier
	2	II	MWThF	150Ph	Mr. Williams
	3	VI	MWThF	150Ph	Mr. Rumbaugh
	Quiz Sec. 1	IX	T	150Ph	
	2	VII	T	166Ph	
		or			
		IX	M	150Ph	
	3	IX	Th	150Ph	
	Lab. Sec. 1	I, II	M	Ar	Mr. Miller
	2	III, IV	M		and assistants
	3	VI, VII	M		
	4	VIII, IX	M		
	5	I, II	T		
	6	III, IV	T		
	7	VI, VII	T		
	8	VIII, IX	T		
	9	I, II	W		
	10	III, IV	W		
	11	VI, VII	W		
	12	VI, VII	Th		
	13	VIII, IX	Th		
	14	I, II	F		
	15	VI, VII	F		
	16	I, II	S		
	17	III, IV	S		
	Schedule for 9s				
	Lect. Sec. 1	III	MTWF	150Ph	Mr. Nier
	2	II	MWThF	150Ph	Mr. Williams
	3	VI	MWThF	150Ph	Mr. Rumbaugh
	Quiz Sec. 1	III	Th	150Ph	
	2	II	S	150Ph	
		or			
		VIII	Th	150Ph	
	3	VI	T	150Ph	
	Lab. See page 81.				

‡ A fee of $2 per quarter is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
7f-8w-9s‡	General Physics—*Continued*				
	Schedule for 9s—*Continued*				
	Lab. Sec. 1	I, II	M	Ar	Mr. Miller
	2	III, IV	M		and assistants
	3	VI, VII	M		
	4	VIII, IX	M		
	5	I, II	T		
	6	III, IV	T		
	7	VI, VII	T		
	8	VIII, IX	T		
	9	I, II	W		
	10	VI, VII	W		
	11	VI, VII	Th		
	12	VIII, IX	Th		
	13	I, II	F		
	14	VI, VII	F		
	15	I, II	S		
	16	III, IV	S		
7w-8s-9f‡	General Physics (See 7f-8w-9s)				
	Schedule for 7w				
	Lect.	II	MWThF	166Ph	Mr. Hill
	Quiz	II	S	150Ph	
	Schedule for 8s				
	Lect.	II	MWThF	166Ph	Mr. Hill
	Quiz	VIII	T	150Ph	
	Schedule for 9f				
	Lect.	II	MWThF	166Ph	Mr. Valasek
	Quiz	II	S	150Ph	
	Lab. schedule for 7w-8s-9f				
	Sec. 1	VI, VII	M	Ar	Mr. Miller
	2	VI, VII	W		and assistants
	3	VI, VII	F		
	4	VIII, IX	Th		
	5	III, IV	S		
15f	The Physical Basis of Music (3 cred.; all; no prereq.) (Same as Music 29)	VII	MWF	166Ph	Mr. Pepinsky
17w	Physics of Tone Color and Tone Production (3 cred.; all; prereq. Phys. 15 or 13) (Same as Music 30)				
	Lect.	VII	MWF	166Ph	Mr. Pepinsky
29f	Introduction to Meteorology—A presentation of the fundamental physical principles underlying meteorological phenomena, accompanied by instrumental observations and weather map study (3 cred.; all; prereq. high school physics or equiv.)	VI	MWF	133Ph	Mr. Miller

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

52w,s‡	Laboratory Arts (3 cred.; jr., sr.; prereq. 15 cred. in physics and approval of dept.)	VI, VII, VIII	TTh	39Ph	Ar
59s	Advanced Physical Analysis of Musical Sounds (3 cred.; jr., sr.; prereq. Math. 51 and Phys. 13 or 15) (Same as Music 69)	VII	MWF	133Ph	Mr. Pepinsky
100f-102w-104s	Intermediate Physics—Discussion of selected problems in classical physics. Solution of problems (9 cred.; all; prereq. calculus and 15 cred. in physics)	II	TThS	145Ph	Mr. Buchta

‡ A fee of $2 per quarter is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
101f-103w-105s	Theoretical Physics (15 cred.; jr., sr., grad.; prereq. 15 cred. in physics, Math. 106 or registration in 106)	III	MTWThF	145Ph	Mr. Rumbaugh
107f-109w-111s	Modern Physics (9 cred.; jr., sr., grad.; prereq. 15 cred. in physics, Math. 50)	I	TThS	145Ph	Mr. Nier
110w-112s‡¶	Modern Experimental Physics (3 or 4 cred. per qtr.; jr., sr., grad.; prereq. 144)	VI-IX	TTh	145Ph	Mr. Williams
113	*Intermediate Acoustics* (3 cred.; jr., sr., grad.; prereq. Math. 51, 15 cred. in physics) *(Not offered)*				
114f-116w-118s¶	Elementary Physical Investigation (9 cred.; jr., sr., grad.; prereq. 15 cred. in physics, Math. 51)	Ar	Ar	Ar	Ar
124w‡	Pyrometry (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics)	VII, VIII, IX	MW	245Ph	Mr. Miller
126s‡	Advanced Heat (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics)	VII, VIII, IX	MW	245Ph	Mr. Miller
131f	Geometrical and Physical Optics (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics, Math. 51)	Ar	Ar	Ar	Mr. Valasek
134f,w‡	Experimental Optics (3 or 4 cred.; jr., sr., grad.; prereq. 15 cred. in physics)	VII, VIII, IX	MF	348Ph	Mr. Valasek
136w,s‡	Spectrum Analysis (3 or 4 cred.; jr., sr., grad.; prereq. 15 cred. in physics)	VII, VIII, IX	MF	348Ph	Mr. Valasek
144f‡	Electricity Measurements (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics, Math. 51)				
	Lect.	III	S	133Ph	Mr. Rumbaugh
	Quiz	II	Th	133Ph	Mr. Rumbaugh
	Lab. Sec. 1	VI, VII	MF	231Ph	
	2	VIII, IX	M	231Ph	
		VI, VII	W		
	3	III, IV	T	231Ph	
		VIII, IX	Th		
	4	VI, VII	TTh	231Ph	
	5	VIII, IX	TF	231Ph	
146w‡	Advanced Electricity Measurements (3 cred.; prereq. 144 and permission of instructor)	Ar	Ar	232Ph	Mr. Rumbaugh
152s	X Rays (3 cred.; jr., sr., grad.; prereq. 15 cred. in physics)	I	MWF	166Ph	Mr. Valasek
154‡	*X-Ray Spectroscopy* (3 cred.; prereq. Math. 51, and permission of instructor) *(Not offered)*				
181f-183w-185s	Atomistic and Elementary Quantum Mechanics—Atomic structure, X rays, spectrum analysis and an introduction to wave mechanics (3 cred. per qtr.; sr., grad.; prereq. 101-103-105 or registration in that course)	Ar	Ar	Ar	Mr. Bardeen

GEOPHYSICS

61w	Introduction to Geophysical Prospecting—Qualitative discussions of the application of physical measurements to the location of petroleum and mineral deposits together with some discussion of the applications of geophysical methods to problems of near surface geologic structure (3 cred.; jr., sr.; prereq. a general course in physics, Math. 12)	Ar	Ar	342Ph	Mr. Wetzel
161f-162w	Principles of Geophysical Prospecting—Quantitative discussions of theory, instruments, field practice, and interpretation of seismic, electric, gravitational, and magnetic geophysical methods. (3 cred. per qtr.; jr., sr., grad.; prereq. a general course in physics, Math. 51)	Ar	Ar	342Ph	Mr. Wetzel
164f-165w-166s	Special Problems in Geophysics (Cred. ar.; prereq. permission of instructor)	Ar	Ar	Ar	Mr. Wetzel

‡ A fee of $2 per quarter is charged for this course.
¶ Students may enter any quarter.

PHYSIOLOGY

MEDICAL SCHOOL

Major adviser in the College of Science, Literature, and the Arts.—Professor Keys.

Major sequences in the College of Science, Literature, and the Arts.—

Sequence A. Physiology. Course 100-101; 103; 104; 6 credits in courses numbered 113 to 140, or Zoology 109-110.

Sequence B. Physiological Chemistry. Courses 100-101; 21 credits in courses numbered 103 to 164, or courses in agricultural biochemistry approved by the major adviser.

Sequence C. Biophysics. Courses will be arranged by Professor Stenstrom with interested students subject to the approval of the assistant dean for the Senior College.

Modification of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f*	Elements of Physiological Chemistry (4 cred.; primarily for students of nursing§; no prereq.)				
	Lect.	II	ThS	Ar	Dr. Arnow
	Lab. Sec. 1	I, II	T	Ar	and others
	2	VII, VIII	M	Ar	
	Quiz	III	Th	Ar	
1s*	Elements of Physiological Chemistry (See 1f)				
	Lect. and quiz.	II	MWF	Ar	Dr. Arnow
	Lab.	II, III	S	Ar	and others
2f*	Elements of Physiology (4 cred.; primarily for students of nursing§; no prereq.)				
	Lect.	I	ThS	Ar	Dr. Kabat
	Lab. Sec. 1	III, IV	T	Ar	and others
	2	III, IV	S	Ar	
	Quiz	VI	F	Ar	
2s*	Elements of Physiology (See 2f)				
	Lect. and quiz.	I	TThS	Ar	Dr. Kabat
	Lab.	II, III	Th	Ar	and others
4f,s*	Human Physiology (4 cred.; all; prereq. 1 qtr. zool., 1 qtr. chem.)				
		III, IV	MWF	301MH	Dr. Hemingway and others

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

50f	Physiological Chemistry (4 cred.; primarily for phys. ed. students§; jr., sr.; prereq. general chemistry)				
		VI	MTWThF	Ar	Dr. Samuels
51w*	Human Physiology (6 cred.; primarily for phys. ed. students§; jr., sr.; prereq. Zool. 1-2-3; Inorg. Chem. 1-2-3, or 4-5, or equiv.; Physiol. 50)				
		IV	MWF	MH	Dr. Keys
		VI, VII, VIII, IX	T	MH	and others
		VI, VII, VIII	Th	MH	
56w	Physiological Chemistry (4 cred.; primarily for dental students§; jr., sr.; prereq. org. chem.)				
	Lect.	I	TThS	Ar	Dr. Armstrong and others
	Quiz	II	T	Ar	
57s	Physiological Chemistry (5 cred.; jr., sr.; prereq. 56)				
	Lect.	I	TS	Ar	Dr. Armstrong
	Lab.	II, III, IV	Th		and others
		II, III	S		

* Will not count for credit for admission to the Medical School except by permission of the dean of that school.

§ Others may be admitted by special permission.

No.	Title	Hour	Day	Bldg.	Instructor
58w*	Human Physiology (6 cred.; primarily for dental students§; sr.; prereq. zool. and Physiol. 56, 57)				
	Lect.	I	TWThS	Ar	Dr. King
	Quiz	II	S	Ar	and others
	Lab.	II, III, IV	T	Ar	
59s*	Human Physiology (8 cred.; sr.; prereq. 58 or equiv.)				
	Lect.	I	MTThFS	Ar	Dr. King
	Quiz	II	T	Ar	and others
	Lab.	II, III, IV	ThS	Ar	
100f	Physiological Chemistry (7 cred.; jr., sr.; prereq. zool., org. chem., and phys.)				
	Lect.	IV	MTWF		Dr. Burr,
	Quiz	I	F		Dr. Armstrong,
	Lab.				Dr. Samuels,
	Sec. AB	I, II, III	MW		Dr. Arnow
	CD	I, II, III	ThS		
101w	Physiological Chemistry (6 cred.; jr., sr.; prereq. 100)				
	Lect.	IV	TS		Dr. Burr
		VI	F		and others
	Quiz	VI	T		
	Lab.				
	Sec. AB	I, II, III	MW		
	CD	I, II, III	ThS		
103f¶	Physiology of Circulation, Respiration, etc. (9 cred.; jr., sr.; prereq. zool. and org. chem.)				
	Lect.	I	MTWThFS		Dr. Visscher,
	Conference‖ or lecture	III	TS		Dr. Scott
	Lab.				
	Div. A	VI, VII, VIII	MW		
	B	II, III, IV	MW		
104w¶	Physiology of Endocrines, Nervous System, etc. (6 cred.; lect. only, 4 cred.; jr., sr.; prereq. 103 or org. chem. and neurology)				
	Lect.	IV	MTWF	Ar	Dr. Visscher,
	Conference‖	IV	S		Dr. Scott,
	Lab.				Dr. Kabat
	Div. A	9:00-11:20	M		
		1:30-4:00	W		
	B	1:30-4:00	M		
		9:00-11:20	W		
114w	Physiology of Muscular Activity (1 or 2 cred.; jr., sr., grad.; prereq. 103 or 51 with grade of A or B)				
	Conference	IX	T	Ar	Dr. Keys
115w	Measurements in Human Physiology (1 cred.; jr., sr., grad.; prereq. 114 which may be taken concurrently) (Limited to 10 students)				
		9:00-11:20	T	Ar	Dr. Keys

For other courses see the bulletin and programs of the Medical School.

POLITICAL SCIENCE

Major advisers.—Professors Anderson, Quigley, Short, and Starr.

Preparation for Senior College work.—Nine credits, including 6 in Course 1-2, and 3 in one of the following: Courses 3, 7, 15, and 25, except as otherwise noted in the prerequisites for particular Senior College courses.

Preparation for a major sequence and for the major in international relations.—Fifteen credits in courses numbered from 1 to 26, plus suitable preparation in History

* Will not count for credit for admission to the Medical School except by permission of the dean of that school.

§ Others may be admitted by special permission.

¶ Students may register for lectures without laboratory.

‖ Optional for nonmedical students.

(1-2-3, 4-5-6, or 20-21-22), Economics (6-7 and 5) or Sociology (1 and 45). In addition students are advised to take one or more of the following: Philosophy 2, Geography 43, Psychology 1-2.

Major sequence.—The preparatory work noted above is designed to provide a general knowledge of (1) the American system of government, and (2) the principal terms and concepts of political science. To this knowledge the major sequence should add the following: (3) a knowledge of the works of a number of great contributors to political ideas; (4) fairly exact and thoro knowledge of some extensive part of at least three of the following fields of political science: (a) American government, politics, and administration; (b) public law; (c) comparative modern government; (d) political theory; (e) local government and administration; (f) international law, organization, and relations; and (5) development of the ability to study independently in at least one of the three chosen fields.

To these ends the student will be expected to take four courses meeting three times a week throughout the year, or the equivalent, including at least one three-quarter sequence in each of his selected fields. To meet the four-course requirement, a student may, with the approval of his adviser, offer the equivalent of one course selected from closely related offerings in Economics, History, Journalism, Psychology, and Sociology. For a list of such approved offerings see the major advisers.

Major in international relations (training for the foreign service).—A special program taking the place of a major sequence will be arranged for students of good standing who desire a general introduction to this field. Courses are drawn from Political Science, Economics, History, Geography, and related departments. Those intending to take the examinations for the American foreign service are advised to follow this program and to prepare themselves adequately in modern foreign languages. Consult Mr. Quigley.

Tutorial and honors courses.—Students who are capable of doing better than average work and who wish to specialize or to study for graduation honors are advised to take some of the special tutorial courses: 4, 5, 6, 17, 26, and 91-92-93. Course 91-92-93 may be elected for independent work in any of the six fields noted above in the description of the major sequence.

Major adviser in the College of Education.—Professor Kirkpatrick.

Requirements for a teacher's certificate.—Major recommendation: At least 36 credits in political science including 1-2-3, either 7, 15, or 25, and at least 12 credits in Senior College courses.

Minor recommendation: At least 18 credits in political science, including 1-2-3, either 7, 15, or 25, and 3 credits in Senior College courses.

For a comprehensive curriculum in social studies, see College of Education Bulletin.

Note for graduate students.—Courses in political science that are indicated as being open to juniors, seniors, and graduates may be taken by graduate students for full credit, subject to the requirement of additional work over and above that assigned to undergraduates, or they may be taken by graduate students for reduced credit.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
Af-Bw-Cs†§	Introduction to Government (for prelegal students only)—A survey of the development of political institutions and ideas, followed by comparative study of the organization and practice of modern governments, with emphasis upon the American system. (9 cred.; no prereq. No student will be given credit for both Courses A-B-C and 1-2-3)	VII	MWF	206Pt	Mr. McLaughlin
1f-2w†-3s§	American Government and Politics—Part 1-2. National, state, and local. Constitutions and fundamental laws; governmental organization; division and separation of powers; legislative, executive, and judicial procedure and problems. Part 3. Principal functions and services of government: defense, law enforcement, regulation of business, public works, and social services (9 cred.; all; no prereq.)	IV	MWF	BuAud	Mr. Christensen
		VII	MWF	BuAud	Mr. Kirkpatrick
1w-2s†§	American Government and Politics (6 cred.; all; no prereq.)	III	MWF	206Pt	Mr. McLaughlin
4,5,6f,w,s	Tutorial Work in American Government and Politics (2 cred. per qtr.; open to students registered in 2, 3 with grade of B or better in preceding quarter of 1-2-3, and to students who have completed 1-2 with equally satisfactory standing. Consult instructor)				
	Fall 4f	III	TTh	9F	Mr. McLaughlin
	5f	VII	TTh	112Bu	Mr. Short
	Winter 4w	I	TTh	209Bu	Ar
	5w	III	TTh	9F	Ar
	Spring 4s	I	MW	218P	Mr. Christensen
	5s	I	TTh	209Bu	Ar
	6s	II	TTh	211Bu	Ar
	6s	III	TTh	9F	Ar
7w,s	Comparative European Government—The governments of Great Britain, France, Italy, Germany, and Russia. Constitutions; governmental organization; parties and elections (3 cred.; all; prereq. for fr. and soph. Course 1, for jr. and sr. none. Course 7 may be taken simultaneously with Course 2 or 3)				
	Winter	VII	MWF	211Bu	Mr. Starr
	Spring	II	TThS	221Bu	Mr. Starr
15f,s	Elements of Political Science—The nature and functions of the state; sovereignty and liberty; constitutions, forms of government (3 cred.; all; prereq. for fr. and soph. Course 1, for jr. and sr. none. Course 15 may be taken simultaneously with Course 2 or 3)				
	Fall	II	TThS	221Bu	Mr. Lippincott
	Spring	VII	MWF	209Bu	Mr. Lippincott
17w	Tutorial Work in Elements of Political Science (2 cred.; open to students who have had or are registered in 15, with honor point average of 1.5 and grade of C+ in 1-2 or in portion thereof completed, and to advanced students of satisfactory standing. Consult instructor)	VII	MW	217Bu	Mr. Lippincott
25f,w	World Politics—Introduction to contemporary international relations; the policies of the great powers; nationalism; imperialism; internationalism (3 cred.; all; prereq. for fr. and soph. Course 1 or Hist. 1-2-3, for jr. and sr. none. Course 25 may be taken simultaneously with Course 2 or 3)				
	Fall	VII	MWF	211Bu	Mr. Mills
	Winter	II	TThS	211Bu	Mr. Mills
26w	Tutorial Work in World Politics (2 cred.; open to students registered in 25, with honor point average of 1.5 and grade of B in 1-2, or in portion thereof completed, and to advanced students of satisfactory standing. Consult instructor.)	VII-VIII	W	111Bu	Mr. Mills

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

§ No student will be given credit for both courses A-B-C and 1-2-3.

No.	Title	Hour	Day	Bldg.	Instructor
85s	Problems of World Politics (3 cred.; jr., sr.; prereq. 25 or Hist. 1-2-3)	II	MWF	211Bu	Mr. Mills
91f-92w-93s	Tutorial and Honors Work in Selected Fields (Cred. ar.; jr., sr.; prereq. 18 cred.; consult major advisers)	Ar	Ar	Ar	Ar
97	*American and European Colonies of Today* (3 cred.; jr., sr.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci) *(Not offered)*				
101f-102w-103s†	Constitutional Law (9 cred.; jr., sr., grad.; prereq. 9 cred.)	III	MWF	209Bu	Ar
104f-105w-106s†	American Constitutional Development (9 cred.; jr., sr., grad.; prereq. 9 cred. or Hist. 20-21-22)	I	MWF	204F	Mr. Kirkpatrick
108w	Legislative Organization and Procedure (3 cred.; jr., sr., grad.; prereq. 9 cred.)	IV	MWF	112Bu	Mr. Short
116f-117w†-118s	Local Government (9 cred.; jr., sr., grad.; prereq. 9 cred.)	I	MWF	221Bu	Mr. Anderson
120f	Municipal Functions (3 cred.; jr., sr., grad.; prereq. 9 cred.)	II	TThS	209Bu	Mr. Ludwig
121w	Municipal Administration (3 cred.; jr., sr., grad.; prereq. 120 or consent of instructor)	II	TThS	209Bu	Mr. Ludwig
122s	Municipal Problems (3 cred.; jr., sr., grad.; prereq. 121 or consent of instructor)	II	TThS	209Bu	Mr. Ludwig
125f	Recent Social Legislation (3 cred.; jr., sr., grad.; prereq. 9 cred.)	III	TThS	209Bu	Mr. Christensen
126w-127s†	Government and the Economic Order (6 cred.; jr., sr., grad.; prereq. 9 cred.)	III	TThS	209Bu	Mr. Christensen
131f-132w-133s†	Public Administration (9 cred.; jr., sr., grad.; prereq. 9 cred.)	II	MWF	221Bu	Mr. Short
144f	American Political Parties (3 cred.; jr., sr., grad.; prereq. 9 cred.)	II	TThS	211Bu	Mr. Starr
145f-146w†	British Government and Politics (6 cred.; jr., sr., grad.; prereq. 9 cred.)	III	TThS	112Bu	Mr. Starr
147s	French Government and Politics (3 cred.; jr., sr., grad.; prereq. 9 cred.)	III	TThS	112Bu	Mr. Starr
148w	European Dictatorships (3 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.)	II	TThS	221Bu	Mr. Starr
149f-150w†	Government and Politics of the British Empire (6 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.)	VI	MWF	209Bu	Mr. Mills
151s	Problems of the British Dominions (3 cred.; jr., sr., grad.; prereq. 149-150 with grade of C+ or better, or consent of instructor)	VI	MWF	209Bu	Mr. Mills
153f	Japanese Government and Politics (3 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.)	IV	MWF	209Bu	Mr. Quigley
154	*Chinese Government and Politics* (3 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.) *(Not offered)*				
160f	Topics in American Political Thought (3 cred.; jr., sr., grad.; prereq. 15 or 161 or 164 or consent of instructor)	III	MWF	111Bu	Mr. Lippincott
161w-162s†§	Recent Political Thought (6 cred.; sr., grad.; prereq. 18 cred. or consent of instructor)	III	MWF	211Bu	Mr. Lippincott, Mr. Kirkpatrick

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

§ No student may receive credit for both Political Science 161-162 and Philosophy 70.

No.	Title	Hour	Day	Bldg.	Instructor
164f-165w-166s†	Development of Political Thought (9 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.)	IV	MWF	211Bu	Mr. Lippincott, Mr. Kirkpatrick
167f-168w-169s†	Readings in the Classics of Politics (9 cred.; jr., sr., grad.; prereq. 15, or 164-165 with which it may be taken simultaneously, or consent of instructor)	VIII-IX	W	301Lib	Mr. Lippincott, Mr. Kirkpatrick
170	*Problems of Democracy* (3 cred.; jr., sr., grad.; prereq. 15 or 161 or 164 or consent of instructor) *(Not offered)*				
171s	Political Psychology (Identical with Psy. 141) (3 cred.; jr., sr., grad.; prereq. Psy. 140)	III	TThS	206Pt	Mr. Bird
180f-181w-182s†	International Law (9 cred.; jr., sr., grad.; prereq. 9 cred.)	I	TThS	221Bu	Mr. McLaughlin
184w	International Organization (3 cred.; jr., sr., grad.; prereq. 9 cred.)	IV	MWF	209Bu	Mr. Quigley
185s	Theories of International Relations (3 cred.; jr., sr., grad.; prereq. 9 cred.)	IV	MWF	209Bu	Mr. Quigley
191f-192w-193s†	International Relations in the Far East (9 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.)	II	MWF	209Bu	Mr. Quigley
195-196	*Colonial Government and the Problems of Imperialism* (6 cred.; jr., sr., grad.; prereq. 9 cred. in pol. sci. or 18 cred. in soc. sci.) *(Not offered)*				

Courses Primarily for Graduate Students

The following courses may be taken by seniors majoring in political science with consent of the instructor:

204f-205w-206s†	Topics in Administrative Law (9 cred.; grad.; prereq. 18 cred. in pol. sci. or consent of instructor)	3:30-5:00	MF	301Lib	Ar
231w	Scope and Methods of Political Science (3 cred.; grad.; prereq. admission to graduate major, or consent of instructor)	VII	MWF	209Bu	Mr. Anderson
232s	Problems of Public Planning (3 cred.; sr. with consent of instructor, grad.; prereq. 15 cred. in pol. sci.)	VII	MWF	211Bu	Mr. Anderson
242f-243w-244s†	Topics in Colonization (9 cred.; grad.; prereq. 195-196 or consent of instructor)	VIII-IX	M	215Bu	Mr. Mills

PREVENTIVE MEDICINE AND PUBLIC HEALTH

MEDICAL SCHOOL

Advisers in the College of Science, Literature, and the Arts.—Professors Anderson and Boynton.

Major advisers in the College of Education.—Professors Anderson and Boynton; Associate Professor Arnstein.

Minor sequence in the College of Science, Literature, and the Arts or in the College of Education.—Courses 50 or 51, 57, 59, and Bact. 53 are recommended.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

Major sequence in Public Health Nursing.—P.M.&P.H. 53, 62, 63, 65, 66, 67, 133; additional P.M.&P.H. courses, 8 credits. (Ed.T. 50 and H.E. 76 may be counted as P.M.&P.H. courses to satisfy this requirement of 8 credits.)

Additional requirements.—Social science (other than sociology), 9 credits; Freshman English or exemption from the requirement; Bact. 53 or 101; Psy. 1-2; Soc. 1, 49, 90 or 129, and 3 additional credits in Child Welfare; natural science courses, 14 credits.

Note.—The sequence leads to a B.S. degree with a major in public health nursing, the nine-month certificate course having been discontinued except for students already holding a B.A. or a B.S. degree.

For additional details of courses of study in public health consult the Bulletin of the Department of Preventive Medicine and Public Health.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
2f	First Aid (1 cred.; no prereq.) (Limited to 20 women)	VI, VII	T	Coll. Dorm., UF	Miss Fisher
2s	First Aid (See 2f) (Limited to 20 women)				
	Sec. 1	I, II	Th	Coll. Dorm., UF	Miss Fisher
	2	VI, VII	W	Coll. Dorm., UF	Miss Fisher
3f§	Personal Health (2 cred.; fr., soph.; no prereq.; not open to students who have taken Human Biol. 103 in the General College)	VI	MW	BuAud	Dr. O'Brien
3w§	Personal Health (See 3f)	VI	WF	BuAud	Dr. O'Brien
3s§	Personal Health (See 3f)	VI	MW	BuAud	Dr. O'Brien
4w,s§	Health Problems of Adult Life (2 cred.; all; prereq. 3 or Human Biol. 103 in the General College)	VI	TTh	*	Dr. Potthoff

Senior College Courses

Courses 53 and 57 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

50f§	Public and Personal Health (3 cred.; open to jrs. and srs. who have not taken Courses 3, 4, 52, or Human Biol. 103 in the General College; no prereq.)	VII	MWF	*	Dr. Boehrer
50s§	Public and Personal Health (See 50f)	IV	MWF	*	Dr. Boehrer
51f§	Community Hygiene (3 cred.; jr., sr.; prereq. 3, or Human Biol. 103 in the General College; not open to students who have taken 50, 52, or 53)	VII	MWF	*	Dr. Cowan
51s§	Community Hygiene (See 51f)	IV	MWF	*	Dr. Cowan
52f,w,s§	Health Care of the Family (3 cred.; jr., sr.; prereq. Bact. 53, Physiol. 4; not open to students who have taken Course 50, 51, or 53) (Lab. sections limited to 45)	VI	MWF	313HE & Room A Girls' Dorm	Dr. Lange, Miss Fisher

* Classroom schedule will be posted on bulletin board in Millard Hall, and will also be published in the *Official Daily Bulletin* at the beginning of each quarter.

§ No credit is granted for this course in the major sequence in Public Health Nursing.

No.	Title	Hour	Day	Bldg.	Instructor
53f	Elements of Preventive Medicine and Public Health (For public health nurses and students in medical social work only) (5 cred.; prereq. 3 or 50, or equiv., and a course in bacteriology)				
	Lect.	II	MWF	*	Dr. Anderson, Dr. Cowan
	Rec. Sec. 1	III	TTh	*	
	2	VI	TTh	*	
55s	Nursing and Social Problems in the Control of Gonorrhea and Syphilis (2 cred.; prereq. 53 and 62. Soc. 90 or 109 may be substituted by medical social service students. Course 55 may be taken concurrently with any of these prerequisites)	II	TTh	*	Miss Arnstein
57s‖	Health of Infant and Preschool Child (2 cred.; jr., sr.; prereq. Psy. 1-2 or P.M.&P.H. 4, 50, 51, 52 or 53)	III	TTh	*	Dr. Boynton
58w	Maternal and Child Hygiene (For public health nurses only) (2 cred.; prereq. 53)	II	MF	*	Dr. Boynton
59s	Health of the School Child (3 cred.; jr., sr.; prereq. 4, 50, 51, 52 or 53)	II	MWF	*	Dr. Ellis
60f,s	Tuberculosis and Its Control (For public health nurses. Others may be admitted by special permission) (2 cred.; prereq. 4, 50, 51, 52, or 53 and 62 which may be taken concurrently)	IV	TS	*	Dr. Myers
62f-63w†	Principles of Public Health Nursing (For public health nurses only) (6 cred.; jr., sr.)				
	Sec. 1§	III	MWF	*	Miss Arnstein
	2§	VI	MWF	*	
65,66,67f,w,s	Field Practice in Public Health Nursing¶ (For public health nurses only) (Cred. ar.; jr., sr.; prereq. 53, 62) The credits are to be allowed, according to experience, to these special fields: P.M.&P.H. 65—School Nursing (prereq. 67) P.M.&P.H. 66—County Nursing (prereq. 67) P.M.&P.H. 67—Family Health Agency	Ar	Ar	*	Miss Arnstein
69s	School Nursing (3 cred.; prereq. 53, 62-63, and some field experience)	I	MWF	*	Miss Palmer
70w,s‡	Special Methods and Supervised Practice in Health Teaching (Identical with Ed.T. 50) (6 cred.; jr., sr.; prereq. 65, 66, 133, and permission of instructor) (Enrolment is limited)	Ar	Ar	*	Miss Palmer
76f	Nutrition for Public Health Nurses (Identical with H.E. 76) (3 cred.; jr., sr.; prereq. 62 which may be taken concurrently)	III	TThS	*	Miss Donelson
91f	Environmental Sanitation (3 cred.; jr., sr.; prereq. 50 or 51 or 52 or 53, or may be taken concurrently with any of these prerequisites)	IV	MWF	*	Mr. Pierce
103f,w,s	Public Health Bacteriology (3 cred., or more by arrangement; jr., sr., grad.; prereq. Bact. 101-102, 116 and permission of instructor)	Ar	Ar	*	Dr. Heathman
104w	Epidemiology I (5 cred.; jr., sr., grad.; prereq. 53 or 100 and consent of instructor)	VI-VII	MWF	*	Dr. Anderson, Mr. Treloar

* Classroom schedule will be posted on bulletin board in Millard Hall, and will also be published in the *Official Daily Bulletin* at the beginning of each quarter.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per credit is charged for this course.

§ Sec. 1 is for students who have had practical experience in public health nursing; Sec. 2 is for students who have not had such experience.

¶ Students must maintain a C average in theory completed before they are admitted to field work.

‖ No credit is granted for this course in the major sequence in Public Health Nursing.

No.	Title	Hour	Day	Bldg.	Instructor
106f,w	Public Health Administration (3 cred.; physicians, engineers, nurses, social workers, and others by arrangement; prereq. 53, 100, 109 or equiv. Course 106 may be taken concurrently with any of the prerequisites)	I	TThS	*	Dr. Anderson
108w	Care of the Handicapped Child (For physicians and nurses) (2 cred.; prereq. 53, 62-63, Psy. 1-2, or permission of instructor)	I	MW	*	Dr. Hilleboe
		VI, VII, VIII	T		and associates
133w	Mental Hygiene Aspects of Public Health Nursing (Identical with Med. 133) (3 cred.; jr., sr., grad.; prereq. 62 or experience)				
	Lect.	II	TTh	*	Dr. Clarke
	Rec. Sec. 1	II	S	*	Miss Shalit
	2	III	S	*	Miss Shalit
170s	Supervision in Public Health Nursing (For public health nurses only) (3 cred.; sr.; prereq. 53, 62-63 and experience in public health nursing)	III	TThS	*	Miss Arnstein
171f,w,s	Advanced Problems in Public Health Nursing (For public health nurses only) (Cred. ar.; sr., grad.; prereq. 170, or permission of instructor)	Ar	Ar	*	Miss Arnstein and staff
173f,w,s	Field Work in Supervision (For public health nurses only) (Cred. ar.; sr., grad.; prereq. 170 with which it may be taken simultaneously)	Ar	Ar	*	Miss Palmer

For Graduate Students Only

200f,w,s	Research	Ar	Ar	*	Dr. Anderson
210f,w,s	Seminar in Preventive Medicine and Public Health (By permission)	Ar	Ar	*	Dr. Anderson and staff

For courses in public health offered to physicians and engineers, see the Bulletin of the Graduate School, or the Bulletin of the Department of Preventive Medicine and Public Health.

BIOSTATISTICS

110f	Biometric Principles (3 cred.; jr., sr., grad.; prereq. 18 cred. in biol. sci. or math. through anal. geom.; to be taken with 111)	III	TThS	*	Mr. Treloar
110s	Biometric Principles (See 110f)	I	TThS	*	Mr. Treloar
111f,s‡	Biostatistics Laboratory (2 cred.; to be taken with 110)	Ar	Ar	118MH	Ar
120w	Correlation Analysis (3 cred.; sr., grad.; prereq. 110 or consent of instructor; to be taken with 121)	III	TThS	*	Mr. Treloar
121w‡	Correlation Laboratory (2 cred.; to be taken with 120)	Ar	Ar	118MH	Ar
130s	Statistical Inference (3 cred.; sr., grad.; prereq. 110 or consent of instructor)	III	TThS	*	Mr. Treloar
131s‡	Sampling Laboratory (2 cred.; to be taken with 130)	Ar	Ar	118MH	Mr. Treloar
140f,w,s‡	Topics in Biometry (Cred. ar.; sr., grad.; prereq. 120 and 130, or consent of instructor)	Ar	Ar	118MH	Mr. Treloar
150f,w,s‡	Life Tables (3 cred.; prereq. permission of instructor)	Ar	Ar	*	Mr. Treloar

* Classroom schedule will be posted on bulletin board in Millard Hall, and will also be published in the *Official Daily Bulletin* at the beginning of each quarter.

‡ A fee of $1 per credit is charged for this course.

PSYCHOLOGY

Major advisers in the College of Science, Literature, and the Arts.—Professors Bird, Elliott, Paterson, and Tinker.

Major sequences in the College of Science, Literature, and the Arts.—

A. Experimental psychology. Courses 101-102-103; 125-126; and 12 additional credits in Senior College courses.

B. Human and animal behavior. Courses 114; 148; 151-152-153; and 12 additional credits in Senior College courses either in psychology or zoology.

C. Differential psychology. Courses 125-126-127; 160; Educational Psychology 141; and 12 additional credits in Senior College courses.

(Prerequisites: For Sequence A, 1-2 and 4-5. Course 55 is recommended. For Sequence B, 9 credits. For Sequence C, 1-2 and 4-5. Course 3 is recommended. Courses in mathematics are recommended for students majoring in psychology.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Honors course.—Students interested in the work of an honors course should consult the chairman of the department.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w†	General Psychology—A general introduction to the study of human behavior with emphasis on the development of the individual (6 cred.; 3rd qtr. fr. with C average, soph., jr., sr.; no prereq.)				
	Sec. 1	I	MWF	BuAud	Mr. Elliott
	2	III	MWF	BuAud	and others
1s,2s	General Psychology (6 cred.; soph., jr., sr.; no prereq.)				
	Sec. 1	II	MTWThFS	JAud	Mr. Bird
	2	IX	MTWThF	301F	
		VIII	Th		
3s	Psychology Applied to Daily Life—A course in the uses of psychological methods in solving such problems as come up in the treatment of ill health, in the courtroom, reformatory, and prison, in business offices and factories, in advertising, in education, in social and political life, in artistic creation and esthetic enjoyment, and in everyday life (3 cred.; soph., jr., sr.; prereq. 1-2)				
		III	MWF	BuAud	Mr. Paterson and others
4f‡-5w*†‡	Introductory Laboratory Psychology—Simple experiments illustrating the subject-matter of contemporary psychology. Included are human and animal learning, visual experience, differences in artistic, musical, and other kinds of abilities, measurement of each student's personality traits, and reactions to advertisements. (4 cred.; soph., jr., sr.; may be taken with or after 1-2) (Sections limited to 48)				
	Sec. 1	I, II	MW	211Psy	Mr. Tinker
	2	VIII, IX	MW	211Psy	and others
	3	I, II	TTh	211Psy	
	4	VI, VII	TTh	211Psy	
	5	III, IV	TS	211Psy	
	6	VIII, IX	TTh	211Psy	
	7§ (premedic)	VI, VII	MW	211Psy	

* Students completing projects with distinction may be recommended to receive either one or two additional credits.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

§ The experiments in this section are chosen to meet the interests and needs of premedical students. Not open to others. Should be taken preferably in the third year, but may be taken by any premedical student who is taking or has taken Psy. 1-2.

No.	Title	Hour	Day	Bldg.	Instructor
4s‡,5s*‡	Introductory Laboratory Psychology (See 4f-5w)				
	Sec. 1	I, II	MTThF	211Psy	Mr. Tinker
	2	VI, VII	MTThF	211Psy	and others
	3	VIII, IX	MTThF	211Psy	

Senior College Courses

Courses 52 and 55 are open to third quarter sophomores who have an average grade of at least C in Course 1-2. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

52s	Genetic Psychology (3 cred.; soph., jr., sr.; prereq. 1-2)				
		IV	MWF	115Psy	Mr. Heron
55s	Psychology of Sensation (3 cred.; soph., jr., sr.; prereq. 1-2)				
		IV	MWF	211Psy	Mr. Tinker
56f	Psychology of Advertising (3 cred.; jr., sr.; prereq. 1-2, and Principles of Economics)				
		II	MWF	211Bu	Mr. Longstaff
56w	Psychology of Advertising (See 56f)				
		VII	MWF	133Ph	Mr. Longstaff
64f	The Higher Mental Processes—Selected aspects of attention, thinking, emotion, motivation, and other higher mental processes will be discussed. Historical experiments and practical applications of principles will be reviewed. (3 cred.; jr., sr.; prereq. 1-2)				
		II	TThS	115Psy	Mr. Baker
72	*The Psychology of the Fine Arts*—An analysis of the production and enjoyment of works of art from the standpoint of psychology, with emphasis on experimental data (3 cred.; jr., sr.; prereq. 1-2) *(Not offered)*				
74	*The Psychology of Literature*—The processes involved in the creation and enjoyment of literature. The descriptive and emotive uses of language, the bases of style, metaphor, word-play, the rôle of unconscious language processes, modern trends toward psychological subject-matter (3 cred.; jr., sr.; prereq. 1-2) *(Not offered)*				
84f	Psychology of Learning (3 cred.; jr., sr.; prereq. 1-2)				
		III	TThS	109Psy	Mr. Heron
86s	Biographical Psychology—Human personalities in relation to their ancestries, their bodies, and their environments, physical and social (3 cred.; jr., sr.; prereq. 9 cred. in psy.)				
		II	TThS	115Psy	Mr. Elliott
90f,91w,92s	Readings in Psychology—Tutorially directed reading and preparation of reports on special topics (Cred. ar.; jr., sr.; prereq. 1-2; 4-5 or Zool. 1-2-3; and written permission of instructor)				
		Ar	Ar	Ar	Mr. Elliott, Mr. Bird, Mr. Paterson, Mr. Heron, Mr. Tinker, Mr. Baker, Mr. Skinner
101f-102w†-103s	Experimental Psychology (3 cred. per qtr.; cred. ar. for honors students; jr., sr., grad.; prereq. 1-2; and 4-5 or equiv. in another science)				
		VII	MWF	116Psy	Mr. Tinker
		VIII	WF		
108f	Systems of Psychology—A reading course (3 cred.; jr., sr., grad.; prereq. 1-2 and consent of instructor)				
		Ar	Ar	Ar	Mr. Elliott
114w	Human Behavior (3 cred.; sr., grad.; prereq. 1-2; 4-5 or Zool. 1-2-3, or Phil. 1)				
		II	TThS	115Psy	Mr. Elliott

* Students completing projects with distinction may be recommended to receive either one or two additional credits.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
118s	Psychology of Language—The nature and forms of verbal behavior; motivational and emotional influences in the emission of speech; the problem of reference or meaning; internal language processes; etc. Emphasis upon experimental data and analyses of written materials (3 cred.; jr., sr., grad.; prereq. 9 cred. in psy. or 6 cred. and permission of instructor)	II	MWF	115Psy	Mr. Skinner
125f-126w†	Psychology of Individual Differences (6 cred.; cred. ar. for honors students; sr., grad.; prereq. 1-2; 4-5 or 5 cred. in statistics)	II	MWF	115Psy	Mr. Paterson
127s	Projects in the Psychology of Individual Differences (3 cred.; sr., grad.; primarily for majors in Sequence C; prereq. 125-126)	Ar	Ar	Ar	Mr. Paterson
130s‡	Vocational Psychology (3 cred.; jr., sr., grad.; prereq. 9 cred. in psy.)				
	Lect.	IV	TS	115Psy	Mr. Paterson
	Lab. Sec. 1	VI-VII	W	211Psy	
	2	VIII-IX	W	211Psy	
140w	Social Psychology (3 cred.; jr., sr., grad.; prereq. 9 cred. in psy.; or 6 cred. in psy. and either Zool. 1-2-3 or 12 cred. in soc.)	III	TThS	206Pt	Mr. Bird
141s	Political Psychology (3 cred.; jr., sr., grad.; prereq. 140)	III	TThS	206Pt	Mr. Bird
144f-145w†	Abnormal Psychology (6 cred.; jr., sr., grad.; prereq. 9 cred. in psy.; or 6 cred. in psy. and either Zool. 1-2-3 or 12 cred. in soc.)	IV	MWF	206Pt	Mr. Bird
148w	Physiological Psychology—The topics treated and illustrated by demonstrations will include the elements of neural anatomy and physiology, tonus, neuromuscular set, integration, and the neural basis of learning. The treatment of these topics will stress their importance for psychology. (3 cred.; sr., grad.; prereq. 1-2; 4-5 or Zool. 1-2-3, or consent of instructor)	VII	MWF	115Psy	Mr. Hathaway
151f	Animal Psychology—The history of the subject and its philosophical and biological foundations; consciousness and its criteria; sensory processes (3 cred.; sr., grad.; prereq. 1-2; 4-5 or equiv. in another science)	VI	MWF	109Psy	Mr. Heron
152w	Animal Psychology—Emphasis upon the motivation of behavior; learning; conditioning; insight; reasoning; thinking; judgment; social influences (3 cred.; sr., grad.; prereq. 1-2; 4-5 or equiv. in another science)	VI	MWF	109Psy	Mr. Heron
153s	Individual Investigations in Animal Psychology (3 cred.; sr., grad.; prereq. 151 or 152)	Ar	Ar	Ar	Mr. Heron
160f	Psychology in Personnel Work (3 cred.; sr., grad.; prereq. 1-2, and Principles of Economics or 9 cred. in political science)	III	MWF	211Bu	Mr. Longstaff

ROMANCE LANGUAGES

Major advisers in the College of Science, Literature, and the Arts.—Professor Searles; Associate Professor Grismer; Assistant Professor Clefton.

Major sequences in the College of Science, Literature, and the Arts.—

FRENCH

Courses 70-71-72 or 73-74; five credits in conversation and composition, if the student has not taken French 20; a minimum of 21 additional credits chosen from courses numbered 50 or above, of which at least 9 must be in literary courses.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 is charged for this course.

ITALIAN

Twenty-four credits in courses numbered 50 or above, and 3 additional credits chosen from the following: English 140, 146-147, 148-149; French 121-122-123, 153; Italian 159-160, 161-162; Latin 121; History 153-154-155.

SPANISH

Five credits in conversation and composition, if the student has not taken Spanish 20. Nine credits in literary courses, and in addition enough credits chosen from courses numbered 50 or above to make a minimum of 27 Senior College credits in all.

MIXED (FRENCH, ITALIAN, AND SPANISH)

Five credits in conversation and composition.

One literary course above 50, and in addition enough credits chosen from courses in any of the three languages numbered 50 or above to make a minimum of 27 credits in all.

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major advisers in the College of Education.—French: Professor Barton, Assistant Professor Clefton; Spanish: Associate Professor Pattison.

Requirements for a teacher's certificate.—Major recommendation in French: 35 credits in courses numbered above 4, these course to include Survey of French Literature and one other literary course; 50; 53, 54-55 (or 20); 63; and 103-104-105.

Major recommendation in Spanish: 32 credits in courses numbered above 4, these courses to include 68-69 or 74-75-76 and one other literary course; 50; 53, 54-55 (or 20); and 60.

Minor recommendation: 17 credits in one language in courses numbered above 4.

Admission to advanced courses.—No student will be allowed to elect courses more advanced than intermediate French or Spanish unless he has received an average grade of C in the intermediate courses.

FRENCH

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w	Beginning French (10 cred.; all; no prereq.)				
		I	MTWThF	227F	Ar
		IV	MTWFS	202F	Ar
		VI	MTWThF	226F	Ar
1w-2s	Beginning French (See 1f-2w)	IV	MTWFS	227F	Ar
1s	Beginning French (1st qtr. of 1-2. See 1f-2w)				
		IV	MTWFS	101F	Ar
2f	Beginning French (2nd qtr. of 1-2. See 1f-2w)				
		I	MTWThF	202F	Ar
		VI	MTWThF	202F	Ar
3f-4w	Intermediate French (10 cred.; all; prereq. 1-2, or two years of high school French. Students who have had three years of high school French will omit Course 3 and take Course 4)				
		I	MTWThF	201F	Ar
		III	MTWThF	226F	Ar
		VII	MTWThF	202F	Ar
3w-4s	Intermediate French (See 3f-4w)				
		I	MTWThF	202F	Ar
		VI	MTWThF	202F	Ar
3s	Intermediate French (1st qtr. of 3-4. See 3f-4w)				
		I	MTWThF	227F	Ar
		IV	MTWFS	202F	Ar
		VI	MTWThF	226F	Ar

No.	Title	Hour	Day	Bldg.	Instructor
4f	Intermediate French (2nd qtr. of 3-4; prereq. 3, or three years of high school French)				
		II	MTWThF	15F	Ar
		IV	MTWFS	227F	Ar
		VI	MTWThF	101F	Ar
20f	Oral and Written French (5 cred.; all; prereq. 4, or four¶ years of high school French)				
		III	MTWThF	227F	Ar
		VII	MTWThF	201F	Ar
20s	Oral and Written French (See 20f)				
		I	MTWThF	201F	Ar
		III	MTWThF	226F	Ar

Senior College Courses

Senior College courses with numbers less than 100 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

50f,w,s	French Pronunciation (3 cred.; jr,. sr.; prereq. 3-4)				
		II	TThS	203F	Miss Guinotte
52s	French Pronunciation and Diction (Open only to candidates for the French play) (1 or 2 cred.; jr., sr.; prereq. 3-4)				
		Ar	Ar	Ar	Ar
53f	French Composition (3 cred.; jr., sr.; prereq. 3-4)				
		III	TThS	201F	Ar
		VI	MWF	205F	Mr. Minault
54w-55s	French Conversation (4 cred.; jr., sr.; prereq. 53 or 20)				
		III	TThS	201F	Ar
		VI	MWF	109F	Mr. Minault
62s	Advanced Pronunciation and Diction (3 cred.; jr., sr.; prereq. 50)				
		I	MWF	203F	Miss Guinotte
63f-64w	Advanced French Composition (6 cred.; jr., sr.; prereq. 53 or 20 with a grade of B)				
		II	MWF	203F	Miss Guinotte
65s	Advanced French Conversation (3 cred.; jr., sr.; prereq. 54-55 or 20 with a grade of B)				
		II	MWF	203F	Miss Guinotte
69w	Rapid Reading in Modern French (4 cred.; jr., sr.; prereq. 3-4)				
		IV	MTWF	108F	Ar
70f-71w-72s	Survey of French Literature (9 cred.; jr., sr.; prereq. 3-4)				
		II	TThS	201F	Mr. Searles
		III	MWF	201F	Mr. LeCompte
73w-74s	Survey of French Literature (10 cred.; jr., sr.; prereq. 3-4)				
		III	MTWThF	227F	Mr. Brackney
		VII	MTWThF	226F	Ar
80f	French Literature: 19th Century—Chateaubriand and Romantic Poets (3 cred.; jr., sr.; prereq.*)				
		II	MWF	201F	Mr. Clefton
81w	French Literature: 19th Century—Drama (3 cred.; jr., sr.; prereq.*)				
		II	MWF	201F	Mr. Barton
82s	French Literature: 19th Century—Poetry and Novel after 1850 (3 cred.; jr., sr.; prereq.*)				
		II	MWF	201F	Mr. Barton, Mr. Clefton
103f-104w-105s†	French Syntax and Composition (3 cred.; jr., sr., grad.; prereq. 63 or registration in 63)				
		VI	F	203F	Mr. Barton

* Prerequisite is 70-71-72 or 73-74.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

¶ Students who have had three years of high school French may be admitted to Course 20 with the consent of the department.

No.	Title	Hour	Day	Bldg.	Instructor
115f	French Literature: 17th Century—Formation of Classic Ideal (4 cred.; jr., sr., grad.; prereq.*)	IV	MTWF	203F	Mr. Searles
116w	French Literature: 17th Century—Molière, Racine, La Fontaine (4 cred.; jr., sr., grad.; prereq.*)	IV	MTWF	203F	Mr. Searles
117s	French Literature: 17th Century—Moral and Didactic Literature (4 cred.; jr., sr., grad.; prereq.*)	IV	MTWF	203F	Mr. Searles
118f-119w-120s	French Literature: 18th Century (9 cred.; jr., sr., grad.; prereq.*)	III	TThS	209½F	Mr. Sirich
121-122-123	*French Literature: 16th Century* (9 cred.; jr., sr., grad.; prereq. 9 cred. in literature courses above 74) *(Not offered)*				
130	*French Romantic Poetry—Victor Hugo* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
131	*Parnassian Poetry* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
132	*Verlaine, Rimbaud, and the Symbolists* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
145	*French Drama, 1890-1915* (2 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
146-147	*Contemporary French Dramatic Literature* (4 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
153	*Contemporary French Lyric Poetry* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
156	*French Realistic Novel* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
157w	French Novel, 1880-1915 (3 cred.; jr., sr., grad.; prereq.*)	VII	MWF	201F	Mr. Minault
158s	Contemporary French Novel (3 cred.; jr., sr., grad.; prereq.*)	VII	MWF	201F	Mr. Minault
171f-172w-173s†	History of French Language (3 cred.; jr., sr., grad.; prereq. one year of Latin or permission of instructor)	VIII	Th	203F	Mr. LeCompte

Seminars

201f-202w-203s	Old French Phonology and Morphology (6 cred.)	Ar	Ar	203F	Mr. LeCompte
204f-205w-206s	Reading in Old French Literature (6 cred.)	Ar	Ar	203F	Mr. LeCompte
207f-208w-209s	Old Provençal (6 cred.)	Ar	Ar	203F	Mr. LeCompte
225f-226w-227s	French Seminar: Modern Period (6 cred.)	VIII, IX	W	203F	Mr. Clefton

ITALIAN

Junior College Courses

1f-2w†¶	Beginning Italian (10 cred.; all; no prereq.)	III	MTWThF	302F	Miss Nissen
3s	Intermediate Italian (5 cred.; all; prereq. 1-2)	III	MTWThF	302F	Miss Nissen
4	*Intermediate Italian* (5 cred.; all; prereq. 1-2) *(Not offered)*				
5w¶	Reading Knowledge of Italian (5 cred.; all; prereq. knowledge of French, Latin, or Spanish. No previous knowledge of Italian is necessary)	VI	MTWThF	302F	Miss Nissen

Senior College Courses

Senior College courses with numbers less than 100 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior

* Prerequisite is 70-71-72 or 73-74.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

¶ Credit will not be given for both Course 1 and Course 5.

College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

No.	Title	Hour	Day	Bldg.	Instructor
69f	Survey of Italian Literature I (3 cred.; jr., sr.; prereq.§)	IV	MWF	226F	Miss Nissen
70w	Survey of Italian Literature II (3 cred.; jr., sr.; prereq.§)	IV	MWF	226F	Miss Nissen
71	*Modern Poetry (Leopardi, Carducci)* (3 cred.; jr., sr.; prereq.§) *(Not offered)*				
72	*Modern Drama (Giacosa, Bracco, Pirandello)* (3 cred.; jr., sr.; prereq.§) *(Not offered)*				
73s	Boccaccio (3 cred.; jr., sr.; prereq.§)	IV	MWF	226F	Miss Nissen
74	*Petrarch* (3 cred.; jr., sr.; prereq.§) *(Not offered)*				
159f-160w	Dante (6 cred.; jr., sr., grad.; prereq. one course above 50)	II	MWF	303F	Miss Nissen
161-162	*The Sixteenth Century* (6 cred.; jr., sr., grad.; prereq. one course above 50) *(Not offered)*				

Courses for Which No Knowledge of Italian Is Required

164	*Dante (in English)* (3 cred.; jr., sr., grad.; prereq. French 70-71-72 or 73-74, or 6 cred. in English above 50, or Hist. 53-54, or Spanish 65-66-67 or 68-69) *(Not offered)*				

SPANISH

Junior College Courses

1f-2w	Beginning Spanish (10 cred.; all; no prereq.)	I	MTWThF	226F	Ar
		IV	MTWFS	201F	Ar
		VI	MTWThF	227F	Ar
1w-2s	Beginning Spanish (See 1f-2w)	VII	MTWThF	109F	Ar
1s	Beginning Spanish (1st qtr. of 1-2. See 1f-2w)	II	MTWThF	226F	Ar
2f	Beginning Spanish (2nd qtr. of 1-2. See 1f-2w)	III	MTWThF	202F	Ar
3f-4w	Intermediate Spanish (10 cred.; all; prereq. 1-2 or two years of high school Spanish. Students who have had three years of high school Spanish will omit Course 3 and take Course 4)	II	MTWThF	226F	Ar
		VI	MTWThF	124F	Ar
3w-4s	Intermediate Spanish (See 3f-4w)	III	MTWThF	202F	Ar
3s	Intermediate Spanish (1st qtr. of 3-4. See 3f-4w)	I	MTWThF	226F	Ar
		IV	MTWFS	201F	Ar
		VI	MTWThF	201F	Ar
4f	Intermediate Spanish (2nd qtr. of 3-4; prereq. 3, or three years of high school Spanish)	II	MTWThF	202F	Ar
		VI	MTWThF	201F	Ar
20s	Oral and Written Spanish (5 cred.; all; prereq. 4 or four¶ years of high school Spanish)	III	MTWThF	205F	Ar
30s	Spanish Commercial Correspondence (3 cred.; all; prereq. 3)	VII	MWF	205F	Ar

Senior College Courses

Senior College courses with numbers less than 100 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

§ The prerequisite is Course 3 or Course 4; but for students beginning Italian in the Senior College it may be Course 1-2 or 5 with permission of the instructor.

¶ Students who have had three years of high school Spanish may be admitted to Course 20 with the consent of the department.

No.	Title	Hour	Day	Bldg.	Instructor
50w	Spanish Pronunciation (3 cred.; jr., sr.; prereq. 4)	III	TThS	205F	Ar
51	*Advanced Spanish Pronunciation and Diction* (3 cred.; jr., sr.; prereq. 50) *(Not offered)*				
52w	Spanish Pronunciation and Diction (Open only to candidates for the Spanish play) (1 or 2 cred.; jr., sr.; prereq. 3-4)	Ar	Ar	Ar	Ar
53f	Spanish Composition (3 cred.; jr., sr.; prereq. 3-4)	II	MWF	306F	Ar
54w-55s	Spanish Conversation (4 cred.; jr., sr.; prereq. 53 or 20)	II	MWF	306F	Ar
60f	Advanced Spanish Composition (3 cred.; jr., sr.; prereq. 53 or 20 with grade of B)	VII	MWF	227F	Mr. LeFort
61w-62s	Advanced Spanish Conversation (6 cred.; jr., sr.; prereq. 54-55 or 20 with grade of B)	VII	MWF	227F	Mr. LeFort
68w-69s	Survey of Spanish Literature (10 cred.; jr., sr.; prereq. 3-4)	VI	MTWThF	201F	Mr. Pattison
70w-71s†	Latin American Culture (6 cred.; jr., sr.; prereq. 4)	III	MWF	203F	Mr. LeFort
74f-75w-76s†	Survey of Spanish American Literature: Contemporary Prose and Poetry (9 cred.; jr., sr.; prereq. 3-4)	II	TThS	108F	Mr. LeFort
110f-111w-112s	Spanish Literature: 19th Century (9 cred.; jr., sr., grad.; prereq.*)	IV	MWF	316F	Mr. Pattison
115f-116w-117s	Spanish Literature: 17th Century (9 cred.; jr., sr., grad.; prereq.*)	II	MWF	316F	Mr. Grismer
120	*The Ballad* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
130s	Cervantes: Don Quijote (3 cred.; jr., sr., grad.; prereq.*)	III	TThS	303F	Mr. Grismer
131	*The Picaresque Novel* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
140	*Rubén Dario and the Contemporary Movement in Spanish American Literature* (3 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
155-156-157	*Spanish Literature: 16th Century* (9 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				
174-175-176	*Contemporary Spanish Literature* (9 cred.; jr., sr., grad.; prereq.*) *(Not offered)*				

Seminars

241-242-243	*Old Spanish Philology* (6 cred.) *(Not offered)*				
244f-245w-246s	Readings in Old Spanish Literature (6 cred.)	Ar	Ar	Ar	Mr. Grismer
250f-251w-252s	Spanish Seminar (6 cred.)	Ar	Ar	Ar	Mr. Pattison

SCANDINAVIAN

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w	Beginning Norwegian (10 cred.; all; no prereq.)	I	MTWThF	206F	Mr. Landa
3s	Intermediate Norwegian (5 cred.; all; prereq. 1-2 or equiv.)	I	MTWThF	206F	Mr. Landa
4f-5w-6s	Advanced Norwegian (9 cred.; all; prereq. 1-2-3 or equiv.)	IV	MWF	206F	Mr. Landa
7f-8w	Beginning Swedish (10 cred.; all; no prereq.)	II	MTWThF	206F	Mr. Gustafson
9s	Intermediate Swedish (5 cred.; all; prereq. 7-8 or equiv.)	II	MTWThF	206F	Mr. Gustafson
10f-11w-12s	Advanced Swedish (9 cred.; all; prereq. 7-8-9 or equiv.)	III	MWF	206F	Mr. Gustafson

* The prerequisite is 68-69 or 74-75-76.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

Senior College Courses

Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

No.	Title	Hour	Day	Bldg.	Instructor
51f*	Scandinavian Literature in the 19th Century (2 cred.; jr., sr.; prereq. 4-5-6 or 10-11-12 or 8 cred. in literature)	VI	TTh	206F	Mr. Gustafson
52w*	Characteristic Trends in Contemporary Scandinavian Literature (2 cred.; jr., sr.; prereq. 4-5-6 or 10-11-12 or 8 cred. in literature)	VI	TTh	206F	Mr. Gustafson
161s*	The Modern Scandinavian Novel (2 cred.; jr., sr., grad.; prereq. 4-5-6 or 10-11-12 or 8 cred. in literature)	VI	TTh	206F	Mr. Gustafson
*171**	*The Modern Scandinavian Drama* (2 cred.; jr., sr., grad.; prereq. 4-5-6 or 10-11-12 or 8 cred. in literature) *(Not offered)*				
180	*Old Norse Literature* (3 cred.; sr., grad.; prereq. 8 cred. in literature) *(Not offered)*				
182s	Germanic Mythology (Identical with German 119) (3 cred.; sr., grad.)	III	TThS	212F	Mr. Reichardt
185	*History of the Scandinavian Languages* (3 cred.; sr., grad.; prereq. 4-5-6 or 10-11-12 or at least one Germanic language) *(Not offered)*				
192	*Gothic—Introduction to Germanic Linguistics* (Identical with German 192) (4 cred.; sr. with completed major sequence, grad.) *(Not offered)*				
195w	Introduction to Old Norse Language and Literature (Identical with German 195) (4 cred.; sr., grad.; prereq. 192 or permission of instructor)	VI	MWThF	209½F	Mr. Reichardt
196s	Eddic Poetry (Identical with German 196s) (3 cred.; sr., grad.; prereq. 195)	VII	MWF	209F	Mr. Reichardt

For Graduate Students Only

215-216-217	*Studies in Scandinavian Romanticism (Not offered)*	
218f-219w-220s	Studies in Late Nineteenth-Century Scandinavian Literature.	Mr. Gustafson
221f-222w-223s	Biographical Problems in Strindberg.	Mr. Gustafson

SOCIOLOGY AND SOCIAL WORK

Major advisers in the College of Science, Literature, and the Arts.—Professors Chapin, Kirkpatrick, Nelson, and Vold; Associate Professors Fenlason, Monachesi, Shea, Sletto, and Vaile; Assistant Professor Doyle; Lecturer Phillips.

Major sequences in the College of Science, Literature, and the Arts.—

Sequence A. General sociology. Course 53; two of 100, 101, 103; two of 115, 116, 119, 160; 123 or 161; 120, 140, 145; 110 or 112 or 114; 102 or 105 or 132.

Sequence B. Applied sociology. Courses 53, 60, 90; two of 100, 101, 102, 103; two of 115, 116, 119, 160; 120 or 123 or 161; 110 or 112 or 114; 132 or 146 or 147.

Sequence C. Rural sociology. Courses as follows: two of 53, 60, 90; two of 100, 101, 103; two of 115, 116, 119, 160; 123 or 161; 120 or 140 or 145; 110, 112, 114.

(Prerequisites: For Sequences A, B, C, Soc. 1 and a total of 20 credits from courses in sociology, anthropology, education, history, philosophy, political science, psychology, and zoology.

Sequence D. An interdepartmental sequence recommended as preparation for the Graduate Course in Social Work. It may be taken as a substitute for the major and minor sequences required for the B.A. degree. Courses 53, 60, 90, 101, 114; three of Courses 100, 102, 103, 110, 115, 119, 120, 123, 146, 160; Economics 82, 83, 84 (unless the student has had Economics 6-7, Principles of Economics, or its equivalent); six

* No knowledge of Scandinavian languages is required.

credits in Senior College courses in psychology, preferably Course 144-145; History 80-81-82 or 83-84-85 or at least six credits in Senior College courses in political science; two Senior College courses in preventive medicine.

(Prerequisites: For Sequence D, Soc. 1, 49; Political Science 1-2; Psychology 1-2. For recommended Junior College electives see the statement about preparation for graduate social work in the Bulletin of the College of Science, Literature, and the Arts.)

Modification of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major adviser in the College of Education.—Professor Kirkpatrick.

Requirements for a teacher's certificate.—Major recommendation: 36 credits including 1, 6, and 14.

Minor recommendation: 19 or 20 credits including 1, 6, and 14.

Note.—Students majoring in sociology must complete two teaching minors in addition to the required professional courses. Teachers who already hold a teacher's certificate may be relieved of this requirement upon petition.

For a specialized curriculum in social studies and a curriculum for "Visiting Teachers" see the Bulletin of the College of Education.

Honors course.—Students interested in the work of an honors course should consult the chairman of the department.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f,w	Introduction to Sociology—The study of the culture of human society. An objective analysis of culture complexes, culture patterns, cultural processes; the influence of culture on the individual's behavior; social change; and social disorganization. (5 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.)				
	Lect.	I	TThS	BuAud	Mr. Monachesi
	Rec. Secs. 1	I	WF	109J	and others
	2	III	MW	110P	
	3	IV	MW	209EdH	
	4	VI	MW	109J	
	5	VII	MW	210P	
	6	III	TTh	209Bu	
1f,w	Introduction to Sociology (For students of the College of Agriculture, Forestry, and Home Economics only) (3 cred.; no prereq.)				
		III	TThS	204OD	Mr. Nelson
1s	Introduction to Sociology (See 1f)				
	Lect.	I	TThS	BuAud	Mr. Monachesi
	Rec. Secs. 1	I	WF	2J	and others
	2	III	MW	2J	
	3	IV	MW	109J	
	4	VI	MW	109J	
	5	III	TTh	15F	
1s	Introduction to Sociology (For students of the College of Agriculture, Forestry, and Home Economics only) (3 cred.; no prereq.)				
		I	TThS	204OD	Mr. Nelson
6f,w	Social Interaction—Influences affecting group life; forms of interaction and communication; personality and its development in the social situation; attitudes and race prejudice; forms of opposition including warfare, class tensions, coercion and intolerance; present-day problems of co-operation, leadership, and social change in an age of science (3 cred.; soph., jr., sr.; prereq. 1. This course is not open to students who have had Soc. 100 or Psy. 140)				
		II	MWF	JAud	Mr. Kirkpatrick
6s	Social Interaction (See 6f)				
		III	MWF	JAud	Mr. Kirkpatrick

No.	Title	Hour	Day	Bldg.	Instructor
14f,w,s	Rural Sociology—A presentation of factual data necessary to an understanding of the problems of rural social life (3 cred.; soph., jr., sr.; prereq. 1)	IV	MWF	JAud	Mr. Nelson
14f,w	Rural Sociology (For students of the College of Agriculture, Forestry, and Home Economics) (3 cred.; soph., jr., sr.; prereq. 1 or jr. class)	I	TThS	102Hr	Mr. Nelson
45f	Social Statistics (5 cred.; soph., jr., sr.; prereq. 1. Not open to students who have received credit in Econ. 5)				
	Lect.	IV	MWF	104J	Mr. Sletto
	Lab.	VI, VII	TTh	104J	
45w	Social Statistics (See 45f)				
	Lect.	VI	MWF	104J	Mr. Sletto
	Lab.	VI, VII	TTh	104J	
45s	Social Statistics (See 45f)				
	Lect.	III	MWF	104J	Mr. Sletto
	Lab.	VI, VII	TTh	104J	
49f,w,s	Social Pathology (3 cred.; 3rd qtr. soph., jr., sr.; prereq. 10 cred. in soc. or Soc. 1 and 10 cred. in soc. sci. or psy.)	I	MWF	301F(f), 206Pt(w,s)	Mr. Sletto

Senior College Courses

Course 53 is open to third quarter sophomores who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

COURSES IN SOCIOLOGY

53f,w,s	Elements of Criminology—A general survey of the field of criminology (3 cred.; jr., sr.; prereq. same as for 49)	III	MWF	104J(f) 109J(w,s)	Mr. Vold
57f	Leisure in the Modern World (3 cred.; open only to students in the College of Education; prereq. Soc. 1 or equiv.)	II	MWF	14P	Mrs. May
60s	Social Protection of the Child (3 cred.; sr. only; prereq. 49)	II	TThS	109J	Mrs. Shea
90f,w	Survey of Social Work (5 cred.; sr. only; prereq. 49)	III	MWF	2P	Miss Phillips
		VII, VIII	TTh	2P	
97f-98w-99s	Tutorial and Honors Work in Selected Fields (9 cred.; jr., sr.; prereq. consent of major adviser in sociology)	Ar	Ar	Ar	Ar
100f	Social Psychology (3 cred.; jr., sr., grad.; prereq. Soc. 1 and 6, or Psy. 1-2, and 9 cred. in soc. sci., ed., phil., or psy.)	II	TThS	109J	Mr. Kirkpatrick
101f	Social Organization (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.)	III	MWF	109J	Mr. Chapin
102s	Contemporary Penology (3 cred.; jr., sr., grad.; prereq. same as for 101, but including 53 or consent of the instructor)	II	MWF	110F	Mr. Vold
103w	Sociology of Conflict (3 cred.; jr., sr., grad.; prereq. same as for 101)	II	TThS	104J	Mr. Vold
105f	Criminological Theories—Historical and Contemporary (3 cred.; jr., sr., grad.; prereq. same as for 101, but including 53 or consent of instructor)	IV	MWF	109J	Mr. Vold
110f	Rural Organization (3 cred.; jr., sr., grad.; prereq. same as for 101)	III	MWF	2J	Mr. Nelson

No.	Title	Hour	Day	Bldg.	Instructor
112s	Methods of Rural Social Research (2 cred.; grad.*; prereq. same as for 101)	I	MW	206OD	Mr. Nelson
114w	Rural Social Institutions (3 cred.; jr., sr., grad.; prereq. same as for 101)	II	MWF	14P	Mr. Nelson
115w	Religion As a Social Institution (3 cred.; jr., sr., grad.; prereq. same as for 101)	III	MWF	104J	Mr. Kirkpatrick
116	*The Newspaper As a Social Institution* (3 cred.; jr., sr., grad.; prereq. same as for 101) *(Not offered)*				
119f	The Family (3 cred.; jr., sr., grad.; prereq. same as for 101)	III	TThS	109J	Mr. Kirkpatrick
119s	The Family (See 119f)	II	MWF	109J	Mr. Kirkpatrick
120f	Social Life and Cultural Change (3 cred.; jr., sr., grad.; prereq. same as for 101)	II	MWF	109J	Mr. Schneider
122s	Statistical Methods (3 cred.; grad.*; prereq. 4 courses in soc.)	II	TThS	104J	Mr. Chapin
123s	Methods of Social Research (3 cred.; jr., sr., grad.; prereq. Soc. 45 or equiv.)	III	TThS	104J	Mr. Sletto
132f	Juvenile Courts and Probation (3 cred.; grad.*; prereq. 53, 102)	III	TThS	104J	Mr. Monachesi
140w	History of Social Theory (3 cred.; jr., sr., grad.; prereq. same as for 101)	I	TThS	200Pt	Mr. Schneider
145s	Contemporary Sociological Theory (3 cred.; jr., sr., grad.; prereq. same as for 101)	III	TThS	14P	Mr. Schneider
146w¶	Community Organization and the Social Setting of Recreation (3 cred.; jr., sr., grad.; prereq. for Arts College students, 3 courses in soc.; for students in Education, 3 courses in soc. sci., including Soc. 57)	II	MWF	211Bu	Mrs. May
147s¶	Group Leadership and Organization (3 cred.; jr., sr., grad.; prereq. Soc. 146 or equiv.)	I	MWF	15F	Mrs. May
148s¶	Supervisory Problems in Recreation (Open only to majors or minors in recreation curriculum) (3 cred.; jr., sr., grad.; prereq. Soc. 147 or equiv.)	III	MWF	304EdH	Mrs. May
160w	Population Problems (3 cred.; jr., sr., grad.; prereq. same as for 101)	II	TThS	109J	Mr. Sletto
161w	Social Aspects of Housing and Standards of Living (3 cred.; sr., grad.; prereq. same as for 101)	II	MWF	109J	Mr. Chapin

COURSES IN SOCIAL WORK

109f,w,s§	The Field of Social Work (3 cred.; grad.*; prereq. same as for 101, or consent of adviser and instructor)				
	Fall	VIII	T	109J	Mrs. Doyle
		VIII, IX	Th	109J	
	Winter	I	TThS	104J	
	Spring	Ar	Ar	Ar	
122s	Statistical Methods (This course is listed under the heading "Courses in Sociology" above)				
125f,w	Principles of Group Work (3 cred.; grad.*; prereq. 109, which may be taken simultaneously, or equiv.)	I	MWF	2J	Miss Phillips
126s	Problems of Supervision in Group Work (3 cred.; grad.*; prereq. 125, 156)	II	MWF	14P	Miss Phillips
127s	Legal Aspects of Social Work (3 cred.; grad.*; prereq. 109, which may be taken simultaneously)	I	MWF	109J	Mr. Finke
128s	Principles of Administration, Publicity, and Finance Applied to Social Work (3 cred.; grad.*; prereq. same as for 101, but including 109 or equiv.)	VIII, IX and one hr. ar.	Th	104J	Ar

* For graduate students only, except by petition.

§ This course is for mature students who have not had Courses 49 and 90.

¶ Open only to majors in sociology and social work or recreation.

No.	Title	Hour	Day	Bldg.	Instructor
129f-130w†	Principles of Social Case Work (6 cred.; grad.*; prereq. for 129 is 109, which may be taken simultaneously, prereq. for 130 is 129, 153)	II	TThS	2J	Mrs. Fenlason
129w-130s†	Principles of Social Case Work (See 129f-130w)	III	TThS	2J	Mrs. Fenlason
131s	Rural Social Work (3 cred.; grad.*; prereq. 129, 153, 114 or equiv.)	I	TThS	2J	Miss Vaile
132f	Juvenile Courts and Probation (This course is listed under the heading "Courses in Sociology," on page 103)				
133s	Social Case Work in Health Problems (3 cred.; grad.*; prereq. 129, 136)	III	TThS	200Pt	Ar
134	*Legal Protection of the Child* (3 cred.; grad.*; prereq. same as for 101 but incl. 60) *(Not offered)*				
135f	Survey of Social Work for Children (3 cred.; grad.*; prereq. 109, which may be taken simultaneously, or equiv.)	IV	TS	2J	Mrs. Shea
		VII	Th	2J	
136w	Essentials of Medicine for Social Workers (3 cred.; grad.*; prereq. P.M.&P.H. 50 or 51 or equiv.)	VIII, IX	T	Ar	Med. Staff U.H.
		IX	Th		
137	*The History and Theory of Social Work* (3 cred.; grad.*; prereq. 109, which may be taken simultaneously) *(Not offered)*				
138w	Case Work with Children (3 cred.; grad.*; prereq. 129, 153)	III	TThS	109J	Mrs. Shea
139s	Psychiatric Problems in Social Case Work (3 cred.; grad.*; prereq. 130, 154 or 221 and 170 or Psy. 144-145)	III	TThS	109J	Mrs. Shea
151f-152w†	Public Welfare (6 cred.; grad.*; prereq. 109 or equiv.)	I	TThS	109J	Miss Vaile
151w-152s†	Public Welfare (See 151f-152w)	IV	TS	109J	Miss Vaile
		VII	Th	109J	
153f,w,s‡-154f,w,s‡-155f,w,s‡	Field Training in Case Work (5 cred.; grad.*; prereq. 129, which may be taken simultaneously, or equiv.)	Ar	Ar	Ar	Mrs. Doyle
156f,w,s‡-157f,w,s‡-158f,w,s‡	Field Training in Group Work (2 to 6 cred. per qtr. to be determined by the adviser in social work; grad.*; prereq. 125, which may be taken simultaneously)	Ar	Ar	Ar	Miss Phillips
161w	Social Aspects of Housing and Standards of Living (This course is listed under the heading "Courses in Sociology," on page 103)				Mr. Chapin
170f	Introductory Psychiatry (Identical with Med. 130) (3 cred.; grad.; no prereq.)	III	TThS	Ar	Dr. Hinckley
171w	Descriptive Neuropsychiatry (Identical with Med. 131) (3 cred.; grad.; prereq. 170 or equiv.)	4:00 to 5:00	MWF	Ar	Dr. Baker
172s	Advanced Considerations in Psychiatry (Identical with Med. 132) (1 cred.; grad.; prereq. 171 or equiv.)	IV	T	Ar	Dr. Clarke
173f	Behavior Problems (Identical with C.W. 140) (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)	I, II	S	202Pt	Miss Goodenough

* For graduate students only, except by petition.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $3.50 is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
174s	Seminar in Psychiatric Social Work (2 cred.; grad.; prereq. 130, 170, 171 or equiv.)	VIII, IX	Th	Women's Lounge (6th fl. HS)	Dr. Hinckley
197f-198w-199s	Special Topics in Social Work (Cred. ar.; grad.*)	Ar	Ar	Ar	Ar

For Graduate Students Only

COURSES IN SOCIOLOGY

200f-w-s	Seminar: Topics in Criminology	Mr. Vold
201f-w-s	Seminar: Topics in Social Psychology	Mr. Kirkpatrick
202f-w-s	Seminar: Topics in Urban Sociology	Mr. Sletto
203f-204w-205s	Seminar in Social Theory	Staff
206f-207w-208s	Seminar: Statistical Theory in Relation to Social Theory and Practice	Mr. Chapin
209f-210w-211s	Seminar: The Theory of Social Evolution	Staff
215f-216w-217s	Seminar in Rural Sociology	Mr. Nelson
234w,s	Seminar in Juvenile Delinquency and Treatment	Mr. Monachesi
238w-239s	Principles of Sociology (6 cred.)	Mr. Monachesi

COURSES IN SOCIAL WORK

218f-w-s	Seminar in Family Case Work	Mrs. Fenlason
219f-w-s	Seminar in Case Work with Children	Mrs. Shea
220f-w-s	Seminar in Medical Social Work	Ar
221f,w,s‡-222f,w,s‡-223f,w,s‡	Graduate Field Training	Staff
224f-225w-226s	Advanced Medical Social Work	Ar
227f,w,s‡-228f,w,s‡-229f,w,s‡	Advanced Field Training	Staff
230f-w-s	Seminar in Public Welfare	Miss Vaile
231f-w-s	Seminar in Group Work	Miss Phillips
232f-w-s	Seminar in Rural Social Work	Miss Vaile
233f-w-s	Seminar in Social Agencies and Social Institutions	Mrs. Doyle
234w-s	Seminar in Juvenile Delinquency and Treatment (This course is listed under the heading "Courses in Sociology," see above)	Mr. Monachesi
235f-w-s	Thesis Preparation	Staff
236f-w-s	Research Topics in Social Work	Staff
237f,w,s	Recent Research in Social Work	Mrs. Shea

SPANISH

See Romance Languages, page 94

SPEECH

Major advisers in the College of Science, Literature, and the Arts.—Professor Rarig; Associate Professors Bryngelson and Lees.

Major sequences in the College of Science, Literature, and the Arts.—

A. Courses 55-56-57; 61, 67; 101-102; 105 or 109; 81-82-83.

B. Courses 31; 32-33, 34; 81-82-83; 91, 92, 93; 111-112-113 and a comprehensive examination in the theater.

* For graduate students only, except by petition.

‡ A fee of $3.50 per quarter is charged for this course.

C. Courses 61; 67; 121-122; 162-163; Psychology 114 and 144-145.

(Prerequisites: 1-2-3 or 5-6; Psychology 1-2. For Sequence C, Psychology 4-5 and Physiology 2 are also required.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major advisers in the College of Education.—Professor Rarig; Associate Professors Bryngelson and Lees; Assistant Professor Gilkinson.

Requirements for a teacher's certificate.—Major recommendation: Speech 1-2-3 or 5-6; 31, 32, 55-56, 61, 67, 81-82, 121-122; total, 39 or 40 credits. Psychology 4-5 advised.

Minor recommendation: Students minoring in speech are required to take Speech 1-2-3 or 5-6 plus other speech courses totaling 27 hours. These courses are to be selected with the aid of an adviser according to the needs of the student. Differential sequences are recommended according to whether the student is primarily interested in General Speech, Theater, or Speech Pathology.

All students majoring or minoring in speech must present satisfactory evidence of interest and effective participation in one or more activities, such as debating, dramatics, oratory, public reading, or public speaking.

Because of the close relation between English and speech in the high schools of Minnesota, students majoring in speech should have a minor in English as well as one other minor.

Students majoring in speech should register for Special Methods and Directed Teaching in English, Ed.T. 66A-66B-66C as well as Special Methods and Directed Teaching in Speech, Ed.T. 88A-88B-88C. See the program of the College of Education.

Students interested in preparing for clinical work in speech correction in public schools should read the statement of the specialized curriculum in "Speech Pathology" in the Bulletin of the College of Education.

Note.—The University maintains a clinical service for students with speech defects. Students who desire treatment should consult the director of the Speech Clinic, 411 Folwell Hall. The clinic also accepts a limited number of full-time outpatients who pay a fee of $50 per quarter. Part-time outpatients pay $30 per quarter.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w-3s*†‡	Fundamentals of Speech (9 cred.; soph., jr., sr.; prereq.* Eng. A-B-C or Comp. 4-5-6 or exemption)				
	Sec. 1	I	MWF	308F	Mr. Gilkinson
	2	II	MWF	311F	and others
	3	III	MWF	306F	
	4	VI	MWF	308F	
	5	I	TThS	305F	
	6	II	TThS	308F	
	7	III	TThS	308F	
	8 (Child Welfare majors)	VII (f,w only)	MWF	308F	Ar
1w-2s*‡	Fundamentals of Speech (2 qtrs. of 1-2-3. See 1f-2w-3s)				
		II	MWF	102F	Ar
	(For dental hygiene students only)	VI	MWF	5F	
3f*‡	Fundamentals of Speech (3rd qtr. of 1-2-3. See 1f-2w-3s)				
		II	MWF	308F	Ar

* Registration is limited. Written permission from the Junior College office, 106 Folwell Hall, is necessary for admission.

† To receive credit for any part of this course a student must complete the parts preceding the dagger. Exception:—Students in Education not majoring in Speech may receive credit for Course 1-2.

‡ A fee of $1 per quarter is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
5f-6w*†‡	Fundamentals of Speech (10 cred.; soph., jr., sr.; prereq.* Eng. A-B-C or Comp. 4-5-6 or exemption)				
	Sec. 1	III	MTWThF	311F	
	2	IV	MTWFS	5F	
	3	VI	MTWThF	6F	
5w-6s*†‡	Fundamentals of Speech (See 5f-6w)				
	Sec. 1	IV	MTWFS	14P	
	2	VI	MTWThF	305F	
5s*‡	Fundamentals of Speech (1st qtr. of 5-6. See 5f-6w)				
	Sec. 1	III	MTWThF	311F	
	2	IV	MTWFS	306F	
6f*‡	Fundamentals of Speech (2nd qtr. of 5-6. See 5f-6w)				
		VI	MTWThF	305F	
31f‡‡	Introduction to the Theater (3 cred.; soph., jr., sr.; prereq. 1-2-3 or 5-6 or concurrent registration)				
		I	MWF	19Mu	Mr. Whiting
32w-33s†‡‡‖	Beginning Acting, Creative and Technical Approaches (6 cred.; soph., jr., sr.; prereq. Sp. 31)				
	Sec. 1	I	MWF	19Mu	Mr. Whiting
	2	II	MWF	19Mu	Ar(w) Mr. Erekson(s)
32s‡‡	Beginning Acting (1st qtr. of 32-33. See 32w-33s)				
		II	TThS	19Mu	Mr. Whiting
33f‡‡	Beginning Acting (2nd qtr. of 32-33. See 32w-33s)				
		II	MWF	19Mu	Mr. Whiting
34w,s	Stagecraft—Construction and Painting (3 cred.; soph., jr., sr.; prereq. 31)				
		VIII, IX	MWF	Stage Mu	Ar

Senior College Courses

Courses 51, 67, 81-82-83 are open to Junior College students who have an average grade of at least C in the prerequisite courses. Other Senior College courses in this department are open to Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

51s‡	Advanced Public Speaking (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6)				
		II	MWF	308F	Ar
55f-56w-57s†‡‖	Argumentation and Debating (9 cred.; jr., sr.; prereq. 1-2-3 or 5-6; Phil. 2, Logic, is recommended)				
		VI	T	308F	Ar
		VI, VII	Th	308F	Ar
61f	Speech Hygiene (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6; Psy. 1-2)				
		VI	MWF	306F	Mr. Bryngelson
65s‡	Radio Speech—Speech arts and psychology of the radio. Practice, exercises, projects, and reports on problems of appeal and audience response. (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6)				
		VIII	MWF	409F, 308F	Mr. Ziebarth
66f	Radio Drama—Study of fundamental problems of directing and acting radio drama (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6; 65 recommended)				
		III	MWF	19Mu	Mr. Erekson
67f,s‡¶	Phonetics (3 cred.; jr., sr.; prereq. 1-2-3 or 5-6)				
		II	MWF	305F(f) 303F(s)	Miss Hurd

* Registration is limited. Written permission from the Junior College office, 106 Folwell Hall, is necessary for admission.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

‡‡ A fee of $3 per quarter is charged for this course.

¶ Students intending to take Speech Pathology should take Phonetics the preceding spring.

‖ Majors in Speech in the College of Education are required to complete only two quarters each of Courses 31, 32-33 and 55-56-57.

No.	Title	Hour	Day	Bldg.	Instructor
78w-79s†‡‡	Advanced Acting—Characterization and Make-up (6 cred.; jr., sr.; prereq. 31, 32-33)	III	MWF	19Mu	Mr. Erekson
81f-82w-83s‡	Interpretative Reading (9 cred.; jr., sr.; prereq. 1-2-3 or 5-6)	IV	MWF	308F	Mr. Rarig
81w-82s‡	Interpretative Reading (See 81f-82w-83s)	I	TThS	308F	Mr. Rarig
83f‡	Interpretative Reading (3rd qtr. of 81-82-83. See 81f-82w-83s)	I	TThS	308F	Mr. Rarig
91w‡‡	Stage Design (3 cred.; jr., sr.; prereq. 31)	VI	MWF	19Mu	Mr. Whiting
92s‡‡	Stage Lighting (3 cred.; jr., sr.; prereq. 31)	VI	MWF	19Mu	Mr. Whiting
93f‡‡	Stage Costuming (3 cred.; jr., sr.; prereq. 31)	VI	MWF	19Mu	Ar
97f,w,s	Intercollegiate Oratory and Debate (3 cred.; jr., sr.; prereq.§)	Ar	Ar	308F	Mr. Rarig
101f-102w†	Persuasion (6 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6; Psy. 1-2; 10 cred. in soc. sci.)	III	MWF	308F	Mr. Rarig
105s*	Theory of Reading and Acting (3 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6; 81-82-83, and Psy. 1-2)	III	MWF	308F	Mr. Rarig
107‡	*Platform Reading* (3 cred.; prereq. 81-82-83 with grade of B in 83) *(Not offered)*				
*109**	*Classical Rhetoric* (3 cred.; jr., sr., grad.; prereq. 101-102, Psy. 140) *(Not offered)*				
111f-112w-113s†‡‡	Stage Direction (9 cred.; sr., grad.; prereq. 31, 32-33, 34, 91-92-93)	VII	MWF	19Mu	Mr. Lees
115f-116w-117s	Playwriting and Production (1 to 3 cred. per qtr.; sr., grad.; prereq. 31, 32-33 and permission of instructor)	III	MWF	109Mu	Mr. Lees
121w-122s†‡	Advanced Speech Problems (6 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6, Psy. 1-2)	II	TThS	306F	Mr. Gilkinson
141-142-143‡	*Voice Science* (9 cred.; jr., sr., grad.; prereq. 1-2-3, Psy. 1-2 and 4-5) *(Not offered)*				
162w-163s†‡¶	Speech Pathology (6 cred.; jr., sr., grad.; prereq. 1-2-3 or 5-6; 61, 67; and permission of instructor)	VI VII	TTh T	406F	Mr. Bryngelson
164f-165w-166s	Clinical Methods and Practice in Speech Pathology (9 cred.; sr., grad.; prereq. 1-2-3; 61, 67, 162, and Ed.Psy. 142. May be taken simultaneously with Sp. 163)	III and ar	TTh	406F	Mr. Bryngelson
*171-172-173***	*History of the Theater* (9 cred.; sr., grad.; prereq. 1-2-3 or 5-6; 31) *(Not offered)*				
174f-175w-176s**	Theater Backgrounds (9 cred.; sr., grad.; prereq. 1-2-3 or 5-6; 31. Courses in literature recommended)	IV	MWF	18Mu	Mr. Lees
181f-182w-183s	Readings in Speech—Directed reading and the preparation of reports on selected subjects (Cred. ar.; jr., sr., grad.; prereq. 1-2-3 or 4-5 and six additional credits and consent of instructor)	Ar	Ar	Ar	Mr. Rarig, Mr. Bryngelson, Mr. Gilkinson, Mr. Lees

* Courses 105 and 109 are offered in alternate years.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

‡‡ A fee of $3 per quarter is charged for this course.

§ Open to representatives of the University in the Northern Oratorical League and to members of the intercollegiate debate squad.

¶ Students intending to take Speech Pathology should take Phonetics the preceding spring.

** Courses 171-172-173 and 174-175-176 are offered in alternate years.

No.	Title	Hour	Day	Bldg.	Instructor
191f‡-192w‡-193s‡	Technical Problems—Advanced problems in the technical phases of the theater. Special problems are assigned to individual students (9 cred.; jr., sr., grad.; prereq. 111-112-113)	IV	MWF	109Mu	Mr. Lees, Mr. Whiting

For Graduate Students Only

201f,w,s	General Seminar	Ar	Ar	Ar	Staff
207f-208w-209s	Seminar in Rhetoric and Persuasion	Ar	Ar	Ar	Mr. Rarig
211f-212w-213s	Seminar in Dramatic Theory	VIII-IX	M	Ar	Mr. Lees
221f-222w-223s	Seminar in the Oral Interpretation of Literature	Ar	Ar	Ar	Mr. Rarig
261f-262w-263s	Seminar in Speech Pathology	Ar	Ar	Ar	Mr. Bryngelson, Mr. Brown
291f-292w-293s	Research in Special Problems	Ar	Ar	Ar	Mr. Rarig, Mr. Bryngelson, Mr. Gilkinson, Mr. Lees

SWEDISH

See Scandinavian, page 99.

ZOOLOGY

Major adviser in College of Science, Literature, and the Arts.—Professor Minnich.

Major sequences in the College of Science, Literature, and the Arts.—

A. In Zoology, 27 credits in Senior College courses of which at least 18 must be in courses with numbers between 49 and 100.

B. In special fields, as cytology, ecology, embryology, entomology, genetics, histology, parasitology, physiology, or protozoology, a major will consist of the respective one-hundred courses, 5 or more credits in a problem course in the special field, and additional credits in approved courses to make a total of 27 credits in Senior College courses.

(Prerequisites: 1-2-3, or equivalent and 21, 22, or equivalent. If possible beginning chemistry and at least one year of French or German should be completed during the Junior College work.)

Modifications of these sequences will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

Major advisers in the College of Education.—Professor Wodsedalek and Associate Professor Ringoen.

Requirements for a teacher's certificate.—Major recommendation: General Zoology, Zoology 52, 53, 75, 83 and Physiology 4.

Minor recommendation: A minimum of 18 credits including General Zoology, Zoology 53 and 75.

For a specialized curriculum in Natural Science see College of Education Bulletin.

Honors Course in Zoology.—A student who has met all of the requirements for admission to the Senior College and who has maintained a grade of B in his work in the department may enroll for the Honors Course in Zoology. Such a student will carry at least twelve hours of problem work in some special phase of the work and will pursue under the direction of his adviser such special reading and outline courses as may

‡ A fee of $1 per quarter is charged for this course.

be required. The completion of the Honors Course will require a reading knowledge of either French or German.

Courses in human anatomy, embryology, and hematology may be arranged for with the head of the Department of Anatomy.

Courses in physiology may be arranged for with the head of the Department of Physiology.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f-2w-3s*†‡	General Zoology (10 cred.; all; no prereq.)				
	Lect. Sec. 1 (Limited to 320)	II	TTh	06Bo	Mr. Minnich
	2 (Limited to 320)	VIII	WF	06Bo	Mr. Dawson
	3 (Limited to 320)	III	WF	06Bo	Mr. Wodsedalek
	4 (Limited to 240)	IV	WF	06Bo	Mr. Olson
	Lab. Sec. 1 (Limited to 150)	I, II	MF	101Z	Ar
	2 (Limited to 174)	III, IV	MF	101Z	Ar
	3 (Limited to 174)	VI, VII	MF	101Z	Ar
	4 (Limited to 174)	VIII, IX	MF	101Z	Ar
	5 (Limited to 174)	I, II	TTh	101Z	Ar
	6 (Limited to 174)	III, IV	TS	101Z	Ar
	7 (For Forestry students only. Limited to 60)	VI, VII	TTh	101Z	Ar
14f-15w†‡	General Zoology (For students of the College of Agriculture, Forestry, and Home Economics) (6 cred.; all; no prereq.)				
	Lect. (Limited to 288)	VII	TTh	150Ph	Mr. Dawson
	Lab. Sec. 1 (For Agr. and H. E. students. Limited to 114)	V, VI	TTh	101Z	Ar
	2 (For Agr. and H. E. students. Limited to 174)	VIII, IX	TTh	101Z	Ar
21f‡§	Histology (5 cred.; soph., jr., sr.; prereq. 1-2-3) (Sections limited to 40 each. Written permission must be obtained from the Junior College office, 106 Folwell Hall)				
	Lect.	III	TThS	313Z	Mr. Ringoen,
	Lab. Sec. 1	I, II	TThS	201Z	Miss Slider
	2	VI, VII, VIII	TTh	201Z	
	3	I, II	MWF	201Z	
22w‡‡	Comparative Anatomy (5 cred.; soph., jr., sr.; prereq. 1-2-3) (Sections 1 and 2 limited to 40 each, section 3 limited to 30. Written permission must be obtained from the Junior College office, 106 Folwell Hall)				
	Lect.	III	TThS	313Z	Mr. Eddy
	Lab. Sec. 1	I, II	TThS	3SZ	
	2	VI, VII, VIII	TTh	3SZ	
	3	VI, VII, VIII	MW	3SZ	
46w-47s†	Ornithology (6 cred.; soph., jr., sr.; prereq. 1-2-3 and permission of instructor)				
	Lect.	VI, VII, VIII	MW	307MNH	Dr. Roberts

Senior College Courses

Courses 50, 51, 52, 53, 81, 82, and 83 are open to sophomores who have a grade of at least C in Course 1-2-3. Other Senior College courses in this department are open to

* Lectures may be elected without laboratory with the consent of the chairman of the department. Laboratory must be taken with the lectures, however, if zoology is offered as the required laboratory science. Students should elect lecture sections in which they can continue throughout the three quarters. Changes from one lecture or laboratory section to another may be made only with the consent of the department office.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

‡‡ A fee of $2 is charged for this course.

§ Not open to regular three-year premedical and predental students.

Junior College students only by special permission of the Students' Work Committee. See a statement on page 21.

No.	Title	Hour	Day	Bldg.	Instructor
50s‡§	Introduction to General Physiology (5 cred.; soph., jr., sr.; prereq. 1-2-3 or 15 cred. in bot.; and 10 cred. in chem. or permission of instructor) (Sections limited to 20 each)				
	Lect.	III	TThS	211Z	Mr. Clark
	Lab. Sec. 1	I, II	TThS	10Z	
	2	VI, VII, VIII	TTh	10Z	
51f‡	Introductory Animal Parasitology (5 cred.; jr., sr.; prereq. 1-2-3) (Sections are limited. Written permission must be obtained from the Junior College office, 106 Folwell Hall)				
	Lect.	VI	MWF	313Z	Mr. Riley,
	Lab. Sec. 1 (Limited to 80)	VII, VIII	MWF	208Z	Mr. Wallace
	2 (Limited to 40)	I, II	MWF	208Z	
	3 (Limited to 40)	III, IV	MWF	208Z	
52w‡	Introductory Entomology (5 cred.; jr., sr.; prereq. 1-2-3) (Sections limited to 20 each. Written permission must be obtained from the Junior College office, 106 Folwell Hall)				
	Lect.	VI	MWF	211Z	Mr. Mickel
	Lab. Sec. 1	VII, VIII	MWF	402Z	
	2	VI, VII, VIII	TTh	402Z	
53s‡	Faunistic Zoology (5 cred.; jr., sr.; prereq. 1-2-3) (Limited to 40. Written permission must be obtained from the Junior College office, 106 Folwell Hall)				
	Lect.	VI	MWF	211Z	Mr. Eddy
	Lab.	VII, VIII	MWF	3SZ	
		IX	F	3SZ	
75s‡	Nature Study (3 cred.; jr., sr.; prereq. 15 cred. including 1-2-3. Required of all zoology majors and minors in the College of Education in the junior year)				
	Lect. and lab.	VI, VII, VIII	TTh	204Z	Mr. Wodsedalek
81f‡	Invertebrate Zoology (3 cred.; jr., sr.; prereq. 1-2-3) (Limited to 24. Written permission must be obtained from the Junior College office, 106 Folwell Hall)				
	Lect. and lab.	I, II	MWF	211Z	Mr. Dawson
82w	Evolution (3 cred.; jr., sr.; prereq. Zool. 1-2-3 or Bot. 1, 7, 21)				
	Lect.	II	MWF	313Z	Mr. Oliver
83s	Introduction to Genetics and Eugenics (3 cred.; jr., sr.; prereq. 1-2-3 or 10 cred. in bot.)				
	Lect.	II	MWF	313Z	Mr. Oliver
107f‡-108w‡	Protozoology (6 cred.; jr., sr., grad.; prereq. 15 cred.)				
	Lect. and lab.	I, II	TThS	208Z	Mr. Turner
109f‡-110w‡-111s‡	General Physiology of Animal Reactions (9 cred.; jr., sr., grad.; prereq. 15 cred.)				
	Lect. and lab.	III, IV	MWF	211Z	Mr. Minnich, Mr. Clark, Mr. Schmitt
112f	General Physiology of Absorption and Secretion (3 cred.; jr., sr., grad.; prereq. 20 cred. in chem. or biochem. or equiv. and adequate training in biol. sci. with consent of instructor)				
	Lect.	II	TThS	211Z	Mr. Clark
113w‡	Laboratory Methods in General Physiology of Absorption and Secretion Problems (3-5 cred.; grad.; prereq. 112 and consent of instructor)				
	Lab.	Ar	Ar	3Z	Mr. Clark
117f‡-118w-119s‡¶	Animal Ecology (9 cred.; jr., sr., grad.; prereq. 15 cred.)				
	Lect.	VI	TTh	211Z(f,s)	Mr. Eddy
	Lab.	VII, VIII	TTh	3SZ(f,s)	Mr. Hodson
				301AdUF(w)**	
120s¶	General Ecology of Insects (3 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)				
	Lect.	VI, VII, VIII	TTh	15AdUF	Mr. Hodson

‡ A fee of $1 is charged for this course.
¶ Either 119s or 120s or both may be taken to complete Course 117f-118w.
§ Not open to regular three-year premedical and predental students.
** Note that in the winter quarter this course is offered at the University Farm.

121f‡	Ichthyology (3 cred.; jr., sr., grad.; prereq. 15 cred.)				
	Lect.	VIII, IX	F	211Z	Mr. Eddy
	Lab.	Ar	Ar	Ar	
125f‡-126w‡-127s‡	Advanced Entomology (9 cred.; jr., sr., grad.; prereq. 15 cred.)				
	Lect.	I	TTh	211Z	Mr. Mickel
	Lab.	I, II, III	S	402Z	
132	*General Physiology of Development* (3 cred.; jr., sr., grad.; prereq. 50 and 180 or consent of instructor) *(Not offered)*				
133s	Genetics of Development (3 cred.; jr., sr., grad.; prereq. proper preparation in advanced genetics or consent of instructor)				
		VI	MW	Ar	Mr. Oliver
144w‡-145s‡-146s*‡	Animal Parasites and Parasitism (6 or 9 cred.; jr., sr., grad.; prereq. 15 cred.)				
	Lect. and lab.	VI, VII, VIII	WF	208Z	Mr. Riley, Mr. Wallace
149w‡-150s‡	Histology and Organology (6 cred.; jr., sr., grad.; prereq. 15 cred. in zool.)				
	Lect. and lab.	VI, VII, VIII	TTh	211Z, 201Z	Mr. Ringoen
155w	Physiology in Relation to Physics (3 cred.; jr., sr., grad.; prereq. 15 cred. in biol. sci. and consent of instructor. Physics recommended)				
	Lect.	VI, VII	TTh		Mr. Schmitt
160f‡-161w‡	Cytology (6 cred.; jr., sr., grad.; prereq. 15 cred. with consent of instructor)				
	Lect. and lab.	VI, VII, VIII	TTh	104Z	Mr. Wodsedalek
170f‡-171w‡	Advanced Genetics (6 cred.; jr., sr., grad.; prereq. 15 cred. including Course 83, or consent of instructor)				
	Lect. and lab.	VI, VII, VIII	MW	10Z	Mr. Oliver
180f‡	Comparative Embryology (3 cred.; jr., sr., grad.; prereq. 15 cred. including Course 21 or equiv.)				
	Lect. and lab.	III, IV	MWF	313Z	Mr. Ringoen
181w	Endocrines and Reproduction (3 cred.; jr., sr., grad.; prereq. 15 cred., including Course 21 or equiv.)				
	Lect.	III	MWF	313Z	Mr. Ringoen
182s	Experimental Embryology (3 cred.; jr., sr., grad.; prereq. 15 cred., including Course 21 or equiv.)				
	Lect.	III	MWF	313Z	Mr. Ringoen
197f-198w-199s	Problems (5 or more cred.; jr., sr., grad.; prereq. 1-2-3, special requirements)				
		Ar	Ar	Ar	Ar

ENTOMOLOGY AND ECONOMIC ZOOLOGY

Students in this college may elect courses in Entomology and Economic Zoology by arrangement with the department. But before registering for any courses they should get the approval of Assistant Dean Shumway, 219 Administration Building. See the program of the College of Agriculture, Forestry, and Home Economics, in another part of this bulletin.

COURSES IN OTHER COLLEGES

Certain courses in other colleges are open to election by seniors. See the Bulletin of the College of Science, Literature, and the Arts. Students interested in such courses may consult the assistant dean for the Senior College.

* 144w-145s is a 6-credit course. 146s (3 cred.) may be taken simultaneously with 145s, at hours to be arranged.

‡ A fee of $1 per quarter is charged for this course.

COLLEGE OF EDUCATION

Junior College courses, primarily for freshmen and sophomores, are numbered from 1 to 49; Senior College courses, primarily for juniors and seniors, are numbered from 50 to 99; courses numbered from 100 to 199 are primarily for seniors and graduates; courses numbered 200 and above are for graduate students only.

Since beginning teachers are usually expected to teach several subjects in addition to their major, it is desirable that the student select the best possible combinations of subjects. It is also desirable to secure training in one or more extra-curricular activities. English teachers are urged to secure credits in library work. Social studies teachers will find a minor in science, mathematics, or a foreign language a valuable addition to their training. Certain selected courses in physical education are recommended for women in some cases. Students may consult Mr. C. P. Archer in the Bureau of Recommendations about opportunities in the various fields of education for men and women with a Bachelor's degree. They should consult their major advisers or Miss Marcia Edwards, assistant to the dean, or Miss Jean H. Alexander, chairman of the Students' Work Committee, about planning their programs to the best advantage. All curricula leading to a B.S. degree and a teaching certificate in Minnesota are outlined in the College of Education Bulletin.

Because the regulations and requirements in subject-matter fields and in education necessary for certification in different states are constantly changing, students who plan to teach in states other than Minnesota should secure a statement of requirements for certification and consult their major advisers in the College of Education in order that they may fully complete the requirements for the specific state in which they have to teach.

Classes whose meeting place is not scheduled in this bulletin will be assigned rooms at the opening of each quarter. Consult the Official Daily Bulletin or the bulletin board at 210 Burton Hall.

GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
Ed.51Af-51Bw-51Cs†‡	Introduction to Secondary School Teaching (9 cred.; jr.; prereq. 6 cred. in psy. and a C average)				
	Sec. 1¶	III	MWF	210Bu	Mr. Boardman, Mr. Cook
	2¶	VII	MWF	210Bu	Mr. Bossing, Mr. Wrenn
Ed.51Af-51Bw-51Cs†‡	Introduction to Secondary School Teaching (See 51A-B-C)				
		I	MWF	210Bu	Mr. Miller(f) Ar(w,s)
Ed.51Aw†‡	Introduction to Secondary School Teaching (See 51A-B-C)				
	Sec. 1	I	MWF	Ar	Ar
	2	III	TThS	210Bu	Ar
Ed.51As†‡	Introduction to Secondary School Teaching (See 51A-B-C)				
	Sec. 1	I	MWF	Ar	Mr. Miller
	2	III	TThS	210Bu	Ar

† The entire course including the final examination covering all units must be completed satisfactorily before credit is given for any quarter. Graduates of teachers colleges should consult their advisers before registering for any part of the course. Students who have completed 51A may register for either 51C or 51B.

‡ A fee of $1 per credit is charged for this course.

¶ Students registering in these sections must complete the entire nine credits in Sec. 1 or Sec. 2. They cannot transfer to other sections in the winter and spring quarters. New students cannot enter in the winter or spring quarters.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.51Bf†‡	Introduction to Secondary School Teaching (See 51A-B-C)	II	TThS	210Bu	Ar
Ed.51Bs†‡	Introduction to Secondary School Teaching (See 51A-B-C)	II	TThS	210Bu	Ar
Ed.51Cf†‡	Introduction to Secondary School Teaching (See 51A-B-C)	III	MWF	210Bu	Mr. Boardman
Ed.51Cw†‡	Introduction to Secondary School Teaching (See 51A-B-C)	II	MWF	210Bu	Mr. Boardman
Ed.61Af-61Bw†‡	Introduction to Elementary School Teaching (6 cred.; jr.; prereq., 6 cred. in psy. and a C average) (This course is to be followed by 61C in either the junior or the senior year)	VI-VII	TTh	106Pt& Dem.Sch.	Ar(f) Mr. Staudenmaier(w)
Ed.61Cs†‡	Introduction to Elementary School Teaching (3 cred.; jr., sr.; prereq. 61A-B) (This course may follow 61A-B in either the junior or senior year)	VI VI-VII	M MW	 106Pt	 Mr. Neale
Ed.Wf,w,s	Professional Preparation for Teaching—This classification is designed for students already holding a baccalaureate degree who desire to complete their preparation for teaching and qualify for the state teacher's certificate. Such students should consult the adviser as to their eligibility and outline for approval a program covering at least three quarters of study. Courses must be selected so as to meet all requirements for major, minor, and professional training. The entire program must be approved by the adviser and completed successfully before credit is allowed for any of the courses taken. (Minimum of 45 cred.; prereq. a Bachelor's degree, a minimum of 135 cred., a 1.75 average in all previous work, and the consent of the course adviser.)	Ar	Ar	Ar	Mr. Carlson

AGRICULTURAL EDUCATION

Major adviser.—Professor Field.

No.	Title	Hour	Day	Bldg.	Instructor
Agr.Ed.1w	Introduction to Agricultural Education (1 cred.; fr.; no prereq.)	VI	M	301Hr	Mr. Field, Mr. Ekstrom
Agr.Ed.51	*Educational Psychology* (3 cred.; jr., sr.; no prereq.) *(Not offered)* (See Ed. 51A)				
Agr.Ed.54f,w	Rural Education and Community Leadership (2 cred.; jr., sr.; prereq. Ed. 51)	IV and 1 hr. ar.	T	301Hr	Mr. Field
Agr.Ed.56w	Rural Youth Leadership (3 cred.; jr., sr.; no prereq.)	II	MWF	301Hr	Mr. Harden
Agr.Ed.81s	Teaching Agriculture (3 cred.; jr.; prereq. 51)	IV	MWF	301Hr	Mr. Field
Agr.Ed.82f‡	Methods in Teaching Agriculture (3 cred.; sr.; prereq. 81)	III	MWF	301Hr	Mr. Field
Agr.Ed.83w‡	Advanced Methods in Teaching Agriculture (Continuation of 82) (2 cred.; sr.; prereq. 82)	III	TTh	301Hr	Mr. Field
Agr.Ed.90f,w,s‡	Observation and Participation (2 cred.; jr., sr.; prereq. 81)	Ar	Ar	Ar	Mr. Field, Mr. Ekstrom

† The entire course including the final examination covering all units must be completed satisfactorily before credit is given for any quarter. Graduates of teachers colleges should consult their advisers before registering for any part of the course. Students who have completed 51A may register for either 51C or 51B.

‡ A fee of $1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Agr.Ed.91f,w,s‡	Supervised Teaching Experience (3 cred.; sr.; prereq. 82 and a C+ average in the major)				
		Ar	Ar	Ar	Mr. Field, Mr. Ekstrom
Agr.Ed.101f	Part-time School Instruction (2 cred.; sr.; prereq. 81)				
		III	TTh	301Hr	Mr. Ekstrom
Agr.Ed.102w	Evening School Instruction (3 cred.; sr.; prereq. 81)				
		III	MWF	301Hr	Mr. Ekstrom
Agr.Ed.103s	Facilities and Materials (3 cred.; sr.; prereq. 82)				
		III	MWF	301Hr	Mr. Ekstrom
Agr.Ed.104s	Planning Programs (2 cred.; sr.; prereq. 82)				
		III	TTh	301Hr	Mr. Field
Agr.Ed.137	*Course of Study Construction in Agriculture* (3 cred.; sr.; prereq. 10 cred. in ed.) *(Not offered)*				
Agr.Ed.141‡	*Supervised Practice in Vocational Agriculture* (3 cred.; sr.; prereq. 10 cred. in ed.) *(Not offered)*				
Agr.Ed.145	*The Integrated Course of Study in Agriculture* (3 cred.; sr.; prereq. 10 cred. in ed.) *(Not offered)*				

ART EDUCATION

Major advisers.—Professor Raymond; Associate Professor Hilpert.

Group A—Design

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
ArtEd.1f-2w-3s*	Fundamental Experiences in Design (9 cred.; prereq. high school art or 14-15-16)				
	Sec. 1 Lect.	II	MWF	207aJ	Mr. Torbert
	Lab. ar. in	III-IV	MWF		
	2 Lect.	I	TThS	203aJ	Mr. Torbert
	Lab. ar. in	II-III	TTh		
ArtEd.14f-15w-16s	Introduction to Art Education (9 cred.; required of all entering Art Ed. as majors or minors; no prereq.)				
	Lect.	I	MWF		Mr. Hilpert
	Quiz sections ar. in	II	MWF	10J	
ArtEd.14Af-15Aw-16As	Introduction to Art Education Laboratory (6 cred.; required in addition to 14-15-16 of those without high school art; no prereq.)				
		I-II	TTh	207bJ	Mr. Hilpert
ArtEd.17f-18w-19s	Art for Elementary Teachers (9 cred.; for nonmajors preparing to teach in preschool and elementary grades; no prereq.)				
	Lect.	IV	T		
	Sec. 1	I-II	TTh	207aJ	Mr. Gayne
	2	VI-VII	M	207aJ	Mr. Gayne
		VI	WF		
ArtEd.20f-21w-22s	Fundamental Experiences in Design—Continued (9 cred.; prereq. Art Ed. 1-2-3)				
		II-III	MWF	207bJ	Miss Berglund

Senior College and Graduate Courses

ArtEd.52Af-52Bw	Design for Home and Furnishing (Cred. ar.)				
		VI-VII	TTh	Ar	Ar
ArtEd.54f-55w-56s	Fundamental Experiences in Art (6 cred.; for nonmajors; prereq. permission of instructors)				
	Ar. in	I	MWF		Mr. Hilpert
	and (Ind. Ed. majors)	II	S	11J	Mr. Torbert

* Each term gives some craft experience for which 1 credit may be allowed toward requirement in Group B.

‡ A fee of $1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
ArtEd.70f-71w-72s	Fundamental Experiences in Design—Continued—Color Emphasis (9 cred.; same as 20-21-22 but held to Senior College level; prereq. 1-2-3 or equiv. or evidence of fitness)	II-III	MWF	207bJ	Miss Berglund
ArtEd.150Ef	Commercial Design (3 cred.; prereq. 1-2-3, B.A. 64, or evidence of fitness)	I-IV	S	207bJ	Mr. Hilpert
ArtEd.151Ew	Industrial Design (3 cred.; sr., grad., or by permission; prereq. 1-2-3 or evidence of fitness)	I-IV	S	207bJ	Mr. Hilpert
ArtEd.152	*Landscape Design (Not offered)*				
ArtEd.153-154-155E	Art in Society				
154f	Personality and Its Expression in Costume (3 cred.; sr., grad.)	4:00-5:00	MWF	207bJ	Miss Raymond
153w	The Home (3 cred.; sr., grad.)	4:00-5:00	TTh	207bJ	Mr. Hilpert
155E	*Painting (Not offered)* (Students expecting to register in 1941-42 should consult Mr. Torbert about prerequisite reading)				

Group B—Handcrafts

At the Senior College level each art major should choose one or two materials with which he should acquire expert skill and with whose possibilities in terms of both handcraft and productive industry he should be familiar. Unless otherwise stated the following courses in handcraft carry three credits.

Junior College Courses

Contacts with materials and hand-processes, primarily for nonmajors. Lectures and demonstrations in handcraft for public school, social work, summer camps, etc.

ArtEd.31f,w	Orientation in Handcraft Processes (3 cred.; no prereq.)	I-II	TThS	10J	Miss Ross

Senior College Courses

ArtEd.73f,w‡	Ceramic Materials and Processes				
	Lect. and dem. Sec. 1	VII	M	10J	Miss Ross
	2	VI	T	10J	Miss Ross
	Lab. ar. in	V-VIII	MTThF	10J	Miss Ross
ArtEd.74,75w‡	Ceramic Processes				
	Lect. and dem. Sec. 1	VII	F	10J	Miss Ross
	2	VI	Th	10J	Miss Ross
	Lab. ar. in	V-VIII	MTThF	10J	Miss Ross
ArtEd.75Bs‡	Bookbinding Process (Schedule same as for Art Ed. 73)			10J	Miss Ross
ArtEd.75Ms‡	Metal Work (Schedule same as for Art Ed. 74, 75)			10J	Miss Ross
ArtEd.76f‡	Textile Materials and Processes				
	Lect. and dem.	VI	MF	11J	Miss Berglund
	Lab.	VII	MF	11J	Miss Berglund
		and VI-VII	W	11J	Miss Berglund
ArtEd.77w‡	Textile Processes, Advanced				
	Lect.	VI	MF	11J	Miss Berglund
	Lab.	VII	MF	11J	Miss Berglund
		and VI-VII	W	11J	Miss Berglund
ArtEd.78s‡	Textile Processes				
	Sec. 1 Printing processes	VI-VII-VIII	MF	11J	Miss Berglund
	2 Weaving processes ar. if demanded				

‡ A fee of $1.50 per quarter is charged for this course.

Group D—Representation

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
ArtEd.4f,w,s-6f,w,s-8f,w,s	Drawing from Still Life and Pose (2 cred. a qtr.; no prereq.)				
	Sec. 1	I-II	MF	203J	Ar
	2	V-VI	MF	203J	Miss Lutz
	3	VII-VIII	MF	203J	Ar
	4	Ar	Ar	203J	Ar
ArtEd.10-11-12	Experiences with Rhythm and Color (Not offered as a separate course in 1940-41)				
ArtEd.23f,w,s	Composition Clinic (2 cred.; prereq. evidence of fitness)				
		I-II and ar	S	203J	Mr. Torbert
ArtEd.24f,w,s-26f,w,s-28f,w,s	Drawing and Painting from Still Life and Pose (Continuation of 4-6-8) (2 cred. each)				
	Sec. 1	I-II	TTh	203J	Miss Lutz
	2	III-IV	MF	203J	Ar
	3	VI-VII	TTh	203J	Ar
ArtEd.29f,w,s-30f,w,s	Rhythmic Sketch—Simple use of figure (1 cred. a qtr.; no prereq.)				
		III-IV	S	Ar	Ar

Senior College Courses

ArtEd.61,62,63f,w,s	Painting (2 cred. each)				
	Sec. 1	II-III	TTh	203J	Miss Lutz
	2	VI-VII	TTh	203J	Miss Lutz
	3	I-IV	W	203J	Miss Lutz
	4	I-IV	S	203J	Miss Lutz
ArtEd.66,67,68f,w,s	Painting (Continuation of 61, 62, 63)				
		I-IV	W	203J	Miss Lutz
		I-IV	S	203J	Miss Lutz
ArtEd.124E-125E-126Ef,w,s	Advanced Painting (2 to 6 cred.)				
		I-IV	W	203J	Miss Lutz
		I-IV	S		

Group D—Appreciation

For History of Art see offerings in Fine Arts.

Senior College and Graduate Courses

ArtEd.57-58	*Art and Leisure*—Participation in cultural advantages of Twin City galleries and auditoriums (1 cred. each) *(Not offered as a separate course in 1940-41)* (See F.A. 1, G.C. 119-120-121)
ArtEd.153w-154f-155E	Art in Society (See Group A)

Group E—Professional Courses

Senior College and Graduate Courses

ArtEd.84s‡	Teaching of Art in the Elementary Grades (3 cred.; prereq. Ed. 61 A-B-C or equiv.)				
		VII 1 hr ar	TTh	207aJ	Mr. Gayne
ArtEd.86f-87w-88s‡	Special Methods and Directed Teaching in Art (12 cred.; prereq. sr. standing)				
	Methods	III		207bJ	Miss Fisher
	Teaching	VI-VII and 1 hr. ar.		Pub. Sch.	Miss Raymond

‡ A fee of $1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
ArtEd.183Es	Philosophy of Art Education (3 cred.; sr., grad.)	4:00-5:00	MWF	207bJ	Miss Raymond
ArtEd.185s	Types of Arts Instruction II (3 cred.; sr., grad.)				
	Ar. in	4:00-5:00	TTh		
		and			
		III-IV	S	207bJ	Mr. Hilpert
ArtEd.189w	Application of Esthetic Theory to Public Education (3 cred.; sr., grad.)	4:00-5:00	MWF	207bJ	Miss Raymond
ArtEd.284Es	Reading and Research in Art Education (3 cred.; grad.)	I-II	S		Miss Raymond and staff
ArtEd.290E,291E, 292Ef,w,s	Special Problems in Art Education	Ar	Ar	Ar	Miss Raymond, Mr. Hilpert, and others
ArtEd.295f,w,s*	Special Problems in Art Education	Ar	Ar	Ar	

CURRICULUM AND INSTRUCTION

Major advisers.—Professors Bossing and Brueckner; Associate Professor Bond.

All courses under *Curriculum and Instruction* carry a fee of $1 per credit.

GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.104f‡	Adult Education (2 cred.; jr., sr., grad.) (Formerly Ed. 104)	I	TTh	Ar	Mrs. May
Ed.C.I.105s‡	Visual Aids in Teaching (2 cred.; jr., sr., grad.) (Formerly Ed. 105)	III-IV	S	106Pt	Ar
Ed.C.I.107f‡	Radio in Education (3 cred.; jr., sr.; prereq. 9 cred. in ed.) (Formerly Ed. 107)	IX-X	W	115UHS	Mr. Tyler
		and			
		1 hr. ar.			
Ed.C.I.107s‡	Radio in Education (3 cred.) (See 107f)	III	MWF	Ar	Mr. Tyler
Ed.C.I.114w‡	Methods and Materials in the Field of Adult Education (2 cred.; jr., sr., grad.)	I-II	S	Ar	Mrs. May
Ed.C.I.145s‡	Remedial Reading (2 cred.; prereq. Ed.C.I. 143 or 144 or 159)	I-II	S	100Pt	Mr. Bond
Ed.C.I.171f,w,s‡	Curriculum Laboratory Practice—A course in the analysis and construction of units, courses of study, and curricula; class projects and individual projects according to needs, interests, level, and specialization (2 to 6 cred.; sr., grad.; prereq. 170 or consent of instructor)	Ar	Ar	Ar	Mr. Bossing, Mr. Cook
Ed.C.I.174f-175w-176s†‡§	Clinical Methods and Practice in Speech Pathology (9 cred.; sr., grad.; prereq. Sp. 1, 2, 3, 61, 67, 162; Psy. 4-5; Zool. 83 or Psy. 52; Ed.Psy. 60; Human Physiol. 2; Human Anat. 3; and permission of instructor)	III	TTh	406F	Mr. Bryngelson, Mr. Brown
		other hrs. ar.			

* This course may be taken for independent study under Plan B for the Master's degree.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per credit is charged for this course.

§ Passing the qualifying examination is prerequisite to this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.190w‡	Principles of Selection of Materials for Reading in the Elementary School (2 cred.; sr., grad.; prereq. 63 or 122 or equiv.)	III-IV	S	204aUHS	Miss Smith
Ed.C.I.207f,w,s*‡	Problems in Radio Education (Cred. ar.) (Formerly Ed. 207)	Ar	Ar	Ar	Mr. Tyler
Ed.C.I.271f,w,s*‡	Problems in Curriculum Construction (2 or 3 cred. a qtr. with a maximum of 6; prereq. completion or current enrolment in one of the following: Ed.C.I. 113, 119, 170 or consent of instructor)	Ar	Ar	Ar	Mr. Bossing, Mr. Cook, Mr. Archer
Ed.C.I.273f,w,s*‡	Problems in Reading (2 to 6 cred.; prereq. previous training in reading such as Ed.C.I. 159 or equiv.)	Ar	Ar	Ar	Mr. Bond

ELEMENTARY EDUCATION

Ed.C.I.60s‡	The Teaching of Reading in the Elementary School (3 cred.; jr.; prereq. Ed. 61A-61B)	VI	MWF	100Pt	Mr. Bond
Ed.C.I.61s‡	The Teaching of the Social Studies in the Elementary School (2 cred.; jr.; prereq. Ed. 61A-61B)	VI	TTh	100Pt	Mr. Wesley
Ed.C.I.62f‡	The Teaching of Arithmetic in the Elementary School (2 cred.; sr.; prereq. 60, 61)	VI	TTh	100Pt	Mr. Brueckner
Ed.C.I.63Tf‡	Children's Literature (2 cred.; for teachers in service)	IX-X	M	106Pt	Miss Smith
Ed.C.I.63w‡	Children's Literature (2 cred.; sr.; prereq. 60, 61)	VI	TTh	100Pt	Miss Smith
Ed.C.I.64f‡	The Teaching of English in the Elementary School (3 cred.; sr.; prereq. 60, 61)	VI	MWF	100Pt	Mr. Archer
Ed.C.I.65w‡	The Teaching of Science in the Elementary School (3 cred.; sr.; prereq. 63, 64)	VI	MWF	100Pt	Mr. Carlson
Ed.C.I.119f‡	Elementary School Curriculum (3 cred.; sr., grad.; prereq. Ed.C.I. 61C or equiv.)	III-IV	S	115UHS	Mr. Cook
Ed.C.I.119T-120T‡	*Elementary School Curriculum* (4 cred. See 119) *(Not offered)*				
Ed.C.I.143f‡	Teaching of Reading in the Elementary School (2 cred.; jr., sr., grad.; prereq. 9 hrs. in ed. including Ed. 51A or 61A)	I-II	S	100Pt	Mr. Bond
Ed.C.I.144w‡	Teaching of Reading in the Upper Grades and Junior and Senior High Schools (2 cred.; sr., grad.; prereq. same as for 143)	I-II	S	100Pt	Mr. Bond
Ed.C.I.146w‡	Current Developments in Language Expression in the Elementary School (2 cred.; jr., sr., grad.; prereq. Ed. 61A-B-C or equiv. Not open to students who have had Ed. 54B)	IX-X	M	204aUHS	Miss Smith
Ed.C.I.148‡	*The Teaching of Primary Arithmetic* (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv. Not open to students who have had Ed.T. 54B) *(Not offered)*				
Ed.C.I.149w‡	The Teaching of Intermediate Grade Arithmetic (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv. Not open to students who have had Ed.T. 54B)	I-II	S	210Bu	Mr. Brueckner
Ed.C.I.150f‡	Supervision and Improvement of Instruction (3 cred.; sr., grad.; prereq. Ed. 61C or equiv.)	I-II 1 hr. ar	S	204bUHS	Mr. Brueckner
Ed.C.I.151w‡	Diagnosis and Remedial Instruction (3 cred.; sr., grad.; prereq. Ed.C.I. 150 or equiv.)	II	MWF	100Pt	Mr. Brueckner

* This course may be taken for independent work under Plan B for the Master's degree.
‡ A fee of $1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.152‡	*The Adjustment of Schools to Individual Differences* (2 cred.; sr., grad.; prereq. 15 hrs. in ed.) *(Not offered)*				
Ed.C.I.153s‡	Supervision and Teaching of English in the Elementary Schools (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv.)	I-II	S	204aEd	Mr. Archer
Ed.C.I.155‡	*Supervision and Teaching of Arithmetic* (2 cred.; sr., grad.; prereq. Ed. 61C or equiv.) (See Ed.C.I. 148, 149) *(Not offered)*				
Ed.C.I.156s‡	Practice Supervision—Group Problems and Field Work (3 cred.; sr., grad.; prereq. 15 hrs. in ed. and permission of instructor)	I-IV	TTh	100Pt Dem. schools, Twin City schools	Mr. Brueckner, Mr. Bond
Ed.C.I.157f,w,s‡	Practice in Supervision (3 cred. a qtr.; sr., grad.; prereq. consent of instructor)	Ar	Ar	Ar	Mr. Brueckner
Ed.C.I.160s‡	Supervision of Elementary Subjects (3 cred.; sr., grad.; prereq. Ed.C.I. 150 or equiv.)	IX-X 1 hr. ar	T	204bUHS	Mr. Brueckner, Miss Smith, Mr. Wesley, Mr. Bond
Ed.C.I.170Aw‡	Curriculum and Course of Study Construction—A study of the principles and methods for the selection and organization of units, courses of study, and curricula at the elementary school level (3 cred.; sr., grad.; prereq. 119 or consent of instructor)	III-IV	S	115UHS	Mr. Cook
Ed.C.I.181s‡	Foundations of Elementary School Methods (3 cred.; sr., grad.; prereq. 9 hrs. in ed.)	I-II 1 hr. ar	S	204bUHS	Mr. Brueckner
Ed.C.I.181T-182T‡	*Foundations of Elementary School Methods* (See 181 above) *(Not offered)*				
Ed.C.I.224f-225w-226s‡	Seminar in Elementary School Problems (Formerly Ed. 224-225-226)	IX-X	Th	209Bu	Mr. Brueckner, Mr. Bond, Mr. Cook, Mr. Archer
Ed.C.I.259‡*	*Supervision and Teaching of Reading* (2 cred.) *(Not offered)*				
Ed.C.I.261f,w,s*‡	Special Problems in School Supervision (2 cred.; prereq. 10 hrs. in ed. including Ed. 51A)	Ar	Ar	220Bu	Mr. Brueckner
Ed.C.I.263f*‡	Research in Arithmetic Instruction (2 cred.; prereq. Ed.C.I. 156 or 148 or 149 or equiv.)	IX-X	T	204aUHS	Mr. Brueckner
Ed.C.I.264w*‡	Research in Educational Diagnosis (2 cred.; prereq. Ed.C.I. 151 or equiv.)	IX-X	T	204aUHS	Mr. Brueckner, Mr. Bond
Ed.C.I.265‡*	*Recent Literature in Supervision* (2 cred.) *(Not offered)*				

SECONDARY EDUCATION

Ed.C.I.113f‡	High School Curriculum (4 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51A-B-C)	IX-X	MW	209Bu	Mr. Bossing
Ed.C.I.121w‡	Educational Advising of Women and Girls (3 cred.; sr., grad.; prereq. 15 cred. in ed.)	VIII	MWF	112Bu	Miss Blitz
Ed.C.I.122s‡	Literature for Adolescents (2 cred.; jr., sr., grad.; prereq. Ed. 51C or junior-senior teaching experience)	I-II	S	117UHS	Miss Smith

* This course may be taken for independent study under Plan B for the Master's degree.
‡ A fee of $1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.135w‡	Teaching of Occupations and Group Guidance (2 cred.; sr., grad.; prereq. 9 hrs. in ed.)	III-IV	S	Ar	Miss Edwards, Miss Wright
Ed.C.I.144w‡	Teaching of Reading in the Upper Grades and Junior and Senior High Schools (2 cred.; sr., grad.; prereq. 9 hrs. in ed. including Ed. 51A)	I-II	S	100Pt	Mr. Bond
Ed.C.I.168w‡	Current Developments in the Social Studies (2 cred.; grad. only)	III-IV	S	206UHS	Mr. Wesley
Ed.C.I.169s‡	Extra-curricular Activities (2 cred.; prereq. 10 hrs. in ed. including Ed. 51A)	III	TTh	106Pt	Mr. Carlson
Ed.C.I.170Bw,s‡	Curriculum and Course of Study Construction—A study of the principles and methods for the selection and organization of units, courses of study, and curricula at the secondary school level. (3 cred.; sr., grad.; prereq. 113 or consent of instructor)				
	(winter)	I-II and 1 hr. ar	S	204aUHS	Mr. Bossing
	(spring)	IX-X and 1 hr. ar.	M	115UHS	Mr. Bossing
Ed.C.I.188‡	*Advanced Course in Methods of Teaching Modern Languages* (2 cred.; sr., grad.; prereq. Ed.T. 72A-B-C, or experience in teaching the modern languages) *(Not offered)*				
Ed.C.I.191s‡	Advanced Course in the Teaching and Supervision of Secondary School Mathematics (2 cred.; prereq. Ed. 51C or permission of instructor)	I-II	S	115UHS	Mr. Walker
Ed.C.I.198s‡	Recent Literature in Methods and Curriculum in English (2 cred.; sr., grad.; prereq. Ed.T. 66A-B-C, or equiv.) (Students should not register for this course in the same year with Ed.C.I. 294)	IX-X	M	Ar	Miss Smith
Ed.C.I.199Ef,w,s‡	Internship (Cred. ar.; grad.)	Ar	Ar	Ar	Ar
Ed.C.I.201f-202w-203s*‡	Problems in Teaching the Social Studies (3 cred. a qtr.; grad.; prereq. consent of instructor)	4:00	T	226Bu	Mr. Wesley
Ed.C.I.204s‡	Social Studies Curriculum (2 cred.)	III-IV	S	206UHS	Mr. Wesley
Ed.C.I.222f-223w-224s‡	Current Problems in Technique of High School Instruction (Cred. ar.; prereq. Ed. 51C and Ed.C.I.113)	IX-X	Th	204bUHS	Mr. Bossing, Mr. Johnson, Miss Smith, Mr. Wesley
Ed.C.I.225f,w,s*‡	Special Problems in Supervision of Instruction in Secondary Schools (Cred. ar.)	Ar	Ar	218Bu	Mr. Boardman
Ed.C.I.254‡	*Supervision of the Social Studies* (2 cred.; sr., grad.; prereq. Ed. 61A,B,C, or equiv.) *(Offered alternate years. Not offered in 1940-41)*				
Ed.C.I.266s‡	Supervision of High School Instruction (3 cred. This course is part of a three-quarter sequence. For fall and winter courses see Ed.Ad. 264-265. Students may register for any quarter.)	III-IV 1 hr. ar	S	204bUHS	Mr. Boardman
Ed.C.I.287f‡	Advanced Course in the Teaching of Science (2 cred.; sr., grad.; prereq. Ed. 51C)	IX-X	T	202UHS	Mr. Johnson
Ed.C.I.293s*‡	Foundations of Secondary School Methods (3 cred.)	IX-X and 1 hr. ar	T	202UHS	Mr. Johnson
Ed.C.I.294f*‡	Advanced Course in Methods of Teaching English (2 cred.; prereq. Ed.T. 66A-B-C or equiv.)	III-IV	S	204aUHS	Miss Smith
Ed.C.I.296w-297s*‡	Special Problems in Techniques of Secondary School Instruction (Cred. ar.; grad.)	Ar	Ar	206Bu	Miss Smith

* This course may be taken for independent study under Plan B for the Master's degree.
‡ A fee of $1 per credit is charged for this course.

HIGHER EDUCATION

No.	Title	Hour	Day	Bldg.	Instructor
Ed.C.I.184f‡	Supervision of Student Teaching (2 cred.; sr., grad.)	I-II	S	117UHS	Mr. Carlson
Ed.C.I.228f-229w-230s*	Problems of College Education (6 cred.) (Formerly Ed. 228-229-230)	Ar	Ar	Ar	Mr. McConnell
Ed.C.I.250f‡	Higher Education in the United States—Curriculum and Instruction (3 cred.; prereq. 15 hrs. in ed.) (Formerly Ed. 250)	I-II 1 hr. ar.	S	114UHS	Ar
Ed.C.I.285f‡	Professional Education of Teachers (2 cred.; prereq. 15 hrs. in ed.) (Formerly Ed. 285)	III-IV	S	205bUHS	Mr. Peik
Ed.C.I.286f,w,s*‡	Problems in Teacher Training (2 cred a qtr.; prereq. 285 or permission of instructor) (Formerly Ed. 286)	Ar	Ar	Ar	Mr. Peik
Ed.C.I.287s‡	Instruction and Administration in Teacher Training Institutions (2 cred.; prereq. 15 cred. in ed.) (Formerly Ed. 287)	I-II	S	205bUHS	Mr. Peik

EDUCATIONAL ADMINISTRATION

Major advisers.—Professors Neale, Boardman, and Bossing.

GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Ad.124f	Public School Administration (3 cred.; sr., grad.; prereq. 10 hrs. in ed.)	IX	MWF	210Bu	Mr. Neale
Ed.Ad.125w	Techniques in Administration (3 cred.; sr., grad.; prereq. 124)	IX-X 1 hr. ar.	M	210Bu	Mr. Neale
Ed.Ad.144s	Organization and Administration of Adult Education in Public and Private Agencies (2 cred.; sr.; prereq. consent of instructor)	I-II	S	206UHS	Mrs. May
Ed.Ad.205f,w,s	Problems in Adult Education (2 cred. a qtr.; open to graduate students and professional workers in the field with permission of instructor; prereq. Ed.Psy. 293-294, Ed.C.I. 114, Ed.Ad. 144)	Ar	Ar	Ar	Mrs. May
Ed.Ad.210s*	Financial Aspects of Public School Business Administration (3 cred.; prereq. 124, 125)	I-II 1 hr. ar.	S	111UHS	Mr. Neale
Ed.Ad.226s	School Plant Planning and Management (3 cred.; sr., grad.; prereq. 124, 125)	IX-X 1 hr. ar.	M	224Bu	Mr. Neale
Ed.Ad.228f,w,s*	Special Problems in Educational Administration (1 or 3 cred.; prereq. 124, 125)	Ar	Ar	224Bu	Mr. Neale
Ed.Ad.230f*	Public Relations for Schools (3 cred.; grad.)	I-II 1 hr. ar.	S	111UHS	Mr. Neale
Ed.Ad.235f-236w-237s	Seminar in Educational Administration	Ar	Ar	224Bu	Mr. Neale

ELEMENTARY EDUCATION

Ed.Ad.115w	Organization of the Elementary School (3 cred.; jr., sr., grad.; prereq. 10 hrs. in ed.)	III-IV 1 hr. ar.	S	111UHS	Mr. Neale

* This course may be taken for independent study under Plan B for the Master's degree.
‡ A fee of $1 per credit is charged for this course.

SECONDARY EDUCATION

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Ad.133f	Guidance in Secondary Schools (2 cred.; sr., grad.; prereq. 9 hrs. in ed.) (Formerly Ed. 133)	III-IV	S	Ar	Miss Edwards, Miss Wright
Ed.Ad.167	*Junior High School* (3 cred.; sr., grad.; prereq. 10 hrs. in ed. including Ed. 51) *(Not offered in 1940-41)* (Formerly Ed. 167)				
Ed.Ad.218f-219w-220s	Current Problems in Secondary School Education (Cred. ar.) Fall—Issues in Secondary Education Winter—Critical Analysis of the Co-operative Study of Secondary School Standards Spring—Recent Literature in Secondary Education	IX-X	Th	218Bu	Mr. Boardman, Mr. Bossing
Ed.Ad.264f-265w	High School Administration (3 cred. a qtr.; grad. For third quarter continuation of this course see Ed.C.I. 266. Students may register for any quarter.)	III-IV 1 hr. ar.	S	204bUHS	Mr. Boardman
Ed.Ad.270f,w,s*	Special Problems in Secondary Education (Cred. ar.; maximum 9 cred.)	Ar	Ar	218Bu	Mr. Boardman, Mr. Bossing
Ed.Ad.280f,w,s‡	Practice in High School Administration (2 cred. a qtr.; sr., grad.; prereq. 264-265 or equiv. and consent of instructor)	Ar	Ar	Ar	Mr. Boardman

HIGHER EDUCATION

Ed.Ad.253w	Administration in Higher Education (3 cred.; prereq. consent of instructor) (Formerly Ed. 253)	VII-VIII 1 hr. ar.	T	224Bu	Mr. Neale
Ed.Ad.287s	Instruction and Administration in Teacher Training Institutions (2 cred.; prereq. 15 hrs. in ed.)	I-II	S	205bUHS	Mr. Peik

EDUCATIONAL PSYCHOLOGY

Major advisers.—Professors Miller, Johnson, McConnell, and Wrenn; Associate Professors Cook and Van Wagenen.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Psy.60f	Introduction to Statistical Methods (2 cred.; jr., sr.; prereq. 6 cred. in psy.)	I-II	S	106Pt	
Ed.Psy.60w,s	Introduction to Statistical Methods (3 cred.; see 60f)	II	MWF	106Pt	
Ed.Psy.116w-117s	Statistical Methods in Education (4 cred.; sr., grad.)	IX-X	T	115Psy	Mr. Van Wagenen
Ed.Psy.120f	Basic Principles of Measurement (3 cred.; sr., grad.; prereq. Ed.Psy. 60 or equiv.)	VIII	MWF		Mr. Cook
Ed.Psy.120s	Basic Principles of Measurement (3 cred. See 120f)	III-IV 1 hr. ar.	S	115UHS	Mr. Cook
Ed.Psy.133f	Guidance in Secondary Schools (2 cred.; sr., grad.; prereq. 9 hrs. in ed.)	III-IV	S	Ar	Miss Edwards, Miss Wright
Ed.Psy.138-139†	*Experimental Educational Psychology* (4 cred.; sr., grad.; prereq. 51A or equiv.) *(Not offered)*				

* This course may be taken for independent study under Plan B for the Master's degree.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per credit is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Psy.140w	Tests and Measurements in Elementary and Secondary Education (3 cred.; sr., grad.; prereq. 120 or equiv.)	VII	MWF	Ar	Mr. Cook
Ed.Psy.141w	Group Aptitude Testing (3 cred.; sr., grad.; prereq. 120 or equiv.)	I	MWF	Ar	Mr. Miller
Ed.Psy.142f	Individual Aptitude Testing (3 cred.; sr., grad.; prereq. 120 or equiv.)	4:30-5:45	TTh	210Bu	Mr. Bond
Ed.Psy.143w	Individual Mental Testing Laboratory (2 cred.; prereq. Ed.Psy. 142)	4 hrs. ar.	Ar	Ar	Mr. Bond
Ed.Psy.149f-150w-151s	Psycho-educational Clinic (2 to 6 cred.; sr., grad.; permission of instructor; prereq. 120, 140 and 141 or 142)	Ar	Ar	Ar	Mr. Bond
Ed.Psy.159f	Personality Adjustments in Education (3 cred.; sr., grad.; prereq. 9 hrs. in ed. and psy. including one recent course in psy.)	III-IV 1 hr. ar.	S	Ar	Mr. Wrenn
Ed.Psy.180	*Esthetics in Education* (2 cred.; sr., grad.; consent of instructor) *(Not offered)*				
Ed.Psy.189	*The Human Organism* (3 cred.; sr., grad.; prereq. permission of instructor) *(Not offered)*				
Ed.Psy.201f-202w-203s	Seminar in Educational Psychology	Ar	Ar	301Psy	Mr. Miller, Miss Edwards, Mr. Johnson, Mr. Wrenn, Mr. Bond, Mr. Cook, Mr. Van Wagenen
Ed.Psy.208w	Methods in Educational Research (2 cred.)	IX-X	M	114UHS	Mr. Johnson
Ed.Psy.216f-217w-218s	Statistical Methods in Education (3 cred. a qtr.; grad.)	II	MWF	109Psy	Mr. Johnson
Ed.Psy.225w*	Diagnosis and Counseling in Guidance (3 cred.; prereq. Ed. 133 and Ed.Psy. 120 or equiv.)	I	MWF	Ar	Mr. Wrenn
Ed.Psy.233f,w,s	Problems in Guidance and Personnel Work (Cred. ar.) (Formerly Ed. 233)	Ar	Ar	Ar	Miss Edwards, Mr. Wrenn
Ed.Psy.240f,w,s*	Problems in Measurement (2 cred. a qtr.)	Ar	Ar	Ar	Mr. Johnson
Ed.Psy.243f,w,s	Problems in Statistics for Students in Education and Psychology (With or without credit. Cred. ar.)	Ar	Ar	Ar	Mr. Johnson
Ed.Psy.253f-254w-255s*	Research Problems (Ar.; prereq. consult instructor) (See also Ed.Psy. 233 and Ed.Psy. 240)	Ar	Ar	Ar	Mr. Miller, Mr. Wrenn, Mr. Bond, Mr. Cook, Mr. Van Wagenen
Ed.Psy.281f,w,s	Practice in Personnel Work (2 cred. a qtr.; prereq. satisfactory preparation in psy. and ed. and approval of instructor)	Ar	Ar	Ar	Miss Edwards, Mr. Wrenn, Mr. Darley

* This course may be taken for independent study under Plan B for the Master's degree.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.Psy.290f	Original Nature of Man (3 cred.; prereq. Ed. 51A and 60 or equiv. and permission of instructor)	III	MWF	301Psy	Mr. Miller
Ed.Psy.291w	Individual Differences (3 cred.; prereq. Ed. 51A and 60 or equiv. and permission of instructor)	III	MWF	301Psy	Mr. Miller
Ed.Psy.292s*	Recent Literature in Educational Psychology (3 cred.; prereq. Ed. 51A and 60 or equiv. and permission of instructor)	III	MWF	301Psy	Mr. Miller
Ed.Psy.293w-294s*	Psychology of Learning (3 cred. a qtr.; prereq. 12 cred. in psy. and ed. psy.)	IV	MWF	100Pt	Mr. McConnell
Ed.Psy.293T	*Psychology of Learning* (3 cred. See 293-294. For teachers and administrators) *(Not offered)*				
Ed.Psy.297-298-299	*Problems in Subnormality* (6 cred.; jr., sr., grad.) *(Not offered)*				

ELEMENTARY EDUCATION

Ed.Psy.113f-114w-115s	Psychology of Elementary School Subjects (2 cred. per qtr.; jr., sr., grad.; prereq. 10 cred. in psy. and ed.)	IX-X	W	109Psy	Mr. Van Wagenen
Ed.Psy.146w-147s†	Child Guidance (4 cred.; jr., sr., grad.; prereq. 15 cred. in psy. and ed.)	I-II	S	106Pt	Mr. Challman
Ed.Psy.157	*Psychology of Child Development* (2 cred.; jr., sr., grad.; prereq. 6 cred. in psy.) *(Not offered)* (See Child Welfare 130-131)				
Ed.Psy.182f	Education of Handicapped Children (2 cred.; jr., sr., grad.; prereq. Ed. 51A or 61A or equiv.) (Formerly Ed.C.I. 110)	IX-X	W	100Pt	Mr. Bond
Ed.Psy.183w	Education of Gifted Children (2 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)	IX-X	W	100Pt	Mr. Bond
Ed.Psy.184s	Education of the Slow Learning Child (2 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)	IX-X	W	100Pt	Mr. Bond

SECONDARY EDUCATION

Ed.Psy.158s	Psychology of Adolescence (3 cred.; jr., sr., grad.; prereq. Ed. 51A or equiv.)	III	MWF	106Pt	Miss Edwards

HIGHER EDUCATION

Ed.Psy.252s	Student Personnel Work in College and University (3 cred.; prereq. 250 or 251 or 253 or 254) (Formerly Ed. 252)	VII	MWF		Mr. Wrenn
Ed.Psy.254s	Measurement and Evaluation in Higher Education (3 cred.; 15 hrs. in ed.)	I-II 1 hr. ar.	S	114UHS	Mr. Johnson

HISTORY AND PHILOSOPHY OF EDUCATION

Major advisers.—Professor Wesley; Associate Professor Brameld; Instructor Miss Jean H. Alexander.

GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
H.Ed.71f,w,s	Brief Course in History of Education (5 cred.; jr., sr.; prereq. 6 cred. in psy.) (Formerly Ed. 71)	IV	MTWFS	210Bu	Miss Alexander

* This course may be taken for independent study under Plan B for the Master's degree.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

No.	Title	Hour	Day	Bldg.	Instructor
H.Ed.73	*Educational Sociology* (3 cred.; jr., sr.; prereq. 6 cred. in psy.) *(Not offered)* (Formerly Ed. 73)				
H.Ed.75	*Public Education in the U. S.* (3 cred.; jr., sr.; prereq. 6 cred. in psy.) *(Not offered)* (Formerly Ed. 75)				
H.Ed.76f	Philosophy and American Education (3 cred.; jr., sr.; prereq. 6 hrs. in psy.) (Formerly Ed. 76)	I	MWF	Ar	Mr. Brameld
H.Ed.101f	Historical Foundations of Modern Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.) (Formerly Ed. 101)	VI	MWF	210Bu	Miss Alexander
H.Ed.102w	History of Modern Secondary and Higher Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.) (Formerly Ed. 102)	VI	MWF	210Bu	Miss Alexander
H.Ed.103s	History of Modern Elementary Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy. Not open to students who have had H.Ed. 71) (Formerly Ed. 103)	IX-X 1 hr ar	W	210Bu	Miss Alexander
H.Ed.129-130	*Educational Classics* (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.) *(Not offered)* (Formerly Ed. 129-130)				
H.Ed.131	*Comparative School Systems* (3 cred.; prereq. 9 cred. in ed.) *(Not offered)* (Formerly Ed. 131)				
H.Ed162s	Significance of Progressive Education (2 cred.; sr., grad.) (Formerly Ed.C.I. 162)	IX-X	M	204bUHS	Mr. Brueckner, Mr. Brameld
H.Ed.176f	Conflicting Issues in Modern Education (2 cred.; jr., sr., grad.; not open to students who have taken 76; prereq. 6 hrs. in psy.)	IX-X	M	204aUHS	Mr. Brameld
H.Ed.177w	Philosophic Foundations of Modern Education (3 cred.; jr., sr., grad.; prereq. 76 or 176 or 6 cred. in general philosophy)	I	MWF	Ar	Mr. Brameld
H.Ed.178f	Education and Problems of American Democracy (3 cred.; jr., sr., grad.; prereq. 76 or 176 or 12 cred. in soc. sci.)	II	MWF	Ar	Mr. Brameld
H.Ed.179s	Critical Thinking for Teachers (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.)	I	MWF	Ar	Mr. Brameld
H.Ed.180w	The School and the Social Order (2 cred.; jr., sr., grad.; prereq. 12 cred. in soc. sci.)	IX-X	M	204aUHS	Mr. Brameld
H.Ed.181s	Tutorial Work in Educational Sociology and Philosophy (3 cred.; jr., sr., grad.; prereq. 5 cred. from the following: 76, 176, 177, 178, 179, 180)	II	MWF	Ar	Mr. Brameld
H.Ed.231	*Problems in Comparative Education* (Cred. ar.) *(Not offered)*				
H.Ed.241f-242w-243s*	Problems in the History of Education (2 cred. a qtr.; prereq. permission of instructor)	IX-X	M	Ar	Mr. Wesley
H.Ed.276f,w,s*	Problems in Educational Philosophy and Sociology (Cred. ar.; consult instructor)	Ar	Ar	Ar	Mr. Brameld

ELEMENTARY EDUCATION

H.Ed.103s	History of Modern Elementary Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy. Not open to students who have had H.Ed. 71) (Formerly Ed. 103)	IX-X 1 hr ar	W	210Bu	Miss Alexander

* This course may be taken for independent study under Plan B for the Master's degree.

SECONDARY EDUCATION

No.	Title	Hour	Day	Bldg.	Instructor
H.Ed.102w	History of Modern Secondary and Higher Education (3 cred.; jr., sr., grad.; prereq. 6 cred. in psy.) (Formerly Ed. 102)	VI	MWF	210Bu	Miss Alexander

HOME ECONOMICS EDUCATION

Major advisers.—Professors Wylle B. McNeal and Clara M. Brown; Assistant Professor Ella J. Rose.

Note.—Courses in Home Economics are open to all students in the College of Education who have satisfied the prerequisites or by permission of the chief of the division. For program of courses see page 149.

No.	Title	Hour	Day	Bldg.	Instructor
H.E.Ed.90f,s	Child Training (3 cred.; jr., sr.; prereq. Psy. 1-2)	IV	MWF	213HE	Mrs. Foster
H.E.Ed.90w	Child Training (Same as 90f,s)	IV 1 hr ar	MW	106Pt	Mrs. Foster
H.E.Ed.91f,w‡§	Observation, Materials, Teaching in Home Economics (5 cred.; jr., sr.; prereq. H.E. 4, 34 [or 170], 41, 50, 55, Psy. 1-2, Ed. 51A, 51C, parallel H.E.Ed. 93)	VI	MTWThF	213HE	Miss Rose
		II-III	Th	Ar	Miss Kafka
H.E.Ed.92w,s	Teaching Problems in Home Economics (2 cred.; sr.; prereq. H.E.Ed. 91, 93, parallel H.E.Ed. 94 and H.E.Ed. 192)	VII	TTh	213HE	Miss Rose, Miss Kafka
H.E.Ed.93f,w‡§¶	Supervised Teaching in Home Economics (3 cred.; jr., sr.; prereq. H.E. 4, 34 [or 170], 41, 50, 55, Psy. 1-2, Ed. 51A, 51C, parallel H.E.Ed. 91)	Ar 3 consecutive hrs. daily between 8:15-3:00 and 1 hr. ar.	Ar	Ar	Miss Rose and others
H.E.Ed.94w,s‡¶	Supervised Teaching in Home Economics (3 cred.; sr.; prereq. H.E.Ed. 91, 93, parallel H.E.Ed. 92 and 192)	Ar 3 consecutive hrs. daily between 8:15-3:00 and 1 hr. ar.	Ar	Ar	Miss Rose and others
H.E.Ed.192f	Educational Measurement in Home Economics (3 cred.; grad.; prereq. Ed. 51A or equiv.)	Ar	Ar	Ar	Miss Brown
H.E.Ed.192w,s	Educational Measurement in Home Economics (2 cred.; sr., grad.; prereq. Ed. 51A or equiv., parallel H.E.Ed. 92 and 94)	VIII	TTh	213HE	Miss Clara Brown, Miss Rose
H.E.Ed.193f,w,s	Home Economics Curriculum (2 or 3 cred.; sr., grad.; prereq. or parallel H.E.Ed. 94 or permission of instructor)	Ar	Ar	Ar	Miss Clara Brown, Miss Rose
H.E.Ed.194af	Adult Education Problems (3 cred.; sr., grad.; prereq. H.E.Ed 91, 93 or equiv.)	Ar	Ar	Ar	Miss Krost
H.E.Ed.194bs	Adult Education Problems (3 cred.; sr.; prereq. same as for 194a)	Ar	Ar	Ar	Miss Krost

‡ A fee of $1 per credit is charged for this course.

§ Passing the qualifying examination in English is prerequisite to registration in this course.

¶ A grade of at least C is required in the following courses: H.E. 3, 4, 21, 22, 34 or (170), 40, 41, 55.

No.	Title	Hour	Day	Bldg.	Instructor
H.E.Ed.197f,w,s‡	Organization and Methods for Related Art Teaching (1 to 3 cred.; sr.; prereq. H.E.Ed. 91; H.E. 180 or parallel)	Ar	Ar	Ar	Miss H. Goldstein
H.E.Ed.243f,w,s	Trends in Home Economics (3 cred.)	Ar	Ar	Ar	Miss McNeal, Miss Clara Brown, Miss Rose
H.E.Ed.292w,s*	Educational Measurement Problems (3 cred.; prereq. H.E.Ed. 192)	Ar	Ar	Ar	Miss Clara Brown
H.E.Ed.293f,w,s*	Special Studies in Home Economics Education (1 to 3 cred.; prereq. permission of instructor)	Ar	Ar	Ar	Miss McNeal, Miss Clara Brown, Miss Rose
H.E.Ed.294f,w,s*	Research Problems (1 to 5 cred.; prereq. permission of instructor)	Ar	Ar	Ar	Miss Clara Brown, Miss Rose
H.E.Ed.295f,w,s*	Current Problems (1 to 3 cred.)	Ar	Ar	Ar	Miss McNeal, Miss Clara Brown, Miss Rose

INDUSTRIAL EDUCATION

Major adviser.—Professor Homer J. Smith.

No.	Title	Hour	Day	Bldg.	Instructor
Ind.11f,w,s‡	Special-Class Woodwork (2 cred.; no prereq.; not open to those who have credit in bench woodwork or cabinet making; for teachers of art, subnormal and elementary grade work. Not a part of the four-year curriculum) (Limited to 24)	I-IV	S	6Pt	
Ind.30f	Graphic Presentation (2 cred.; no prereq.)	IX-X	F	202EdH	
Ind.40f	Analysis (2 cred.; no prereq.)	IX-X	Th	202EdH	
Ind.42w	Course Organization (2 cred.; prereq. Ind. 40)	IX-X	Th	202EdH	
Ind.44w	Equipment and Management (2 cred.; prereq. Ind. 40, 42)	III-IV	S	202EdH	
Ind.50Af-50Bw-50Cs‡§	Directed Teaching (6 cred.; sr.; prereq. Ind. 70 or 75, and 80)	Ar	Ar	6Pt	Mr. Micheels
Ind.60f	Philosophy of Vocational Education (2 cred.; no prereq.)	IX-X	M	202EdH	Mr. Widdowson
Ind.61w	Practices in Vocational Education (2 cred.; prereq. Ind. 60)	IX-X	M	202EdH	Mr. Widdowson
Ind.65	*Non-vocational Subjects* (Not a part of the four-year curriculum) *(Not offered)*				
Ind.66w	Related Subjects (2 cred.; prereq. Ind. 40, 42)	IX-X	F	202EdH	
Ind.70s‡	Methods in Shop Subjects (2 cred.; prereq. Ind. 40, 42)	IX-X	F	202EdH	

* This course may be taken for independent study under Plan B for the Master's degree.

‡ A fee of $1 per credit is charged for this course.

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or the subject in which student teaching is done, are prerequisite to registration in this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ind.75s‡	Methods in Drawing (2 cred.; prereq. 10 cred. in drawing or consent of instructor. Not a course in drawing)	IX-X	T	8UHS	
Ind.80f	General Industrial Training (2 cred.; no prereq.) (Not a shop course)	IX-X	T	202EdH	
Ind.81w	The General Shop (2 cred.; jr., sr.; prereq. Ind. 80. Not a shop course)	IX-X	W	202EdH	
Ind.101f	Tests in Industrial Subjects (2 cred.; prereq. Ed. 51A)	I-II	S	Ar	Mr. Widdowson
Ind.103w	Instructional Aids (2 cred.; sr., grad.; prereq. Ind. 40, 42)	IX-X	T	202EdH	
Ind.105w	Industrial Education (3 cred.; jr., sr., grad. Not a part of the four-year curriculum. For certain students in the specialty and for students of administration and supervision, commercial education, etc.)	I-II and 1 hr. ar	S	Ar	Mr. Smith
Ind.107s	Co-ordination (2 cred.; jr., sr., grad.; prereq. Ind. 60, 61 or 105 or consent of instructor)	IX-X	M	202EdH	Mr. Widdowson
Ind.108s	Apprenticeship (2 cred.; jr., sr., grad.; prereq. same as for 107)	IX-X	T	209EdH	
Ind.110w	Guidance in the Schools (3 cred.; jr., sr., grad.; prereq. Ed. 51A. See Ed. 133)	IX-X and 1 hr. ar	F	209EdH	Mr. Smith
Ind.115s	Supervision of Industrial Education (2 cred.; sr., grad.; prereq. Ind. 60, 80, Ed.Ad. 124 or consent of instructor. Not a part of the four-year curriculum. For advanced students in the specialty and for students of administration and supervision)	IX-X	W	202EdH	
Ind.170f	Day Industrial Schools (2 cred.; jr., sr., grad.; prereq. Ind. 60, 61)	IX-X	Th	209EdH	
Ind.171w	Evening Industrial Schools (2 cred.; jr., sr., grad.; prereq. Ind. 170)	IX-X	Th	209EdH	
Ind.172s	Part-time Education (2 cred.; jr., sr., grad.; prereq. Ind. 170, 171)	IX-X	Th	209EdH	
Ind.200f,w,s*	Research Problems (3 to 9 cred.; prereq. admission to Graduate School and consent of instructor)	IX	M	209EdH	Mr. Smith
Ind.250f-251w-252s	Problems in Vocational Education (6 cred.; prereq. admission to Graduate School and consent of instructor. Plan for full year)	IX-X	W	209EdH	Mr. Smith
	Off-Campus Courses and Services	Ar	Ar	Ar	Mr. Widdowson

Shop and Drawing Courses—arranged by Mr. Smith.

Shop and drawing courses are available in wide variety in the Institute of Technology, University campus, and the Division of Agricultural Engineering, Farm campus. Students may elect to pursue courses, day or evening, at the William Hood Dunwoody Industrial Institute without fees other than those paid to the University, except a deposit of $1. All shop and drawing courses should be taken under special advice and may be either extensive or intensive in resultant preparation for teaching. Degree candidates, especially those transferring from other institutions, should bear in mind the maximum of forty-five quarter credits, of shopwork and drawing combined, which is enforced in this department. Twenty credits of shopwork and ten credits of drawing are required. Credits in excess of forty-five will be recorded but will not be counted toward degree requirements. Certain off-campus courses and services will be available. Those interested should consult with members of the Industrial Education staff.

METHODS AND DIRECTED TEACHING

Major adviser.—Associate Professor Carlson.

Time required.—Students registered for practice teaching spend at least one hour a day in observation and teaching. They should get their practice teaching assignment

* This course may be taken for independent study under Plan B for the Master's degree.

‡ A fee of $1 per credit is charged for this course.

before completing their registration for other classes. They should count on spending a minimum of 12 hours a week in all directed teaching courses.

Honor point average.—C+ average (1.5 honor points) per credit in the major or in the subject in which student teaching is done, is required for registration in all special methods and directed teaching courses.

Conference for Student Teachers.—The director of Student Teaching will arrange for a series of conferences which are a part of the required work in directed teaching. The hours at which these conferences are held will be announced in the fall.

Statement of fees.—For all courses in methods, directed teaching, and special methods and directed teaching combined, a fee of $1 per credit is charged. Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or the subject in which student teaching is done is prerequisite to all special methods and student teaching courses. For Clinical Methods and Directed Teaching in Speech Pathology see Ed.C.I. 174-175-176. For methods and directed teaching in special methods see department concerned.

GENERAL COURSES

No.	Title	Hour	Day	Bldg.	Instructor
Ed.T.50w,s‡	Special Methods and Directed Teaching in Health Education for Public Health Nurses (9 cred.; sr., grad.; prereq., permission of instructor)	VII-VIII and 3 hrs. ar	TTh	Ar	Miss Palmer
Ed.T.51Aw‡§¶	Special Methods of Teaching in Schools of Nursing (3 cred.; sr., grad.; prereq. Ed. 51A,B and Nu. 69)	III	MWF	Ar	Miss Petry
Ed.T.51Bs‡§¶	Special Methods of Teaching in the School and Teaching in Schools of Nursing (5 cred.; sr., grad.; prereq. Ed.T. 51A; prereq. or parallel Nu. 71)	III and 2 hrs. ar	MWF	Ar	Miss Petry
Ed.T.52f,w,s‡§	Directed Teaching (5 cred.; sr.; prereq. Special Methods Course)	Ar	Ar	Ar	Mr. Carlson
Ed.T.81‡	*Techniques of Puppetry* (3 cred.; jr., sr.; prereq. 51A or 61A) *(Not offered)*				
Ed.T.85Af-85Bw-85Cs‡	Practice and Field Work in Recreation Leadership (3 cred. for minors, 6 cred. for majors; sr.; prereq. Phys.Ed. 57, 136, Soc. 146, 147)	Ar	Ar	Ar	Mr. Haislet, Mrs. May

ELEMENTARY EDUCATION

Ed.T.53s‡§	Directed Teaching of Subnormal Children (5 cred.; sr.)	Ar	Ar	Ar	Mr. Carlson
Ed.T.54Af-54Bw‡§	Directed Teaching in the Elementary School (3 cred.(f), 5 cred.(w); sr.; prereq. Ed. 61A-B, Ed.C.I. 60, 61)	Ar	Ar	Ar	Mr. Archer
Ed.T.55f‡	Principles of Early Childhood Education (3 cred.; jr., sr.; prereq. C.W. 80 or simultaneously)	VIII	MWF	202Pt	Mrs. Foster
Ed.T.56s‡	Permanent Play Materials (2 cred.; jr., sr.; prereq. Psy. 1-2)	VII	WF	202Pt	Ar
Ed.T.57s‡	Plastic Materials (3 cred.; jr., sr.; prereq. C.W. 80)	VIII	MWF	202Pt	Miss Headley

‡ A fee of $1 per credit is charged for this course.

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or the subject in which student teaching is done, are prerequisite to registration in this course.

¶ An additional section of 51A will be added in the fall quarter and an additional section of 51B will be offered in the winter as a continuation of 51A, if registration warrants.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.T.59w‡	Story Telling for Young Children (2 cred.; jr., sr.; prereq. Ed.T. 55)	V	TTh	202Pt	Miss Headley
Ed.T.64‡§	*Teaching of Geography and History in the Elementary School* (See Ed.T. 54A-54B) *(Not offered)*				
Ed.T.65‡§	*Directed Teaching with Special Methods in Elementary Schools* (3 or 5 cred.; sr.; prereq. approval of instructor) *(Not offered)*				
Ed.T.75f,s‡	Methods and Observation in the Nursery School (3 cred.; sr.; prereq. Ed.T. 55, C.W. 40, Ed.T. 56, 57, 58, 59. Open only to students in home econ. and nursing ed.)	VII	M and ar	Ar	Ar
Ed.T.76Af-76Bw-76Cs†‡§	Methods and Observation (3 cred.; sr.; prereq. Psy. 1-2)	VII	M	202Pt	Mrs. Cummings, Miss Headley
Ed.T.77Af-77Bw-77Cs†‡§	Directed Teaching in Kindergarten or Nursery School (9 cred.; sr.; prereq. Ed.T. 55 to 59 and 76A-B-C)	II and 9 hr. ar	M	100Pt	Mrs. Foster
Ed.T.78A-78B‡	*Methods in Primary Grades* (4 cred.; jr., sr.) *(Not offered)*				

SECONDARY EDUCATION

Ed.T.60Af-60Bw-60Cs†‡§	Special Methods and Directed Teaching in Geography (9 cred.; sr.; prereq. 20 cred. in geography and Ed. 51A-B-C)	VIII and 6 hr. ar	MW	100Pt	Mr. Wesley
Ed.T.61s‡§	Teachers' Course in Norwegian (3 cred.; sr.; prereq. Scand. 4-5-6)	Ar	Ar	122F	
Ed.T.62f,w‡§	Teachers' Course in Swedish (3 cred.; sr.; prereq. Scand. 10-11-12)	VII	MWF	122F	
Ed.T.66Af-66Bw-66Cs†‡§	Special Methods and Directed Teaching in English (9 cred.; sr.; prereq. consent of instructor)	VIII	TTh(f,w)	210Bu	Miss Smith
		VIII and 6 hr. ar	TTh(s)	308F	
Ed.T.66Amf‡§	The Teaching of Composition in the Senior High School (2 cred.; sr.)	VIII	TTh	210Bu	Miss Smith
Ed.T.66Bmw§	The Teaching of Literature in the Senior High School (2 cred.; sr.)	VIII	TTh	210Bu	Miss Smith
Ed.T.67Af-67Bw-67Cs†‡§	Special Methods and Directed Teaching in Mathematics (9 cred.; sr.; prereq. Math. 50 or 60)	VIII and 6 hr. ar	TTh	205aUHS	Mr. Walker
Ed.T.67Amf-67Bmw†‡§	The Teaching of Secondary School Mathematics (4 cred.; sr.; prereq. consent of instructor)	VIII and 1 hr. ar	TTh	205aUHS	Mr. Walker
Ed.T.68Af-68Bw-68Cs†‡§	Special Methods Course and Directed Teaching in Secondary School Science (9 cred.; sr.; prereq. consent of instructor)	IX and 6 hr. ar	MW	6aPt	Mr. Johnson, Mr. Peterson

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per credit is charged for this course.

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or in the subject in which student teaching is done are prerequisite to registration in this course.

No.	Title	Hour	Day	Bldg.	Instructor
Ed.T.68Amf-68Bmw†‡§	Methods of Teaching Secondary School Science (4 cred.; sr.; prereq. consent of instructor)	IX	MW	6aPt	Mr. Johnson, Mr. Peterson
Ed.T.69Af-69Bw-69Cs†‡§	Special Methods and Directed Teaching in the Social Studies (9 cred.; sr.; prereq. 30 cred. in hist. or soc. sci. Consult instructor)	VIII and 6 hr. ar	MW	100Pt	Mr. Wesley
Ed.T.69Amf-69Bmw†‡§	Methods of Teaching the Social Studies (For students with a major in the social studies) (4 cred.; sr.; prereq. consent of instructor)	VIII	MW	100Pt	Mr. Wesley
Ed.T.70Af-70Bw-70Cs†‡§	Special Methods and Directed Teaching in German (9 cred.; sr.; prereq. German Comp. 50-51-52, German Conversation 53-54-55 and 15 additional credits)	IX and 6 hr. ar	MW	114UHS	Miss Will
Ed.T.71Af-71Bw-71Cs†‡§	Special Methods and Directed Teaching in Latin (9 cred.; jr., sr.; prereq. 73 and any two of Latin courses numbered between 50 and 100)	IX and 6 hr. ar	MW	112UHS	Miss Marlowe
Ed.T.72Af-72Bw-72Cs†‡§	Special Methods and Directed Teaching in Romance Languages (9 cred.; sr.; prereq. 20 cred. above French 4. Consult instructor)	IX and 6 hr. ar	TTh	206UHS	Miss Walker
Ed.T.73Af-73Bw-73Cs†‡§	Special Methods and Directed Teaching in Commercial Subjects (9 cred.; sr.; prereq. consent of instructor) Fall—shorthand; winter—typewriting; spring—bookkeeping and junior business training	VIII and 6 hr. ar	MW	111UHS	
Ed.T.74w‡§	Teachers Course in Journalism (3 cred.; jr., sr.; prereq. Jour. 41 or 51)	VII	MWF	10P	Mr. Kildow
Ed.T.88Af-88Bw-88Cs†‡§	Special Methods and Directed Teaching in Speech (9 cred.; prereq. 30 cred. in speech)	IX(f) VIII(s)	TTh	308F	Ar
		VIII(f,w) and 6 hr. ar	TTh	210Bu	Miss Smith
Ed.T.89Amf-89Bmw†‡§	Methods of Teaching the Social Studies (For students with minors in one of the social studies) (4 cred.; prereq. a minor in soc. sci.)	III	MW	100Pt	Mr. Morse

MUSIC EDUCATION

Major advisers.—Professor Scott; Associate Professor Pepinsky; Instructor Hazel B. Nohavec.

Note.—Students following the Music Education Curriculum may elect seven credits in music in addition to the requirements of their curriculum. All other electives must be in academic subjects:

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per credit is charged for this course.

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or in the subject in which student teaching is done are prerequisite to registration in this course.

No.	Title	Hour	Day	Bldg.	Instructor
Mu.Ed.1f	Music Orientation (No cred.; freshmen majoring in music education; no prereq.)	V	TTh	4Mu	Mr. Ferguson, Mrs. Nohavec, and others
Mu.Ed.4f-5w-6s‡	Applied Instrumental Technique (6 cred.; soph.; no prereq.)	I	MTWF	4Mu(f)	Mr. Pepinsky
		VII	MTWF	4NMA(w,s)	Mr. Prescott
Mu.Ed.50Af‡	Primary Methods (2 cred.; jr.; no prereq.)	III	TTh	4Mu	Mrs. Nohavec
Mu.Ed.50Bw‡	Intermediate Methods (2 cred.; prereq. Mu.Ed. 50A)	III	TTh	4Mu	Mrs. Nohavec
Mu.Ed.52s‡	Technique of Teaching Appreciation (1 cred.; jr.; prereq. Ed. 51A)	III	TTh	4Mu	Mrs. Nohavec
Mu.Ed.53s‡	High School Methods (3 cred.; jr.; prereq. Ed. 51A and Mu.Ed. 50A,B)	III	MWF	4Mu	Mrs. Nohavec
Mu.Ed.54w‡	Operetta Production (3 cred.; jr.; prereq. Ed. 51A)	III	MWF	4Mu	Mrs. Nohavec
Mu.Ed.55w‡	Survey and Evaluation of Vocal Materials and Methods (4 cred.; sr.; prereq. Mu.Ed. 50A, 50B, 53)	VI	MTWF	4Mu	Mrs. Nohavec
Mu.Ed.59w‡¶	Choral Literature and Conducting (2 cred. for seniors; 1 cred. for fr., soph., jr.)	V	TTh	106Pt	Mrs. Nohavec
Mu.Ed.60f-61w-62s†‡§	Supervision and Teaching (9 cred.; sr.; prereq. Ed. 51A,B,C and Mu.Ed. 50A,B, 53 and a C+ average in the major)	IX-X and 6 hr. ar	W	4Mu	Mrs. Nohavec
Mu.Ed.63w‡	Band Conducting (2 cred.; jr., sr.; prereq. 4-5-6)	VI	TTh	4NMA	Mr. Prescott
Mu.Ed.64s‡	Band Organization (3 cred.; sr.; prereq. 4-5-6)	VI	MWF	4NMA	Mr. Prescott
Mu.Ed.65w‡	Instrumentation (3 cred.; jr.; prereq. Phys. 15)	II	TThS	4Mu	Mr. Pepinsky
Mu.Ed.68s	Conducting of Instrumental Music and Survey of Materials (4 cred.; sr.; prereq. Mu.Ed. 65)	I-II	MWF	5NMA	Mr. Pepinsky
Mu.Ed.70f	Accompanying and Sight Reading (2 cred.; jr., sr.)	III	TTh	3Mu	Mr. Scott
Mu.Ed.101Es	Tests and Measurements in Music (2 cred.; sr., grad.; prereq. permission of instructor)	VI	TTh	4Mu	Mrs. Nohavec
Mu.Ed.220Ef,w,s	Survey and Application of Research in Music Education (3 cred.; prereq. Mu.Ed. 101)	Ar	Ar	Ar	Mrs. Nohavec
Mu.Ed.224Ef,w,s	Seminar and Individual Research Problems in Music Education (Cred. ar.)	Ar	Ar	Ar	Mrs. Nohavec and others
Mu.Ed.225Ef,w,s‡‡	Advanced Applied Music (2 to 4 cred.; prereq., entrance exam.)	Ar	Ar	Ar	Ar

NURSING EDUCATION

Major adviser.—Professor Densford.

For other courses in Nursing see the bulletins of the School of Nursing and the Medical School. For courses in Nursing Education and in Public Health Nursing see

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per credit is charged for this course.

‡‡ One individual lesson per week, 2 credits, $25; two individual lessons per week, 4 credits, $50.

§ Passing the qualifying examination and a C+ average (1.5 honor points per credit) in the major or in the subject in which student teaching is done are prerequisite to registration in this course.

¶ Four credits are required for Mu.Ed. 59. This course should be repeated until all four credits are earned.

pages 88-91. For specialized curricula in Nursing Education and Public Health Nursing see the College of Education Bulletin. See also Ed.T. 50, 51A, 51B.

No.	Title	Hour	Day	Bldg.	Instructor
Nu.Ed.60s	Ward Administration (4 cred.; sr. nurse or grad. nurse; no prereq.)	VI-VII	TTh	Ar	Miss Densford and others
Nu.Ed.63f	Motion Study (2 cred.)	VI, VII, VIII	Th	202ME	Mr. Koepke
Nu.Ed.65w	Comparative Nursing Procedures (4 cred.; sr. or grad. nurse; prereq. permission of instructor)	VI-VII	TTh	410MeS	Miss Petry and others
Nu.Ed.69f,s	Survey of Conditions and Trends in Nursing (3 cred.; sr., grad.; no prereq.)	IV	MWF	Ar	Miss Densford
Nu.Ed.71s	Curriculum Making in Schools of Nursing (3 cred.; sr., grad.; no prereq.)	VI	MWF	Ar	Miss Petry
Nu.Ed.72w	Teaching and Supervision in Schools of Nursing (3 cred.; sr., grad.; no prereq.)	VI	MWF	Ar	Miss Petry

PHYSICAL EDUCATION FOR MEN

Major advisers.—Associate Professor Keller; Assistant Professors Haislet, Nordly, and Piper; Instructors Bartelma and Gibson.

The courses in sports education are offered by the Department of Physical Education to men students of the University for the purpose of providing instruction and practice in sports of a recreational nature in which men may participate during present and future years for more enjoyable living. The status of these courses in the various colleges is as follows:

1. College of Education—(all except majors and minors in physical education) required with credit.
2. General College—required.
3. The Institute of Technology—elective with credit if taken for three quarters.
4. College of Agriculture, Forestry, and Home Economics—elective with credit if taken for three quarters.
5. University College—elective with credit.
6. All other colleges—elective without credit.

A towel and locker fee of $1.25 per quarter is charged all students using physical education facilities for activity.

The University furnishes uniforms to students for class work or recreational activity for $1 per quarter.

The facilities of the Department of Physical Education, including the golf course, tennis courts, gymnasiums, swimming pools, handball and squash courts, golf gymnasium, table tennis room, and playing fields, are available for use by the general student body. All men are invited to participate in some form of physical activity. For information regarding the intramural and intercollegiate athletic programs see the physical education handbook published by the Department of Physical Education for Men or inquire at the offices in Cooke Hall.

For specialized curriculum in Physical Education for Men, see College of Education Bulletin.

SPORTS EDUCATION

Supervisor of Sports Education.—R. A. Piper.

No.	Title	Hour	Day	Bldg.	Instructor
Phys.Ed.1f,2w,3s	Sports Education (3 cred.) All freshmen in General College and College of Education:				
		III	MWF	CH Gym	Mr. Bartelma,
		IV	MWF		Mr. Beise,
	Fall: Touchball, Swimming, Volleyball				Mr. Boyce,
	Winter: Boxing, Wrestling, Basketball, and Golf				Mr. Brain,
	Spring: Soft Ball, Tennis, Handball, and Squash				Mr. Otterness
					Mr. Thorpe
Phys.Ed.1f,2w,3s	Sports Education. Elective for sophomores in the General College and any men in all other colleges:				
	Beginning Swimming	II	MWF		Mr. Thorpe,
	Intermediate Swimming	II	TThS		Mr. Boyce
	Advanced Swimming	III	MWF	(w,s)	
	Lifesaving	III	TThS		
	Miscellaneous Swimming	VI	MWF		
	Boxing	VIII	MWF	(f,w)	Mr. Haislet
		IX	MWF		
	Badminton	VI	MWF	(w)	Mr. Brain
	Tennis	VII	MWF	(s)	Mr. Brain
	Individual Physical Education Activities (by permission of instructor only)				
		III	MWF	246S	Mr. Osell
		IV	MWF		
		VIII	MWF	(f,w)	
		VII	MWF	(s)	

Substitution of athletic team practice may be allowed by the department to men who rank sufficiently high on the introductory test.

Courses in Major and Minor Curricula in Physical Education for Men

Phys.Ed.4Af-4Bw-4Cs	Fundamentals of Athletic Sports (3 cred.; no prereq.)				
		VII-VIII	TTh	215CH	Mr. MacMillan,
					Mr. Beise,
					Mr. Otterness
Phys.Ed.5Af-5Bw-5Cs	Physical Education Activities (3 cred.; no prereq.)				
		III-IV	T	CH	Mr. Piper
		III	Th		Mr. Bartelma,
					Mr. Beise
Phys.Ed.6Af-6Bw-6Cs	Intramural Sports (3 cred.; all; no prereq.)				
		VII(f,w)	MWF	215CH	Mr. Keller,
					Mr. Gibson
		I(s)	MWF	215CH	Mr. Beise,
					Mr. Thorpe
Phys.Ed.7Af-7Bw-7Cs	Physical Education Activities (3 cred.; soph., jr., sr.) (Formerly Course 19-20-21)				
		II-III	TTh	CHGym	Mr. Piper,
					Mr. Bartelma,
					Mr. Beise
Phys.Ed.8s	Dual Spring Sports (1 cred.; all; no prereq.)				
		VII	MWF	215CH	Mr. Smith,
					Mr. Brain
Phys.Ed.9s	Rhythms (1 cred.; jr., sr.)				
		II	TThS	Ar	Mr. Piper
Phys.Ed.50s	Human Anatomy (4 cred.; soph.; prereq. Zool. 1-2-3 or G.C. 101, 102-103)				
		III-IV	MWF	Ar	Mr. Keys
					and others

No.	Title	Hour	Day	Bldg.	Instructor
Phys.Ed.51f	Mechanics of Movement (3 cred.; jr.; prereq. 50)				
		II	MWF	206CH	Mr. Osell
Phys.Ed.53f‡,54w‡, 55†‡	Methods and Materials in Physical Education (4 cred.; jr.; prereq. 4 cred. from 5A-B-C, 6A,B,C; and 7A-B-C, 8, 9) (Formerly Course 7-8-9 and 54-55)				
	Lect.	V(f,w)	Th	206CH	Mr. Bartelma
	Lab.	Ar			
	Lect.	I(s)	M		
	Lab.	Ar			
Phys.Ed.56w	Nature and Function of Play (2 cred.; sr., grad.; prereq. Psy. 1, 2 or equiv.)				
		VII-VIII	T		Mr. Haislet
Phys.Ed.57s	Operation and Conduct of Play Centers (3 cred.; sr., grad.; prereq. permission of instructor)				
		VII	MWF	206CH	Mr. Haislet
Phys.Ed.60s	Prevention and Care of Injuries (2 cred.; jr.)				
		III	TThS	206CH	Mr. Stein
Phys.Ed.61f	History of Physical Education (2 cred.; sr.)				
		I	MWF	206CH	Mr. Keller
Phys.Ed.63s	Organization and Administration of Physical Education (3 cred.; sr.; prereq. 53, 54, 55)				
		III	MWF	206CH	Mr. Piper
Phys.Ed.66Af,66Bw‡	Methods and Techniques of Officiating (2 cred.; sr.; prereq. 4A,B,C and 6A,B,C)				
	Lect.	VIII	M	206CH	Mr. Piper
	Lab.	Ar			Mr. Smith, Mr. Gibson
Phys.Ed.67s	Coaching of Athletic Sports (Football) (2 cred.; sr.; prereq. 4B and one year experience on Minnesota squad)				
		II	TThS	214CH	Mr. Bierman
Phys.Ed.68f	Coaching of Athletic Sports (Basketball) (2 cred.; sr.; prereq. 4A)				
		VI	MWF	214CH	Mr. MacMillan
Phys.Ed.69s	Coaching of Athletic Sports (Track) (2 cred.; sr.; prereq. 4C)				
		VII and 2 hrs ar	MW	214CH	Mr. Kelly, Mr. Otterness
Phys.Ed.72w	Coaching of Athletic Sports (Baseball) (2 cred.; sr.; prereq. permission of instructor)				
		VI	MWF	214CH	Mr. McCormick
Phys.Ed.73f‡,74w‡, 75s‡	Directed Teaching (6 cred.; sr.; prereq. 4A-B-C; 5A-B-C; 6A-B-C; 7A-B-C; 53, 54, 55)				
		V and 5 hrs. ar	M	214CH	Mr. Bartelma
Phys.Ed.78w	Elements of Scout Leadership (2 cred.; no prereq.)				
		VI	TTh	206CH	Mr. Osell
Phys.Ed.79s	Camp Craft and Camp Administration (2 cred.; no prereq.)				
	Lect.	VI	T	206CH	Mr. Osell
	Lab.	VI-VII	Th		
Phys.Ed.101Ew§	Principles of Physical Education (3 cred.; sr., grad.; prereq. 53, 54, 55)				
		I	MWF	206CH	Mr. Keller, Mr. Haislet
Phys.Ed.103Es§	Physical Examination and Adaptation of Activities (3 cred.; sr., grad.; prereq. 50, 51, Physiol. 50, 51 or equiv.)				
		VI	MWF	206CH	Mr. Keys, Dr. Hauser, Mr. Osell
Phys.Ed.133Ef§	Special Administrative Problems in Physical Education (3 cred.; sr., grad.; prereq. 63 or equiv.)				
		I-II and 1 hr ar	S	206CH	Mr. Nordly

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per credit is charged for this course.

§ The designation "E" after a course number over 100 signifies that the course is of graduate level in the College of Education but does not carry credit for Plans A and B in the Graduate School.

No.	Title	Hour	Day	Bldg.	Instructor
Phys.Ed.134Ew§	The Secondary School and College Curriculum in Physical Education (3 cred.; sr., grad.; prereq. 63, 101E or equiv.)	I-II and 1 hr ar	S	206CH	Mr. Nordly
Phys.Ed.135Es§	Tests and Measurements in Physical Education (3 cred.; sr., grad.; prereq. 10 hrs. in phys. ed. and Ed. Psy. 60 or equiv.)	I-II and 1 hr ar	S	206CH	Mr. Keller
Phys.Ed.136Ef§	Leadership in Recreation (3 cred.; sr., grad.; prereq. 56 or equiv. and 10 hrs. in ed. or permission of instructor)	IX-X	T	206CH	Mr. Haislet
		IX	Th		
Phys.Ed.137Es§	Recent Literature and Research in Health Education, Physical Education, and Recreation (3 cred.; grad.; permission of instructor)	IX-X	T	206CH	Mr. Nordly
		IX	Th		
Phys.Ed.237E	Problems in Health Education, Physical Education, and Recreation (2-6 cred.; grad.; prereq. 137E and Ed. 208; ar.)				Mr. Nordly

PHYSICAL EDUCATION FOR WOMEN

The College of Education offers a specialized curriculum in Physical Education for Women. For curricula see College of Education Bulletin. For schedule of courses see pages 15-20 in this bulletin.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

The College of Education offers specialized curricula in Public Health Nursing and Nursing Education. For curricula see College of Education Bulletin. For class schedule see pages 88-91 in this bulletin.

THEORY AND PRACTICE OF TEACHING

For courses formerly listed in this department, see General Courses, Curriculum and Instruction, and Methods and Directed Teaching.

‡ A fee of $1 per credit is charged for this course.

§ The designation "E" after a course number over 100 signifies that the course is of graduate level in the College of Education but does not carry credit for Plans A and B in the Graduate School.

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

All courses in the College of Agriculture, Forestry, and Home Economics are scheduled on the University Farm campus except those indicated by an asterisk (*).

AGRICULTURAL BIOCHEMISTRY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
2f,w	Quantitative Methods (5 cred.; soph., jr., sr.; prereq. Inorg. Chem. 10 cred.) (Limited to 35)	VI, VII, VIII, IX	MWF	102SnH	Mr. Reitz, Mr. Reid
4f	Introduction to Organic and Biochemistry (5 cred.; soph., jr., sr.; prereq. Inorg. Chem. 10 cred.§)	II	MTWThF	100GH	Mr. Reitz
4w	Introduction to Organic and Biochemistry (Same as 4f)	II	MTWThF	107En	Mr. Reitz
5s	Plant Biochemistry (5 cred.; soph., jr., sr.; prereq. 4, Soils 9 advised)	II	MTWThF	217En	Mr. Reitz
6f	Animal Biochemistry (5 cred.; soph., jr., sr.; prereq. 4, Soils 9 advised)	II	MTWThF	113SnH	Mr. Palmer

Junior and Senior Courses

101f-102w	Agricultural Quantitative Analysis (6 cred.; jr., sr.; prereq. 2)	VI, VII, VIII	MWF	208SnH	Mr. Briggs
103s	Dairy Chemistry (5 cred.; jr., sr.; prereq. 2, 6)				
	Lect.	VI	MWF	113SnH	Mr. Palmer
	Lab.	VII, VIII, IX	MWF	208SnH	Mr. Palmer
108s	Chemistry of Wheat and Wheat Products (3 cred.; jr., sr.; prereq. 5)	II	MWF	211SnH	Mr. Bailey, Mr. Geddes
110s	Flour Laboratory Methods (3 to 5 cred.; jr., sr.; prereq. 101-102 or equiv.)	VI, VII, VIII, IX	MWF	211SnH	Mr. Geddes, Mr. Merritt
113f-114w-115s	Biochemical Laboratory Methods (6 cred.; jr., sr.; prereq. quant. anal., parallel 119, 123)	VI, VII, VIII	TTh	202,208SnH	Mr. Sandstrom, Mr. Evans
116w	Advanced Animal Nutrition (3 cred.; jr., sr.; prereq. 6 or Physiol. Chem. 120 advised)	III	TThS	211SnH	Mr. Palmer, Miss Kennedy
117f,w,s	Laboratory Problems in Animal Nutrition (3 cred.; jr., sr.; prereq. 116, instructor's permission)	Ar	Ar	314SnH	Mr. Palmer, Miss Kennedy
118f,w,s	Laboratory Problems in Biochemistry (3 or 5 cred.; sr.; prereq. 113-114, 119; or 103 or 110)	Ar	Ar	Ar	Ar
119f	Colloids (3 cred.; sr.; prereq. Zool. or Bot. 9 cred., and 5 cred. in Org. Chem. 51-52-153)	III	MWF	113SnH	Mr. Gortner
120w	Proteins (3 cred.; sr.; prereq. 119)	III	MWF	113SnH	Mr. Gortner

§ By special permission of the student's adviser General College Courses 88, 89, 90 will be acceptable as prerequisites.

No.	Title	Hour	Day	Bldg.	Instructor
121w	Carbohydrates (3 cred.; sr.; prereq. 119)	II	MWF	113SnH	Mr. Geddes
122s	The Lipids and Fats (3 cred.; sr.; prereq. 119)	III	TThS	113SnH	Mr. Briggs
123s	Enzymes (3 cred.; sr.; prereq. 119)	III	MWF	113SnH	Mr. Sandstrom

AGRICULTURAL ECONOMICS

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Principles of Economics I (3 cred.; soph., jr., sr.; no prereq.) (Sections limited to 60 each)				
	Sec. 1	I	MWF	109HH	Mr. Lowe
	2	I	TThS	109HH	Mr. Lowe
1w	Principles of Economics I (Same as 1f) (Sections limited to 60 each)				
	Sec. 1	I	TThS	100HH	Mr. Peterson
	2	III	MWF	109HH	Mr. Lowe
2w	Principles of Economics II (5 cred.; soph., jr., sr.; prereq. 1) (Sections limited to 60 each)				
	Sec. 1	I	MTWThF	109HH	Mr. Lowe
	2	III	MTWThF	204So	Mr. Peterson
2s	Principles of Economics II (Same as 2w) (Sections limited to 60 each)				
	Sec. 1	I	MTWThF	109HH	Mr. Peterson
	2	III	MTWThF	109HH	Mr. Lowe
3f,w,s	Principles of Economics (Home Economics) (5 cred.; soph., jr., sr.; no prereq.) (Sections limited to 60 each)	II	MTWThF	109HH	Mr. Lowe
7w	Natural Resources (3 cred.; soph., jr., sr.; no prereq.)	III	TThS	109HH	Mr. Dowell
8s	Rural Economics (3 cred.; soph., jr., sr.; prereq. 2 or 3)	III	TThS	311HH	Mr. Jesness
25f,w	Principles of Accounting (4 cred.; soph., jr., sr. in agr., for., and home econ. only) (Limited to 50)				
	Lect.	II(f)	MWF	311HH	Mr. Koller
		II(w)	TThS	311HH	
	Lab.	VIII, IX	Th	311HH	
30f	Agricultural Prices (3 cred.; soph., jr., sr.; prereq. 2)	II	TThS	312HH	Mr. Peterson
40f,s	Principles of Marketing Organization (3 cred.; soph., jr., sr.; prereq. 2)	I(f)	MWF	312HH	Mr. Cox
		II(s)	MWF	312HH	Mr. Cox
47s	Marketing Accounting (4 cred.; soph., jr., sr.; prereq. 25)				
	Lect.	IV	MWF	311HH	Mr. Koller
	Lab.	VIII, IX	F	311HH	

Junior and Senior Courses

50f§	Farm Finance (5 cred.; jr., sr. in agr. and for. only; prereq. 2)	IV	MTWFS	312HH	Mr. Koller
80s§	Farm Management (3 cred.; jr., sr.)	I	TThS	312HH	Mr. Engene
90f§	Agricultural Statistics (5 cred.; jr., sr.)				
	Lect.	III	TThS	312HH	Mr. Cox
	Lab.	Ar	Ar		
102w	Farm Organization (3 cred.; jr., sr.; prereq. 2) (Limited to 60)	II	TThS	210HH	Mr. Pond
103s	Farm Operation (3 cred.; jr., sr.; prereq. 102) (Limited to 60)	II	TThS	100HH	Mr. Pond
104s	Types of Farming (3 cred.; jr., sr.; prereq. 2)	III	MWF	312HH	Mr. Pond

§ Open to sophomores on petition.

No.	Title	Hour	Day	Bldg.	Instructor
110f-111w	Economics of Agricultural Production I and II (6 cred.; jr., sr.; prereq. 2)				
		I	TThS	312HH	Mr. Dowell
126f,s	Economics of Consumption (3 cred.; jr., sr.; prereq. 2 or 3)				
		I	TThS	100HH	Mr. Waite
131w	Market Prices (3 cred.; jr., sr.; prereq. 30, 40)				
		III	TThS	312HH	Mr. Waite
135s	Methods of Price Analysis (3 cred.; sr.; prereq. 30, 191)				
		III	TThS	312HH	Mr. Waite
140f	Marketing Organization: Staples (3 cred.; jr., sr.; prereq. 40)				
		III	MWF	312HH	Mr. Cox
141w	Marketing Organization: Dairy and Poultry Products (3 cred.; jr., sr.; prereq. 40)				
		II	MWF	312HH	Mr. Jesness
142s	Marketing Organization: Fruits and Vegetables (2 cred.; jr., sr.; prereq. 40)				
		III	MW	311HH	Mr. Cox
143w	Marketing Organization: Livestock and Meats (3 cred.; jr., sr.; prereq. 40)				
		III	MWF	312HH	Mr. Dowell
144f	Co-operative Organization (3 cred.; jr., sr.; prereq. 40)				
		II	TThS	311HH	Mr. Jesness
150s	Advanced Farm Finance (3 cred.; jr., sr.; prereq. 50 or equiv.)				
		2:30-4:00 p.m.	TTh	312HH	Mr. Koller
170s	Land Economics (3 cred.; jr., sr.; prereq. 110)				
		1:30-3:00 p.m.	WF	312HH	Mr. Dowell
191w	Advanced Agricultural Statistics (3 cred.; jr., sr.; prereq. 90)				
		IV	MWF	312HH	Mr. Waite

See also Economics and Business Administration in School of Business Administration section.

AGRICULTURAL ENGINEERING

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
3f,w,s	Mechanical Drawing (3 cred.; no prereq.) (Sections limited to 60 each; spring section open to foresters only)				
		III, IV(f,w)	MWF	303En	Mr. Neubauer
		VII, VIII(s)	MWF	303En	
4s	General Woodworking (3 cred.; no prereq.)				
	Lect.	I	MWF	41En	Mr. Christopherson
	Lab. Sec. 1	VI, VII, VIII	W	48En	
	2	VI, VII, VIII	Th	48En	
5f	Farm Structures Laboratory (3 cred.; prof. agr. eng. only; no prereq.)				
	Lect.	I	TS	41En	Mr. Christopherson
	Lab.	II, III	TS	48En	
7s	Buildings (3 cred.; no prereq.)				
		IV	MWF	305En	Mr. White
11w	Applied Mathematics (5 cred.; high school elementary algebra and plane geometry or their qualitative equivalent) (Sections limited to 20 each)				
	Sec. 1	III	MTWThF	105En	Mr. Manson,
	2	III	MTWThF	106En	Mr. Park
	3	IV	MTWFS	106En	
12s	Agricultural Machinery (3 cred.; no prereq.)				
		I	MWF	216En	Mr. Schwantes
13f,s	Gas Engines (3 cred.; no prereq.) (Limited to 40)				
		VI, VII, VIII(f)	MW	216,37En	Mr. Torrance
	Sec. 1	VI, VII, VIII(s)	WF		
	2	III, IV(s)	MWF		
14f	Tractors (3 cred.; prereq. 13)				
	Lect.	II	TTh	216En	Mr. Torrance
	Lab.	VI, VII, VIII, IX	F	37En	

No.	Title	Hour	Day	Bldg.	Instructor
18s	Agricultural Automotives (4 cred.; prof. agr. eng. only; prereq. Phys. 7)				
	Lect.	VI	TTh	216En	Mr. Torrance,
	Lab.	VII, VIII, IX	TTh	37En	Mr. Strait
19f	Elementary Surveying (3 cred.; prereq. 3, 11 or trigonometry) (Sections limited to 30 each)				
	Lect.	IV	T	105En	Mr. Park
	Lab. Sec. 1	VI, VII, VIII	TTh	305En	Mr. Manson,
	2	VI, VII, VIII	WF	305En	Mr. Park
19s	Elementary Surveying (Same as 19f)				
	Lect.	IV	T	105En	Mr. Park
	Lab.	VII, VIII, IX	TTh	305En	Mr. Manson, Mr. Park
20f	Advanced Surveying (3 cred.; prereq. 19) (Limited to 45)				
	Lect.	IV	M	105En	Mr. Manson, Mr. Park
	Lab.	VII, VIII, IX	M	305En	Mr. Manson,
		VI, VII, VIII	W		Mr. Park
20s	Advanced Surveying (Same as 20f)				
	Lect.	VI	M	105En	Mr. Manson, Mr. Park
	Lab.	VII, VIII, IX	MF	305En	Mr. Manson, Mr. Park
21s	Elements of Surveying (4 cred.; prof. agr. eng. only; prereq. Draw. 3 and M. & M. 12)				
	Lect.	VI	F	105En	Mr. Roe, Mr. Manson
	Lab.	VI, VII, VIII	MW	305En	Mr. Roe
		VII, VIII, IX	F	305En	Mr. Manson, Mr. Park
22s	Agricultural Machinery Laboratory (1 cred.; prereq. 12 or parallel)				
		VI, VII, VIII	T	105En	Mr. Schwantes
23f	General Physics (5 cred.; no prereq.) (Lab. sections limited to 20 each) (Not open for credit to students offering one unit of high school physics for entrance)				
	Lect.	III	TThS	101En	Mr. Hustrulid
	Lab. Sec. 1	I, II	ThS	102En	Mr. Hustrulid
	2	VI, VII	TTh	102En	Mr. Tyler
	3	VIII-IX	TTh	102En	Mr. Hustrulid
23s	General Physics (Same as 23f) (Lab. sections limited to 16 each)				
	Lect. Sec. 1	III	TThS	101En	Mr. Hustrulid
	2	IV	MWF	101En	Mr. Hustrulid
	Lab. Sec. 1	I, II	WF	102En	Mr. Hustrulid
	2	I, II	TS	102En	Mr. Hustrulid
	3	VI, VII	TTh	102En	Mr. Tyler
	4	VI, VII, VIII, IX	M	102En	Mr. Tyler
	5	VI, VII, VIII, IX	W	102En	Mr. Tyler
	6	III, IV	MW	102En	Mr. Tyler
	7	VI, VII, VIII	F	102En	Mr. Hustrulid
	8	VIII, IX	TTh	102En	Mr. Hustrulid
24f	Agricultural Physics I (4 cred.; prereq. Math. 6 or equiv.) (Lab. sections limited to 16 each)				
	Lect.	III	MWF	107En	Mr. Hustrulid
	Lab. Sec. 1	VI, VII	M	102En	Mr. Hustrulid
	2	VIII, IX	M	102En	Mr. Hustrulid
	3	VI, VII	W	102En	Mr. Hustrulid
	4	VI, VII	F	102En	Mr. Hustrulid
	5	VIII, IX	F	102En	Mr. Hustrulid
25w	Agricultural Physics II (4 cred.; prereq. 24)				
	Lect.	I	TThS	107En	Mr. Hustrulid
	Lab. (Same as 24f)			102En	
28w	Land Clearing (2 cred.; no prereq.) (Offered only in even numbered years, 1941-42, etc.)				
		I	TTh	105En	Mr. Schwantes

No.	Title	Hour	Day	Bldg.	Instructor
31w,s	Principles of Drainage (3 cred.; no prereq.)				
		II(w)	MWF	105En	Mr. Roe
		I(s)	MWF	105En	Mr. Manson
32w	Elements of Supplemental Irrigation (2 cred.; no prereq.) (Offered only in odd numbered years, 1940-41, etc.)				
		I	TTh	105En	Mr. Roe, Mr. Park
35w	Household Physics (3 cred.; prereq. 23 or equiv. or G.C. 88)				
		I, II	MWF	103En	Mr. Hustrulid
37f,w,s	Rural Sanitation and Water Supply (3 cred.; no prereq.)				
		I(f)	TThS	101En	Mr. Tyler
		I(w)	MWF	101En	Mr. Tyler
	(Prof. agr. eng. only; prereq. M.&M. 129)				
		I(s)	MWF	101En	Mr. Tyler
40f,s	Mechanical Training (3 cred.; no prereq.)				
		I, II	MWF	20,106En	Mr. Dent
41w	Metal Work (3 cred.; no prereq.)				
		I, II	MWF	20,106En	Mr. Dent, Mr. Strait
43s	Mechanical Laboratory (3 cred.; prof. agr. eng. only; no prereq.)				
		I, II	TThS	20,106En	Mr. Dent, Mr. Strait
44s	Advanced Drawing (2 cred.; prereq. Draw. 3 or equiv.)				
		Ar	Ar	Ar	Mr. Neubauer

Junior and Senior Courses

51w	Land Reclamation (5 cred.; jr. and sr. prof. agr. eng. only; prereq. 21 or parallel, Soils 9, M.&M. 129) (Offered only in even numbered years, 1941-42, etc.)				
		VI	MTWThF	105En	Mr. Roe, Mr. Manson, Mr. Park
52f	Elements of Farm Machinery (3 cred.; prof. agr. eng. only; prereq. M.&M. 26)				
	Lect.	VII	WF	216En	Mr. Schwantes
	Lab.	VII, VIII, IX	M	49En	
53s	Farm Structures (3 cred.; prof. agr. eng. only; prereq. 5, Draw. 3 or equiv.)				
	Lect.	II	TS	305En	Mr. White
	Lab.	III, IV	TS	305En	
67f	Advanced Farm Structures Design (3 cred.; prof. agr. eng. only; prereq. 5, 53, M.&M. 128)				
	Lect.	I	T	305En	Mr. White,
	Lab.	I. II	ThS	305En	Mr. Neubauer
		II	T	305En	
70f	Dairy Engineering (3 cred.; jr., sr.; prereq. 24)				
		I	MWF	105En	Mr. Strait
71f	Design and Economics of Agricultural Machinery (3 cred.; prof. agr. eng. only; prereq. 18, 52, M.E. 27)				
	Lect.	VI, VII	T	105En	Mr. Schwantes
	Lab.	VI, VII, VIII	Th	49En	Mr. Schwantes
72s	Applied Electricity (3 cred.; jr., sr. prof. agr. eng. only; prereq. Phys. 9, or 43, 44) (Offered only in even numbered years, 1941-42, etc. Alternates with Agr. Eng. 73)				
	Lect.	III	MF	101En	Mr. Hustrulid
	Lab.	VI, VII, VIII, IX	W	Ar	
73s	Steam Boilers and Heat Engines (3 cred.; prof. agr. eng. only; prereq. 18 and M.E. 31) (Offered only in odd numbered years, 1940-41, etc. Alternates with Agr. Eng. 72)				
	Lect.	III	MF	216En	Mr. Strait
	Lab.	VI, VII, VIII, IX	W	37En	

No.	Title	Hour	Day	Bldg.	Instructor
101f,102w,103s	Advanced Drainage Problems (2 to 6 cred. per qtr.; sr.; prereq. 51)	Ar	Ar	Ar	Mr. Roe, Mr. Manson, Mr. Park
104f	The Soil Moisture Relation in Agriculture (3 cred.; not open to engineers; prereq. 9 cred. in agr. eng. including phys.)	Ar	Ar	105En	Mr. Roe
111f,112w,113s	Farm Building Problems (2 to 6 cred. per qtr.; prereq. 67)	Ar	Ar	305En	Mr. White, Mr. Christopherson, Mr. Neubauer
114w	Buildings, Equipment, Materials and Methods of Construction (3 cred.; not open to engineers; prereq. 9 cred. in agr. eng. including Agr. Eng. 3 and 4 or equiv.)	Ar	Ar	305En	Mr. White, Mr. Christopherson, Mr. Neubauer
121f,122w,123s	Farm Power and Machinery Problems (2 to 6 cred. a qtr.; jr., sr.; prereq. 126)	Ar	Ar	Ar	Mr. Schwantes
124s	Agricultural Machinery and Mechanical Power Management (3 cred.; not open to engineers; prereq. 9 cred. in agr. eng. including phys. and Agr. Eng. 12)	Ar	Ar	105En	Mr. Schwantes
126w	Selection and Management of Agricultural Machinery (3 cred.; jr., sr.; prereq. 18, 71, Agr. Econ. 102)				
	Lect.	III	MW	103En	Mr. Schwantes
	Lab.	3 hrs. ar			

AGRONOMY AND PLANT GENETICS

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f,s	General Farm Corps (3 cred.; no prereq.)	IV	MWF	107En	Mr. Murphy
21w	Grain Crops (4 cred.; soph., jr., sr.; prereq. 1)				
	Lect.	VI	MWF	217En	Mr. Wilson
	Lab.	VII	MWF	102Ad	Mr. Wilson
22s	Grain and Hay Grading (3 cred.; soph., jr., sr.; prereq. 1)	I, II	MWF	100Ad	Mr. Wilson
23f	Forage Crops (4 cred.; soph., jr., sr.; prereq. 1)	VI, VII	MWF	100Ad	Mr. Arny
31f,w	Principles of Genetics (4 cred.; soph., jr., sr.)				
	Lect.	I	TThS	217En	Mr. Immer
	Lab.	Ar	Ar		Mr. Rinke

Junior and Senior Courses

124s	Problems in Farm Crops (3 cred.; jr., sr.; prereq. 1, 31, and at least two courses from 21, 23, 132, 134. Seniors and special students may register in course with approval of instructor)	III	MWF	102Ad	Mr. Wilson
126f	Crop Judging (4 cred.; jr., sr.; prereq. 22)	VI, VII	MWF	102Ad	Mr. Wilson
132w	Farm Crops Plant Breeding (4 cred.; jr., sr.; prereq. 31)	VI, VII, VIII	TTh	102Ad	Mr. Hayes
133s	Pasture Crops and Management (4 cred.; jr., sr.; prereq. 23)	III, IV	MWF	100Ad	Mr. Arny
134s	Seminar in Agronomy (2 cred.; sr.; prereq. 9 cred.)	Ar	Ar	Sem.Ag.	Staff

ANIMAL AND POULTRY HUSBANDRY

ANIMAL HUSBANDRY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f,w,s	Livestock Production (3 cred.; no prereq.) (Limited to 65)				
		I, II(f,s)	MWF	CSt	Mr. Harvey
		I, II(w)	TThS	CSt	Mr. Johnson
3f-4w	Breeds of Livestock (6 cred.; soph., jr., sr.; prereq. 1)				
		III, IV	TS	WSt	Mr. Ferrin,
		III	Th		Mr. Anderson
5s	Livestock Judging (3 cred.; soph., jr., sr.; prereq. 3-4)				
		III, IV	MWF	CSt	Mr. Harvey

Junior and Senior Courses

50s	Fundamentals of Livestock Production (3 cred.; jr., sr. in forestry or prof. agr. eng. only; no prereq.)				
	Forestry (Offered only in even numbered years) *(Not offered in 1940-41)*	II	MWF	3St	Mr. Ferrin
	Prof. agr. eng. (Offered only in odd numbered years) *(Offered in 1940-41)*	I	TThS	3St	Mr. Ferrin
51w	Meat Selection (3 cred.; jr., sr.; prereq. 1)				
		VI, VII, VIII	WF	MS	Mr. Anderson
52s	Meats (3 cred.; jr., sr.; prereq. 1, 51)				
		VI, VII, VIII	TTh	MS	Mr. Anderson
53f	Advanced Meats (3 cred.; jr., sr.; prereq. 52)				
		VI, VII, VIII	TTh	MS	Mr. Anderson
54w	Utilization of Meats (3 cred.; jr., sr. home econ. students; no prereq.)				
		III	ThS	MS	Mr. Anderson
		III, IV	T		
56f-57w	Livestock Feeding (6 cred.; jr., sr.; prereq. 1)				
		III	MWF	3St	Mr. Ferrin
58f	Market Classes and Marketing of Livestock (4 cred.; jr.; prereq. 3-4)				
		II	TThS	3St	Mr. Peters
		VI, VII, VIII	T	CSt	
101f	Advanced Stock Judging (3 cred.; jr., sr.; prereq. 5)				
		VI, VII	MWF	CSt	Mr. Harvey
107s	Meat Problems (3 cred.; jr., sr.; prereq. 53)				
	Lect.	IV	TS	MS	Mr. Anderson
	Lab.	VI, VII, VIII	F	MS	
108s	Seminar (3 cred.; jr., sr.; prereq. 3-4)				
		II	TThS	3St	Mr. Peters
112w	Animal Breeding (3 cred.; jr., sr.; prereq. Agron. 31)				
		IV	MWF	3St	Mr. Winters
113s	Livestock Management (3 cred.; jr., sr.; prereq. 3-4)				
		III	MWF	3St	Mr. Peters

POULTRY HUSBANDRY

Freshman and Sophomore Courses

1w	Poultry Production (3 cred.; soph.; no prereq.)				
		IV	MWF	102Ve	Mr. Sloan
2w	Poultry Breeds, Varieties, and Culling (3 cred.; prereq. 1 or parallel)				
		VII, VIII	TTh	102Ve	Mr. Canfield

Junior and Senior Courses

50w,s	Poultry Problems (2 to 6 cred.; jr., sr.; prereq. 6 cred. in poultry husb.)				
		Ar	Ar	Ar	Mr. Sloan

No.	Title	Hour	Day	Bldg.	Instructor
51s	Incubation, Brooding, and Breeding (4 cred.; jr., sr.; prereq. 1, Agron. 31)	III	MWF	102Ve	Mr. Canfield
52f	Poultry Judging and Marketing (3 cred.; jr., sr.; prereq. 2)	VII, VIII	TTh	102Ve	Mr. Canfield
103f	Poultry Feeding and Management (3 cred.; jr., sr.; prereq. 1, Agr. Biochem. 4)	IV	MWF	103Ve	Mr. Sloan
104f	Seminar (2 cred.; sr.; prereq. 9 cred. in poultry husb. including 51s, 103f or equiv.)	Ar	Ar	Ar	Mr. Sloan

DAIRY HUSBANDRY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f,s	Elements of Dairying (3 cred.; prereq. entrance cred. in chem. or Inorg. Chem. 1 or 9) (Limited to 90)	III	MWF	100HH	Mr. Combs
2w	Dairy Bacteriology (3 or 5 cred.; 3 cred. for lect., 2 cred. for lab.; soph., jr., sr.; prereq. Bact. 53) (Lecture taken separately only on permission of instructor)				
	Lect.	VI	MWF	210HH	Mr. Macy
	Lab.	VII-VIII	MWF	212HH	Mr. Olson
3f	Testing Dairy Products (2 cred.; prereq. 1)	VII, VIII	MW	210HH	Mr. Olson
4s	Dairy Products Practice (3 cred.; soph., jr., sr.; prereq. 1)	Ar	Ar	Ar	Mr. Combs
9s	Dairy Cattle Judging (1 cred.; soph., jr., sr.; no prereq.)	VI, VII, VIII	F	DB	Mr. Allen
10s	Dairy Products Judging (1 cred.; soph., jr., sr.; prereq. 1)	Ar	Ar	20HH	Mr. Coulter
20s	Household Microbiology (4 cred.; 3rd qtr. fresh., soph., jr., sr.; prereq. approval of adviser and permission of instructor) (Limited to 90)	VI	MF	100HH	Mr. Macy
		VI, VII	W		

Junior and Senior Courses

51s	Market Milk (3 cred.; jr., sr.; prereq. 1, 2)	IV	MW	210HH	Mr. Macy
		VI, VII, VIII	Th		
101f	Milk Production (5 cred.; jr., sr.; prereq. 1)	IV	MTWFS	210HH	Mr. Fitch
103w	Dairy Stock Feeding (3 cred.; sr.; prereq. 101, An. Husb. 56)	II	TThS	312HH	Mr. Fitch
104f	Dairy Stock Selection (2 cred.; jr., sr.; prereq. 9, 101 or parallel)	VI	TTh	210HH	Mr. Allen
105f	Seminar I (1 cred.; sr.; prereq. 3 courses in dairy husb.)	II	S	214HH	Mr. Macy
106w	Seminar II (1 cred.; sr.; prereq. 105)	II	S	214HH	Mr. Macy
110w	Dairy Products: Ice Cream and Frozen Desserts (3 cred.; jr., sr.; prereq. 1, 3)	IV	TS	210HH	Mr. Combs,
		VI, VII, VIII	T		Mr. Coulter
111f	Dairy Products: Butter (3 cred.; jr., sr.; prereq. 1, 2, 3)	VI	MW	210HH	Mr. Combs,
		VI, VII, VIII	F		Mr. Coulter
112s	Dairy Products: Cheese (3 cred.; jr., sr.; prereq. 1, 2, 3)	IV	TS	210HH	Mr. Combs
		VI, VII, VIII	T	210HH	Mr. Coulter
113s	Technical Control (3 cred.; sr.; prereq. 2, 111 or 112)	I, II, III	TTh	210HH	Mr. Coulter, Mr. Olson

No.	Title	Hour	Day	Bldg.	Instructor
114w	Milk By-Products (3 cred.; jr., sr.; prereq. 1, 3)				
		I	TTh	210HH	Mr. Coulter
		II, III	Th	24HH	
115s	Advanced Dairy Bacteriology (3 cred.; sr.; prereq. 2, 111 or 112)				
		I, II	MWF	212HH	Mr. Macy
116s	Milk Secretion (3 cred.; sr.; prereq. physiol. 9 cred. and Agr. Biochem. 103)				
		I	MWF	214HH	Mr. Petersen
117s	Dairy Cattle Breeding (3 cred.; jr., sr.; prereq. 101, 104, Agron. 31)				
		Ar	Ar	Ar	Mr. Petersen

For course in Dairy Chemistry see Agricultural Biochemistry 103, page 138.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
5f,w	Economic Entomology (5 cred.; soph., jr., sr.; prereq. Zool. 14-15 or equiv.) (Section limited to 36)				
		VI, VII, VIII	MWF	301,302Ad	Mr. Ruggles
5s	Economic Entomology (5 cred.; soph., jr., sr.; prereq. Zool. 14-15 or equiv.) (Section limited to 36) (Formerly Course 49s)				
		VI, VII, VIII	MWF	301,302Ad	Mr. Mickel
13su	Field Zoology (1 cred.; no prereq.) Given at Itasca Park				Mr. Mickel, Mr. Hodson
14f,s-15w-16s	Principles of Beekeeping (2 to 6 cred.; no prereq.)				
	(14f-15w-16s)	IV	MF	307Ad	Mr. Tanquary
	(14s)	III	MF		
17f,s-18w-19s	Beekeeping Practice (1 to 3 cred.; prereq. 14-15 or parallel)				
		II, III, IV or ar.	W	307Ad	Mr. Tanquary, Mr. Haydak
20f,w,s	Advanced Beekeeping (2 to 6 cred.; prereq. 14 to 19 and 5 cred. in ent.)				
		Ar	Ar	Ar	Mr. Tanquary

Junior and Senior Courses

51f*§	Introductory Parasitology (5 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.) (Sections limited. Written permission must be obtained from the Junior College office, 106 Folwell Hall)				
		VI, VII, VIII	MWF	208Z	Mr. Riley
52w*§	Introductory Entomology (5 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.) (Sections limited to 20 each)				
	Lect.	VI	MWF	211Z	Mr. Mickel
	Lab. Sec. 1	VII, VIII	MWF	402Z	
	2	VI, VII, VIII	TTh	402Z	
55f,su	Entomological Techniques (9 hrs. lab.; 3 cred.; jr., sr.; ar.)				Mr. Mickel
56f,w	Forestry Entomology (3 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.) (Sections limited to 30)				
		VI, VII, VIII	WF	307Ad	Mr. Hodson
61s	Forest Zoology (3 cred.; jr., sr.; prereq. Zool. 1-2-3)				
		Given at Cloquet			Mr. Hatfield
62su	Wildlife Conservation Principles and Administration (3 cred.; jr., sr.; prereq. Zool. 1-2-3 or equiv.)				
		Given at Itasca Park			Mr. Swanson
64w	Economic Vertebrate Zoology (3 cred.; jr., sr.; prereq. Zool. 1-2-3)				
		I	MWF	301Ad	Mr. Swanson
114s	Apiculture (3 cred.; jr., sr.; prereq. 9 cred. in ent.)				
		I	MW	307Ad	Mr. Tanquary,
		2 hrs. ar.			Mr. Haydak

* Offered on the Minneapolis campus.

§ Open to sophomores on petition.

No.	Title	Hour	Day	Bldg.	Instructor
117f-118w-¶ 119s*	Animal Ecology (9 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)	VI, VII, VIII	TTh	211Z(f,s) 301AdUF(w)	Mr. Eddy, Mr. Hodson
120s	General Ecology of Insects (3 cred.; jr., sr.; alternative to 119s, or both may be taken; prereq. 117f-118w)	VI, VII, VIII	TTh	307Ad	Mr. Hodson
125f-126w-127s*	Advanced General Entomology (9 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)				
	Lect.	I	TTh	211Z	Mr. Mickel
	Lab.	I, II, III	S	402Z	
139f-140w	Histology and Development of Insects (9 cred.; jr., sr.; prereq. 125-126-127 or equiv.)	Ar	Ar	Ar	Mr. Riley
141f-142w	Insects in Relation to Plant Diseases (6 cred.; jr., sr.; prereq. 8 cred. in ent. or plant path.)	I, II	MWF	302Ad	Mr. J. J. Christensen, Mr. Granovsky
144w-145s-146s*	Animal Parasites and Parasitism (3 to 9 cred.; jr., sr.; prereq. Zool. 9 cred.)	VI, VII, VIII	WF	208Z	Mr. Riley
150s	Introduction to Aphidology (3 cred.)	Ar	Ar	Ar	Mr. Granovsky
161f	Waterfowl and Upland Game Birds (3 cred.; jr., sr.; prereq. Zool. 46-47 or equiv.)	III, IV	TS	301Ad	Mr. Swanson
		III	Th		
163f	Mammalogy (3 cred.; jr., sr.; prereq. Zool. 22)	IV	MWF	301Ad	Mr. Hatfield
165w	Game Management (3 cred.; jr., sr.; prereq. 62, 64, 163)	I	TThS	307Ad	Mr. Swanson
166s	Methods in Field Zoology (3 cred.; jr., sr.; prereq. 163, 165)	VI, VII, VIII	TTh	301Ad	Mr. Swanson
175f	Insecticides and Their Action (4 cred.; sr.; prereq. inorg. and org. chem.)	III	MWF	302Ad	Mr. Shepard
		Lab. hrs. ar.			
176w	Advanced Economic Entomology (3 cred.; sr.; prereq. 5 or 56, Zool. 117-118-119 or equiv.)	III	MWF	302Ad	Mr. Ruggles
197f,w,s,su	Introduction to Research (5 or more cred.; sr.; prereq. work as prescribed by the division)	Ar	Ar	Ar	Mr. Riley, Mr. Ruggles, Mr. Tanquary, Mr. Granovsky, Mr. Mickel, Mr. Hodson, Mr. Shepard, Mr. Swanson

FORESTRY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	General Forestry (3 cred.; no prereq.)	III	TThS	100GH	Mr. Cheyney
2su	Field Dendrology (1 cred.; no prereq.)	Given at Itasca Park			
3w	Dendrology (3 cred.; no prereq.)	III	TThS	100GH	Mr. Schmitz

* Offered on the Minneapolis campus.

¶ Note that in the winter quarter this course is offered at the University Farm.

No.	Title	Hour	Day	Bldg.	Instructor
4s	Dendrology (4 cred.; no prereq.)				
	Lect.	II	MWF	100GH	Mr. Schmitz
	Lab. Sec. 1	VI-VII-VIII	T	Ar	Mr. Rees
	2	VI-VII-VIII	Th	Ar	Mr. Rees
5su	Field Silviculture (2 cred.; no prereq.)				
		Given at Itasca Park			Mr. Cheyney
6su	Field Mensuration (1 cred.; no prereq.)				
		Given at Itasca Park			Mr. Brown
7f-8w-9s	Forest Mensuration (9 cred.; all; prereq. 6, Math. 1 and 6)				
	Lect.	IV	MW	100GH	Mr. Brown
	Lab. Sec. 1	VI, VII, VIII	M	206GH	
	2	II, III, IV	S	206GH	
10w	Farm Forestry (3 cred.; not open to students majoring in forestry; no prereq.)				
		VI	MWF	100GH	Mr. Cheyney
11su	Camp Management (1 cred.; no prereq.)				
		Given at Itasca Park			Mr. Brown
20w	Grazing (3 cred.; soph., jr., sr.; no prereq.)				
		II	TThS	203GH	Mr. Allison
49s	House and Furniture Woods (2 cred.; soph., jr., sr.; not open to students majoring in forestry; no prereq.)				
		III, IV	TS	211GH	Mr. Rees

Junior and Senior Courses

53f-54w	Wood Structure and Identification (6 cred.; jr., sr.; prereq. 3, 4)				
	Sec. 1	VI, VII, VIII	WF	211GH	Mr. Rees
	2	VI, VII, VIII	TTh		
56s	Forest Products (3 cred.; jr., sr.; no prereq.)				
		V	MWF	203GH	Mr. Kaufert
57f	Wood Utilization (3 cred.; sr.; prereq. 53-54)				
		II	MWF	203GH	Mr. Kaufert
58w	Lumber Merchandising and Grading (3 cred.; sr.; prereq. 53-54, 152)				
		III	TThS	201GH	Mr. Kaufert
62f	Forest Problems (2 cred.; sr. class.)				
	Sec. 1	VI, VII	Th	206GH	Mr. Brown
	2	VIII, IX	Th	206GH	Mr. Brown
63w	Forest Problems (2 cred.; sr. class.)				
		I	WF	201GH	Mr. Brown
101w	Advanced Dendrology (3 cred.; jr., sr.; prereq. 3, 4)				
		Ar	Ar	Ar	Mr. Rees
111f-112w 111w-112s	Advanced Forest Mensuration (6 cred.; sr.; prereq. 9)				
	Lect. } 111f,w	VI, VII, VIII, IX	T	206GH	Mr. Brown
	Lab. } 112w,s	VI, VII, VIII, IX	Th	206GH	
113f	Wood Pulp and Paper (3 cred.; jr., sr.; prereq. 53-54, Chem. 3 or 10)				
		III	MWF	201GH	Mr. Kaufert
114f	Mechanical and Physical Properties of Wood (3 cred.; jr., sr.; prereq. 53-54, Math. 7)				
		I	TThS	201GH	Mr. Rees
115w-116s	Mechanical and Physical Properties of Wood (6 cred.; jr., sr.; prereq. 114)				
	115w	I, II	TThS	3GH	Mr. Rees
	116s	I, II	MWF	3GH	Mr. Rees
119s	Advanced Wood Structure I (4 cred.; sr.; prereq. 53-54)				
	Lect.	IX	M	209GH	Mr. Kaufert
	Lab.	VI, VII, VIII	MWF	209GH	
125s	Wood Preservation (3 cred.; jr., sr.; prereq. 53-54)				
		III	MWF	201GH	Mr. Kaufert
126f	Silvics (3 cred.; jr., sr.; no prereq.)				
		III	MWF	203GH	Mr. Cheyney
127w	Silviculture (3 cred.; jr., sr.)				
		II	MWF	203GH	Mr. Cheyney
128s	Silviculture Laboratory (6 cred.; jr., sr.; prereq. 127)				
		Given at Cloquet			Mr. Cheyney

No.	Title	Hour	Day	Bldg.	Instructor
129f,w,s	American Silvicultural Practice (3 cred.; jr., sr.; prereq. 126 and 127)	Ar	Ar	Ar	Mr. Cheyney
130f	Forest Valuation (5 cred.; jr., sr.)	I	MTWThF	203GH	Mr. Allison
131w	Forest Policy and Administration (5 cred.; jr., sr.)	IV	MTWFS	203GH	Mr. Allison
132s	Forest Regulation Laboratory (6 cred.; jr., sr.)	Given at Cloquet			Mr. Allison
136f	Forest Economics (3 cred.; jr., sr.; prereq. Agr. Econ. 2)	II	MWF	201GH	Mr. Allison
137w	Seeding and Planting (3 cred.; jr., sr.; prereq. 126 or 127)	III	TThS	203GH	Mr. Cheyney
140f	Forest Working Plans (3 cred.; sr.; prereq. 128, 132)	III	TThS	201GH	Mr. Allison
141f	Principles of Silvics (3 cred.; jr., sr.; prereq. 126)	IV	MWF	203GH	Mr. Cheyney
142s	Wood Chemistry (3 cred.; jr., sr.; prereq. Org. Chem. 52, For. 54)	II	MWF	201GH	Mr. Kaufert
143w	Forest Recreation (3 cred.; jr., sr.)	III	MWF	201GH	Mr. Cheyney
144s	Forage and Browse Plants (3 cred.; jr., sr., grad.; prereq. Bot. 113 and P.P. 7)	Ar	Ar	Ar	Mr. Schmitz
151f,w,s	Logging (3 cred.; jr., sr.)	Ar	Ar	Ar	Mr. Brown
152s	Wood Seasoning (3 cred.; jr., sr.; prereq. 53-54)	I	TThS	201GH	Mr. Rees
155w	Forest Protection (3 cred.; jr., sr.; prereq. 127)	III	MWF	203GH	Mr. Hansen
220-221-222	*Major Report* (2 cred. per qtr.; grad.) *(Not offered in 1940-41)*	Ar	Ar	Ar	Mr. Schmitz, Mr. Allison, Mr. Cheyney
223f-224w-225s	Literature Seminar (1 cred. per qtr.; grad.)	4:00-6:00 p.m.	Th	209GH	Mr. Schmitz

HOME ECONOMICS

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Choice and Care of Clothing (4 cred.; fr.; not open to seniors; no prereq.) (Limited to 60)				
	Sec. 1	II	MTWTh	313HE	Miss Brew
	2 (Open only to 1st qtr. fr.)	III	MTWTh	313HE	Miss Brew
1w	Choice and Care of Clothing (Same as 1f) (Limited to 60)	III	MTWTh	313HE	Miss Lamoreaux
1s	Choice and Care of Clothing (Same as 1f; not open to seniors) (Limited to 60)	I	MTWF	313HE	Miss Brew
2f	Introduction to Textiles (3 cred.; for S.L.&A., Bus. Adm., and Art Ed.; no prereq.) (Limited to 24)	VI, VII	MWF	307HE	Miss Brew
2s	Introduction to Textiles (Same as 2f) (Limited to 24)	VI, VII	MWF	307HE	Miss Lamoreaux
3f	Clothing Construction A (3 cred.; soph.; prereq. 1) (Limited to 24)				
	Sec. 1	VI, VII, VIII	TTh	305HE	Miss Lamoreaux
	2	VI, VII	MWF	304HE	Miss Lamoreaux
3w	Clothing Construction A (Same as 3f) (2 sections—limited to 48)	VI, VII, VIII	TTh	305HE	Miss Lamoreaux
3s	Clothing Construction A (Same as 3f) (Sections limited to 24 each)				
	Sec. 1	III, IV	MWF	305HE	Miss Lamoreaux
	2	VI, VII, VIII	TTh	305HE	Miss Brew

No.	Title	Hour	Day	Bldg.	Instructor
4f	Clothing Construction B (3 cred.; soph., jr.; prereq. 3, 21, and home practice in clothing construction) (2 sections—limited to 48)				
		III, IV	MWF	304HE	Miss Lamoreaux
4w	Clothing Construction B (Same as 4f) (2 sections—limited to 48)				
		I, II	MWF	304HE	Miss Lamoreaux
4s	Clothing Construction B (Same as 4f) (2 sections—limited to 48)				
		I, II	MWF	304HE	Miss Lamoreaux
10f	Introduction to Home Economics (2 cred.; 1st qtr. fr. only; no prereq.)				
		IV	WF	203HE	Miss McNeal and others
15w	Personal Relationships (2 cred.; fr., not open to seniors; no prereq.) (Limited to 60)				
		IV	MW	203HE	Miss Jeary
15s	Personal Relationships (Same as 15w) (Limited to 60)				
	Sec. 1	IV	MW	213HE	Miss Jeary
	2	VI	TTh	203HE	Miss Jeary
20f,w	Introduction to Related Art (4 cred.; fr., not open to seniors; no prereq.) (Limited to 60)				
		III	MTWTh	203HE	Miss V. Goldstein
20s	Introduction to Related Art (Same as 20f,w) (Sections limited to 60 each)				
	Sec. 1	II	MTWTh	203HE	Miss Cox
	2	IV	MTWF	203HE	Miss Cox
21f	Color and Design I (3 cred.; prereq. 20) (Sections limited to 24 each)				
	Sec. 1	I, II	MWF	402HE	Mrs. Weismann
	2	I, II	TThS	402HE	Mrs. Weismann
21w	Color and Design I (Same as 21f) (Limited to 24)				
		VI, VII	MWF	402HE	Miss Cox
21s	Color and Design I (Same as 21f) (Limited to 24)				
	Sec. 1	I, II	MWF	402HE	Miss Segolson
	2	VI, VII, VIII	TTh	402HE	Miss Segolson
22f	Color and Design II (3 cred.; all; prereq. 21) (Limited to 24)				
		VI, VII	MWF	402HE	Miss Cox
22w	Color and Design II (Same as 22f) (Sections limited to 24 each)				
	Sec. 1	III, IV	MWF	402HE	Miss Cox
	2 and 3 (Limited to 48)	VI, VII, VIII	TTh	402HE	Miss Cox, Mrs. Weismann
22s	Color and Design II (Same as 22f) (Limited to 24)				
		VI, VII	MWF	112HE	Miss Cox
23w	Advanced Design (3 cred.; soph., jr.; prereq. 22) (Limited to 24)				
		I, II	TTh	401HE	Mrs. Weismann
24s	Problems in Home Planning and Furnishing (5 cred.; soph.; prereq. 20) (Limited to 24)				
	Sec. 1	III, IV	MTWF	402HE	Miss V. Goldstein
	2	VI, VII, VIII	MW	401HE	Miss Segolson
		VI, VII	F		
25s	Design Applied to Crafts (3 cred.; prereq. 22) (Limited to 24)				
		III, IV	TS	110HE	Mrs. Weismann
		III	Th		
26f	Decorative Needlework and Other Crafts (3 cred.; prereq. 22) (Limited to 24)				
		VI, VII	TTh	402HE	Mrs. Weismann
30s*§	Introduction to Nutrition (2 cred.; not open to home econ. ed. students; no prereq.)				
		VI	TTh	133Ph	Miss Biester
31f	Introduction to Nutrition (3 cred.; fr.; not open to seniors; no prereq.) (Sections limited to 65 each)				
	Sec. 1	I	MWF	213HE	Miss Hunt
	2	II	MWF	213HE	Miss Biester
31w	Introduction to Nutrition (Same as 31f) (Limited to 65)				
		IV	MWF	213HE	Miss Hunt
31s	Introduction to Nutrition (Same as 31f) (Limited to 65)				
		VI	MWF	213HE	Miss Donelson

* Offered on the Minneapolis campus.

§ Intended for students in Science, Literature, and the Arts. Open to students in Home Economics only by special permission of chief of division.

No.	Title	Hour	Day	Bldg.	Instructor
33f	Nutrition I (4 cred.; soph., jr., sr.; prereq. Agr. Biochem. 4, Physiol. 4) (Limited to 24)				
	Lect.	III	MWF	211,213HE	
	Lab.	VI, VII, VIII	T		Miss Donelson
34f	Nutrition Problems (4 cred.; 3rd qtr. soph., jr., sr.; prereq. 31, 40, physiol. or human biol.)				
		I	TWThF	203HE	Miss Biester
40f	Food Preparation (5 cred.; not open to freshmen; prereq. 2 qtrs. chem.) (Sections limited to 24 each)				
	Sec. 1	I, II	MTWThF	103HE	Miss Shepek
	2	III, IV	MTWF	103HE	Miss Worline
		III	Th		
	3	VI, VII	MTWThF	103HE	Miss Worline
40w	Food Preparation (Same as 40f) (Sections limited to 24 each)				
	Sec. 1	I, II	MTWThF	103HE	Miss Shepek
	2	III, IV	MTWF	103HE	Miss Worline
		III	Th		
	3	VI, VII	MTWThF	103HE	Miss Worline
40s	Food Preparation (Same as 40f) (Sections limited to 24 each)				
	Sec. 1	I, II	MTWThF	103HE	Miss Shepek
	2	III, IV	MTWF	103HE	Miss Worline
		III	Th		
	3	VI, VII	MTWThF	103HE	Miss Kafka
41f,w	Food Management and Marketing (5 cred.; soph., jr., sr.; prereq: 31, 40) (Sections limited to 20 each)				
	Sec. 1	III, IV	MTWF	207HE	Miss Chambers
		V	TW		
	2	VI, VII	MWThF	208HE	Miss Chambers
		VIII	MTh		
41s	Food Management and Marketing (Same as 41f,w) (2 sections—limited to 40 each)				
	Sec. 1	III, IV	MTWF	105HE	Miss Chambers
		V	TW	207HE	Miss Gilpin
	2	VII, VIII	MWThF	105HE	Miss Worline
		IX	MTh	207HE	Miss Gilpin

Junior and Senior Courses

50f	Textiles (3 cred.; jr., sr.; prereq. 1) (2 sections—limited to 48)				
		I, II	MWF	305,307HE	Miss Phelps, Miss Gorham
50w	Textiles (Same as 50f) (2 sections—limited to 24 each)				
	Sec. 1	I, II	MWF	305HE	Miss Brew
	2	III, IV	MWF	307HE	Miss Phelps
50s	Textiles (Same as 50f) (Limited to 24)				
		III, IV	MWF	307HE	Miss Gorham
53f	Advanced Clothing (3 cred.; jr., sr.; prereq. 4, 22, 50) (Limited to 24)				
		I, II	MWF	304HE	Miss Carlotta Brown, Miss Gorham
53w	Advanced Clothing (Same as 53f) (Limited to 24)				
		VII, VIII	MWF	305HE	Miss Carlotta Brown, Miss Gorham
53s	Advanced Clothing (Same as 53f) (Limited to 24)				
		VII, VIII	MWF	305HE	Miss Carlotta Brown, Miss Gorham
54w	Problems in Clothing Construction (3 cred.; jr., sr.; prereq. 53 or permission of instructor)				
		III, IV	MWF	304HE	Miss Gorham
55f	Related Art Problems (3 cred.; jr., sr.; prereq. 22 or 56) (Limited to 24)				
		I, II	TThS	401HE	Miss Cox

No.	Title	Hour	Day	Bldg.	Instructor
55w	Related Art Problems (Same as 55f) (Limited to 24)				
	Sec. 1	I, II	MWF	401HE	Miss V. Goldstein
	2	VI, VII	MWF	401HE	Miss H. Goldstein
55s	Related Art Problems (Same as 55f) (Limited to 24)	I, II	MWF	401HE	Mrs. Weismann
55Af-56Bs	Applications of Color and Design (3 cred. each.; not open to home econ. students; no prereq.; courses must be taken in the sequence indicated. Written permission must be obtained from the Junior College office, 106 Folwell Hall) (Limited to 24)				
	56Af	VI, VII, VIII	TTh	401HE	Miss Cox
	56Bs	VI, VII	MWF	402HE	Miss H. Goldstein
61f	Quantity Cookery (4 cred.; jr., sr.; prereq. 40) (Limited to 12)				
	Lect.	I	S	313HE	Miss King, Miss Shepek
	Lab. Sec. 1	VI, VII, VIII	MW	DH	Miss Shepek
	2	I, II, III	TTh	DH	Miss King
61w,s	Quantity Cookery (Same as 61f) (Winter sections limited to 12 each; Sec. 1, spring, limited to 8; Sec. 2, spring, limited to 12)				
	Sec. 1 Lect.	VI	F	106HE	Miss Shepek
	Lab.	VI, VII, VIII	MW	DH	Miss Shepek
	2 Lect.	I	S	313HE	Miss King
	Lab.	I, II, III	TTh	DH	Miss King
62f,w,s	Institution Experience A (3 cred.; jr., sr.; prereq. 40) (Limited to 10)				
	Lect.	IV	M	DH	Miss Dunning
	Lab.	IV, V	WF		
63f,w,s	Institution Experience B (3 cred.; jr., sr.; open only to institution management majors; prereq. 61, 62) (Sections limited to 6 each)				
	Lab. Sec. 1	I, II, III	MW	DH	Miss Dunning
	2	VI, VII, VIII	TTh		Miss King
64f	Institution Buying (4 cred.; jr., sr.; prereq. 61 or parallel, 62 or parallel)				
	Lect.	I	MWF	313HE	Miss King
	Lab.	VI, VII, VIII	F		
70s	Advanced Food Preparation (3 cred.; prereq. Agr. Biochem. 4, H.E. 40)	I, II, III	TTh	105HE	Miss Noble
71	*Demonstrations* (1 cred.; open to 3rd qtr. jr. and sr.) *(Not offered in 1940-41)*				
75f	Dietetics Laboratory (2 cred.; jr., sr.; prereq. 34 or 170) (Limited to 20)	I, II	TTh	107HE	Miss Hunt
75w	Dietetics Laboratory (Same as 75f) (Limited to 20)				
	Sec. 1	I, II	MW	107HE	Miss Donelson
	2	I, II	TTh	107HE	Miss Hunt
76f*	Nutrition (3 cred.; not open to home econ. students; prereq. permission of instructor)	III	TThS	200Pt	Miss Donelson
79s	Selected Problems for Dietitians (3 cred.; jr., sr.; prereq. 170 or equiv.)	II	MWF	213HE	Ar
84f,w,s	Junior-Senior Problems (2 cred.; prereq. permission of instructor under whom student wishes to work)	Ar	Ar	Ar	Staff
85f,w	Home Management: Operation and Maintenance, Lectures (3 cred.; jr., sr.; prereq. 40, H.E.Ed. 90 or C.W. 40 or parallel)	VIII	MWF	203HE	Miss Studley
86f,w,s§	Home Management: Operation and Maintenance, Laboratory (4 cred.; jr., sr.; prereq. 85 or parallel, 40, 185 parallel, H.E.Ed. 90 or C.W. 40) (Sections limited to 14 each)				
	Sec. 1 1st half of quarter	I and other hours	S	Home Mgt. House	Miss Studley
	2 2nd half of quarter				Miss Jeary
98w	Home Economics Extension (3 cred.; sr.; prereq. H.E.Ed. 91 or parallel)	V Anyone taking this course must plan to spend 4 full days in the field.	MW	213HE	Miss Newton, Miss Krost, and others

* Offered on the Minneapolis campus.

§ Students who register for H.E. 86, Section 1, will take H.E. 185 the last half of the quarter, and students who register for H.E. 86, Section 2, will take H.E. 185 the first half of the quarter.

No.	Title	Hour	Day	Bldg.	Instructor
102f,s	Advanced Textiles (3 cred.; jr., sr.; prereq. 50, Agr. Biochem. 4, Agr. Econ. 3 or parallel) (Limited to 16)	VI, VII, VIII	TTh	307,311HE	Miss Phelps
107w	Textile Analysis (3 cred.; jr., sr.; prereq. 102, Agr. Biochem. 2)	VI, VII, VIII	MWF	311HE	Miss Phelps
115w	Clothing Economics (2 cred.; jr., sr.; prereq. 50, Agr. Econ. 3)	III	TTh	213HE	Miss Brew
120f,w,s	Art History and Appreciation (3 cred.; open to Senior College and grad. students only)	VIII	MWF	313HE	Miss H. Goldstein, Miss V. Goldstein
121s	Textile Design (3 cred.; jr., sr.; prereq. 50, 55, 120) (Limited to 24)	VI, VII, VIII	TTh	401HE	Ar
122s	Advanced Interior Design (3 cred.; jr., sr.; prereq. 180, 120 or permission of instructor) (Limited to 20)	I, II	TThS	401HE	Miss V. Goldstein
125w	Advanced Costume Design (3 cred.; jr., sr.; prereq. 4 or permission of instructor, 22; 26 recommended) (Limited to 20)	I, II	TThS	402HE	Miss Cox
142f,w	Experimental Cookery (3 cred.; jr., sr.; prereq. 40, Agr. Biochem. 4) (Limited to 12)	VI, VII, VIII	MW	107HE	Miss Davis
142s	Experimental Cookery (Same as 142f,w)	I, II, III	TTh	107HE	Miss Davis
146s	Special Food Problems (3 cred.; sr.; prereq. 142)	VI, VII, VIII	MW	107HE	Miss Chambers
147s	Special Food Problems (5 cred.; sr.; prereq. 142)	VI, VII, VIII 4 hrs. ar.	MW	107HE	Miss Chambers
163s	Institution Management Problems (3 cred.; sr.; prereq. 61, 62, 64 or parallel)				
	Lect.	III	TTh	313HE	Miss Dunning
	Lab.	III, IV	S	DH	
170f	Nutrition of the Family (3 cred.; jr., sr.; prereq. 31, 40, Agr. Biochem. 4, Physiol. 3 cred.) (Limited to 40)	II	MWF	106HE	Miss Leichsenring
170w	Nutrition of the Family (Same as 170f) (Limited to 40)	I	MWF	313HE	Miss Hunt
171w,s	Child Nutrition (3 cred.; jr., sr.; prereq. 170, H.E.Ed. 90 or C.W. 40) (Limited to 30)				
	Lect.	III	MW	213HE(w)	Miss Leichsenring
		III*	F	213HE(s)	
	Lab.	IV	Ar before completing registration		
173s	Nutrition in Disease (3 cred.; jr., sr.; prereq. 170; 175 also advised)	I	MWF	213HE	Miss Hunt
175w	Nutrition II (4 cred.; jr., sr.; prereq. 33) (Each lab. section limited to 24)				
	Lect.	III	MWF	211HE	Miss Donelson
	Lab.	VI, VII, VIII	T	213HE	
176w	Advanced Nutrition (4 cred.; jr., sr.; prereq. 175 or parallel, Agr. Biochem. 2) (Limited to 12)	II, III, IV	TS	307HE	Miss Biester
		II, III	Th	311HE	
177s	Digestion and Metabolism (3 cred.; jr., sr.; prereq. 175) (Limited to 15)	VI, VII, VIII	TTh	313HE	Miss Leichsenring
178f,w	Clinical Problems in Nutrition (2 cred.; jr., sr.; prereq. 75 or parallel, 170, 175 or parallel) (Limited to 8) (See instructor before completing registration)				
	Lect.	V	M	313HE	Miss Hunt
	Lab.	V, VI, VII, VIII	Th	Ar	
178s	Clinical Problems in Nutrition (Same as 178f,w) (Limited to 8)				
	Lect.	IV	T	313HE	Miss Hunt
	Lab.	V, VI, VII, VIII	Th	Ar	

* Offered on the Minneapolis campus.

No.	Title	Hour	Day	Bldg.	Instructor
179f	Readings in Nutrition (2 cred.; jr., sr.; prereq. 170) (Limited to 15)	III	TTh	213HE	Miss Leichsenring
179w	Readings in Nutrition (Same as 179f) (Limited to 15)	IV	MW	313HE	Miss Leichsenring
179s	Readings in Nutrition (Same as 179f) (Limited to 15)	I	TTh	213HE	Miss Donelson
180f,w,s	Home Planning and Furnishing (5 cred.; jr., sr.; prereq. 55; 120 recommended) (Limited to 24)	III, IV	MTWF	401HE	Miss H. Goldstein
185f,w§	Family Relationships (2 cred.; jr., sr.; prereq. 86 or parallel, H.E.Ed. 90 or C.W. 40)	VII and 1 hr. ar.	MWF	213HE	Miss Studley
185s	Family Relationships (Same as 185f,w)	VI and 1 hr. ar.	MWF	203HE	Miss Studley
186s	Problems in Income Management (3 cred.; prereq. 85 or parallel, 86, 170 or equiv., Agr. Econ. 126 or parallel)	VII	MWF	203HE	Miss Studley

HORTICULTURE

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
6f	Fruit Growing (3 cred.; no prereq.)	II	MWF	102Hr	Mr. Brierley
10s	Home Floriculture (3 cred.; not open to students with credit in Hort. 11 or 56; no prereq.)	III 1 extra lab. hr. ar.	MWF	8Hr	Mr. Longley
11s	Garden Flowers (3 cred. [2 cred. if Course 10 has been taken]; prereq. Bot. 10 cred. or equiv.) (Offered only in odd numbered years) (Offered in 1940-41)	VI, VII, VIII	TTh	8Hr	Mr. Longley
12f	Commercial Floriculture, Fall Crops (3 cred.; prereq. Bot. 1 or equiv.)	VI, VII, VIII	T	8Hr	Mr. Longley
		VI, VII	Th		Mr. Sando
14	*Commercial Floriculture, Spring Crops* (3 cred.; prereq. Bot. 1 or equiv.) (Offered only in even numbered years) *(Not offered in 1940-41)*	VI, VII, VIII	T	8aHr	Mr. Longley
		VI, VII	Th		Mr. Sando
21f	Plant Materials, Fall and Winter Aspects (3 cred.; prereq. Bot. 10 cred. or equiv.)	VI, VII, VIII	MW	8aHr	Mr. Longley
22s	Plant Materials, Spring and Summer Aspects (3 cred.; prereq. Bot. 10 cred. or equiv.)	VI, VII, VIII	MW	8aHr	Mr. Longley
24w	Principles of Landscape Design (3 cred.; prereq. 21 or 22, Draw. and Des. Geom. 41 or Agr. Eng. 3)	VI, VII, VIII	MW	107Hr	Mr. Longley
32s	Vegetable Growing (3 cred.; no prereq.) Lect.	II	MWF	102Hr	Mr. Krantz, Mr. Hutchins
41f	Judging Horticultural Crops (2 cred.; soph., jr., sr.; prereq. 6 or 32) (Offered only in even numbered years) (Offered in 1940-41)	VI, VII, VIII	T	302Hr	Mr. Brierley, Mr. Currence, Mr. Sando

§ Students who register for H.E. 185, Section 1, will take H.E. 86 the last half of the quarter, and students who register for H.E. 185, Section 2, will take H.E. 86 the first half of the quarter.

Junior and Senior Courses

56w	*Plant Propagation* (3 cred.; [2 cred. if Course 10 has been taken); jr., sr.; prereq. Bot. 7 cred. or equiv.) (Offered only in even numbered years) *(Not offered in 1940-41)*				
		VI, VII, VIII	T	8Hr	Mr. Longley
		VI, VII	Th		Mr. Sando
107f	Orchard Management (3 cred.; jr., sr.; prereq. 6) (Offered only in even numbered years) (Offered in 1940-41)				
		III	TTh	106Hr	Mr. Brierley
		VI, VII	Th		
110w	Horticultural Crop Breeding (3 cred.; jr., sr.; prereq. Agron. 31)				
		III	TThS	106Hr	Mr. Wilcox
111f	*Systematic Pomology* (3 cred.; jr., sr.; prereq. 6, Bot. 10 cred. or equiv.) (Offered only in odd numbered years) *(Not offered in 1940-41)*				
		VI, VII, VIII	TTh	106Hr	Mr. Brierley
121w	Small Fruit Culture (3 cred.; jr., sr.; prereq. 6 or 32, Bot. 10 cred. or equiv.)				
		II	MWF	106Hr	Mr. Brierley
135f	Potatoes (3 cred.; jr., sr.; prereq. 32, Bot. 10 cred. or equiv.)				
		Ar	Ar	Ar	Mr. Krantz
137w	Vegetable Crops (3 cred.; jr., sr.; prereq. 32, Bot. 10 cred. or equiv.)				
		Ar	Ar	Ar	Mr. Currence
153w	Conservatory Plants and Florists' Flowers (3 cred.; jr., sr.; prereq. Bot. 10 cred. or equiv.) (Offered only in odd numbered years) (Offered in 1940-41)				
		VI, VII, VIII	T	8aHr	Mr. Longley
		VI, VII	Th		Mr. Sando
176s	Landscape Construction (3 cred.; sr.; prereq. 24) (Offered only in odd numbered years) (Offered in 1940-41)				
		VI, VII, VIII, IX	F	107Hr	Mr. Longley
		1 hr. lect. ar.			
190f-191w-192s	Special Problems (2 to 4 cred. per qtr.; jr., sr.; prereq. instructor's permission)				
		Ar	Ar	Ar	Mr. Alderman and staff
193f-194w	Horticultural Seminar (1 cred. per qtr.; sr.; prereq. Hort. 9 cred.)				
		IX	W	106Hr	Horticultural staff

ORIENTATION

No.	Title	Hour	Day	Bldg.	Instructor
1f,w,s	Freshman Orientation Lectures (1 cred.)				
		IV	T	(f) AudAd (w) 107PP (s) Ar	Mr. Freeman, Mr. Harden

PLANT PATHOLOGY AND BOTANY

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Plant Pathology (5 cred.; soph., jr., sr.; not open to students who have taken Course 10; prereq. 10 cred. in plant sciences of which at least 7 shall be in botany)				
		VII, VIII, IX	MWF	106,107PP	Mr. Stakman, Mr. Moore, Mr. Tervet
1s	Plant Pathology (See 1f)				
		VII, VIII, IX	MWF	106,107PP	Mr. Moore, Mr. Tervet
7w	Grasses and Sedges (3 cred.; fr., soph., jr., sr.; prereq. Bot. 7 cred.)				
		III	TThS	206OD	Mr. Larson
		IV	TS	206OD	

No.	Title	Hour	Day	Bldg.	Instructor
8s	Weeds (3 cred.; fr., soph., jr., sr.; prereq. Bot. 7 cred.) (Each section limited to 40 students)				
	Sec. 1 Lect.	III	TTh	204OD	Mr. Larson
	Lab.	III, IV	S	206OD	
	Rec. and quiz	IV	T	204OD	
	2 Lect.	III	ThS	204OD	
	Lab.	III, IV	T	206OD	
	Rec. and quiz	IV	S	204OD	
9f	Weeds and Seed Testing (3 cred.; fr., soph., jr., sr.; prereq. Bot. 7 cred.)	VI, VII, VIII	TTh	206OD	Mr. Larson
10w	Forest Pathology (5 cred.; soph., jr., sr.; not open to those who have completed Course 1; prereq. Bot. 9 cred.)	VII, VIII, IX	MWF	106,107PP	Mr. C. Christensen
10s	Forest Pathology (Same as 10w)	I	MWF	107PP	Mr. C. Christensen
		I, II	TThS	106,107PP	

Junior and Senior Courses

51f,w,s	Special Problems in Forest Pathology (2 to 5 cred.; jr., sr.; prereq. 10)	Ar	Ar	Ar	Mr. C. Christensen
52w	Seed Problems (3 cred.; jr., sr.; prereq. 9)	Ar	Ar	Ar	Mr. Larson
53s	Food Plants of Game Animals (3 cred.; jr., sr.; prereq. one yr. of bot. and one yr. of zool. or equiv.)	IV	MWF	206OD	Mr. Larson
105f-106w-107s	Mycology (3 or 5 cred. per qtr.; jr., sr.; prereq. 1 or 10 or equiv.)	Ar	Ar	302PP	Miss Dosdall
110w	Principles of Pathology (3 cred.; jr., sr.; prereq. 1 or 10, Bact. 53)	III, IV	MWF	400,104PP	Mr. Stakman, Mr. Eide
111w	Diseases of Field Crops (3 cred.; jr., sr.; prereq. 1 or 10)	VI, VII	MWF	106,107PP	Mr. J. J. Christensen
112s	Diseases of Fruit and Vegetable Crops (3 cred.; jr., sr.; prereq. 1 or 10) (Offered only in odd numbered years) (Offered in 1940-41)	III, IV	MWF	107,104PP	Mr. Eide, Mr. Sharvelle
114w	Advanced Forest Pathology (3 cred.; jr., sr.; prereq. 1 or 10)	Ar	Ar	104PP	Mr. C. Christensen
118f	Bacterial Diseases of Plants (3 cred.; jr., sr.; prereq. 1 or 10)	Ar	Ar	107,104PP	Mr. Eide
119s	Principles of Plant Disease Control (3 cred.; jr., sr.; prereq. 1 or 10)	VI, VII, VIII	TTh	107,104PP	Mr. Sharvelle, Mr. Moore
141f-142w	Insects in Relation to Plant Disease (6 cred.; jr., sr.; prereq. 8 cred. in ent. or plant path.)	I, II	MWF	302Ad	Mr. J. J. Christensen, Mr. Granovsky
143f	Methods (3 cred.; jr., sr.; prereq. 1 or 10)	Ar	Ar	104PP	Miss Hart, Mr. Moore
160f	Plant Histochemistry (3 cred.; sr.; prereq. bot. and elem. chem.)	Ar	Ar	Ar	Mr. Landon

No.	Title	Hour	Day	Bldg.	Instructor
161f	Transport, Storage, and Ripening of Fruits and Vegetables (3 cred.; sr.; prereq. Plant Physiol. 3 cred.)	Ar	Ar	Ar	Mr. Harvey
162w	Physiological Relations of Crop Plants to Temperature (3 cred.; sr.)	Ar	Ar	206PP	Mr. Harvey
163s	Applied Plant Physiology (3 cred.; jr., sr.; prereq. Plant Physiol. 3 cred., Chem. 5 cred.)	Ar	Ar	206PP	Mr. Landon

PUBLICATIONS AND RURAL JOURNALISM

No.	Title	Hour	Day	Bldg.	Instructor
50-51-52	*Agricultural Journalism* (9 cred.; jr., sr.; prereq. Journ. 13-14-15, 51-52 and permission of instructor) *(Not offered in 1940-41)*				
53w	Publicity (3 cred.; jr., sr.; prereq. Rhet. 1, 2, 3)	I	TThS	206OD	

For additional courses see under Journalism, College of Science, Literature, and the Arts, page 62.

RHETORIC

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Rhetoric I (3 cred.; no prereq.) (Sections limited to 35 each)				
	Sec. 1	II	MWF	216En	Mr. Randel
	2	II	TThS	308En	Miss Thurston
	3	I	TThS	312En	Mr. Randel
	4	I	MWF	310En	Mr. Brown
	5	IV	MWF	312En	Mr. Lansing
	6	III	MWF	308En	Miss Thurston
1w	Rhetoric I (Same as 1f) (Limited to 35)	I	MWF	310En	Mr. Brown
1s	Rhetoric I (Same as 1f)	II	TThS	306En	Mr. Randel
2f	Rhetoric II (3 cred.; prereq. 1 or exemption on basis of placement test) (Sections limited to 35 each)				
	Sec. 1	II	MWF	308En	Miss Thurston
	2	III	MWF	105En	Mr. Randel
	3	II	TThS	310En	Mr. Brown
2w	Rhetoric II (Same as 2f) (Sections limited to 35 each)				
	Sec. 1	II	MWF	310En	Mr. Brown
	2	II	TThS	310En	Mr. Brown
	3	III	MWF	310En	Mr. Randel
	4	I	MWF	307En	Mr. Randel
	5	II	MWF	216En	Mr. Randel
	6	III	MWF	308En	Miss Thurston
2s	Rhetoric II (Same as 2f) (Limited to 35)	IV	MWF	310En	Mr. Brown
3f	Rhetoric III (3 cred.; prereq. 2) (Limited to 35)	IV	MWF	310En	Mr. Brown
3w	Rhetoric III (Same as 3f) (Sections limited to 35 each)				
	Sec. 1	III	TThS	216En	Mr. Lansing
	2	IV	MWF	308En	Miss Thurston
	3	II	TThS	216En	Mr. Randel
3s	Rhetoric III (Same as 3f) (Sections limited to 35 each)				
	Sec. 1	II	MWF	310En	Mr. Brown
	2	III	MWF	307En	Mr. Randel
	3	I	TThS	307En	Mr. Nichols
	4	I	MWF	312En	Mr. Lansing
	5	III	TThS	306En	Mr. Randel
	6	II	TThS	312En	Mr. Lansing

No.	Title	Hour	Day	Bldg.	Instructor
11f	Argumentation (3 cred.; soph., jr., sr.; prereq. 3, 22 recommended) (Limited to 20)				
		II	MWF	307En	Mr. Lansing
11s	Argumentation (Same as 11f) (Limited to 30)				
		II	MWF	307En	Mr. Lansing
12f,w	Debate and Discussion (3 cred.; soph., jr., sr.; prereq. 3, 22 recommended)				
		III	TThS	100HH	Mr. Nichols
22f§	Public Speaking (3 cred.; soph., jr.; prereq. 3) (Sections limited to 20 each)				
	Sec. 1	IV	MWF	311En	Mr. Routledge
	2	III	MWF	311En	Mr. Routledge
	3	I	TThS	310En	Mr. Nichols
	4	III	MWF	103En	Mr. Nichols
	5	II	TThS	311En	Mr. Routledge
	6	I	MWF	311En	Mr. Nichols
	7	II	MWF	310En	Mr. Nichols
22w§	Public Speaking (Same as 22f) (Sections limited to 20 each)				
	Sec. 1	IV	MWF	311En	Mr. Routledge
	2	II	MWF	102Ad	Mr. Nichols
	3	III	MWF	311En	Mr. Routledge
	4	III	TThS	311En	Mr. Routledge
	5	II	TThS	311En	Mr. Routledge
	6	I	MWF	311En	Mr. Nichols
	7	I	TThS	307En	Mr. Nichols
22s§	Public Speaking (Same as 22f) (Sections limited to 20 each)				
	Sec. 1	III	MWF	311En	Mr. Routledge
	2	II	TThS	307En	Mr. Nichols
	3	III	TThS	307En	Mr. Nichols
	4	II	MWF	312En	Mr. Nichols
23s§	Public Speaking (5 cred.; soph., jr., sr.; prereq. 3) (Limited to 20)				
		IV	MTWFS	311En	Mr. Routledge
24s	Advanced Public Speaking (3 cred.; soph., jr., sr.; prereq. 22) (Limited to 20)				
		II	MWF	311En	Mr. Routledge
28f	Play Production (3 cred.; soph., jr., sr.; prereq. 3)				
		III	TThS	311En	Mr. Routledge
31f	Survey of English Literature I (5 cred.; soph., jr., sr.; prereq. 3 or permission of instructor) (Limited to 40)				
		III	MTWThF	307En	Mr. Lansing
31w	Survey of English Literature I (Same as 31f) (Limited to 40)				
		II	MTWThF	308En	Miss Thurston
31s	Survey of English Literature I (Same as 31f) (Limited to 40)				
		III	MTWThF	308En	Miss Thurston
32f	Survey of English Literature II (3 cred.; soph., jr., sr.; prereq. 3) (Limited to 40)				
		III	TThS	310En	Mr. Brown
32s	Survey of English Literature II (Same as 32f) (Limited to 40)				
		III	TThS	310En	Mr. Brown
33f,s	American Life in American Literature (3 cred.; soph., jr., sr.; prereq. 3)				
		III	TThS	105En(fall)	Mr. Randel
		I	TThS	306En(spring)	Mr. Randel
34f,w,s	Books and Reading (1 cred.; no prereq.)				
	Sec. 1	II	F	103En(fall)	Mr. Brown
	2	III	F	217En(fall)	
	Sec. 1	IV	F	103En(winter)	
	2	III	F	217En(winter)	
	Sec. 1	I	F	217En(spring)	
	2	III	W	217En(spring)	

Junior and Senior Courses

51f	Exposition (3 cred.; jr., sr.; prereq. 3) (Limited to 35)				
	Sec. 1	III	TThS	308En	Miss Thurston
	2	II	TThS	307En	Mr. Lansing

§ Students may not receive credit for both Rhetoric 22 and 23.

No.	Title	Hour	Day	Bldg.	Instructor
51w	Exposition (Same as 51f)				
	Sec. 1	II	TThS	307En	Mr. Lansing
	2	III	MWF	307En	Mr. Lansing
	3	III	TThS	308En	Miss Thurston
51s	Exposition (Same as 51f)				
	Sec. 1	II	TThS	308En	Miss Thurston
	2	IV	MWF	308En	Miss Thurston
59s	Advanced Play Production (3 cred.; jr., sr.; prereq. 28 or permission of instructor)				
		III	TThS	311En	Mr. Routledge
60w,s	Contemporary Literature (3 cred.; jr., sr.; prereq. 3)				
		IV	MWF	105En	Mr. Lansing

SOILS

Freshman and Sophomore Courses

No.	Title	Hour	Day	Bldg.	Instructor
9w	Soils I (4 cred.; soph., jr., sr.; prereq. Agr. Biochem. 4) (Formerly Course 6w)				
		II	MTWTh	204So	Mr. Rost
10f,s	Soils II. Laboratory (1 cred.; soph., jr., sr.; prereq. Soils 9) (Sections limited to 20 each)				
	Sec. 1	VI, VII, VIII	M	201So	
	2	VI, VII, VIII	T	201So	
	3	VI, VII, VIII	W	201So	
	4	VI, VII, VIII	Th	201So	
	5	VI, VII, VIII	F	201So	

Junior and Senior Courses

50s	Forest Soils (2 cred.; jr. in forestry; prereq. Agr. Biochem. 4)				
		Given at Cloquet			Mr. McMiller
101f	Chemical Analysis of Soils (3 to 5 cred.; jr., sr.; prereq. 9, quant. anal.)				
	Lect.	IV	T	204So	Mr. Rost
	Lab.	Ar	Ar	Ar	
103s	Soil Erosion (3 cred.; jr., sr.; prereq. 9)				
		II	TThS	204So	Mr. Rost
104s	Soil Mapping (3 cred.; jr., sr.; prereq. 108)				
		Ar	Ar	204So	Mr. McMiller
107f	Fertilizers (3 cred.; jr., sr.; prereq. 9)				
		II	TThS	204So	Mr. Rost
108w	Physical Properties of Soils (3 cred.; jr., sr.; prereq. 9 or 50)				
	Lect.	VI	W	204So	Mr. McMiller
	Lab.	VII, VIII, IX	W	201So	Mr. McMiller
		VI, VII, VIII	F	201So	

VETERINARY MEDICINE

Junior and Senior Courses

No.	Title	Hour	Day	Bldg.	Instructor
50f-51w-52s†	Anatomy, Physiology, and Hygiene of Domestic Animals (9 cred.; jr., sr.)				
		I	TThS	102Ve	Mr. Boyd, Mr. Kernkamp

† Course must be taken in sequence 50-51-52 but entire sequence need not be completed in order to receive credit.

SCHOOL OF BUSINESS ADMINISTRATION

ECONOMICS

Junior College advisers.—Associate Professor Borak; Instructors Dreiman, Lund, Nordin, Simpson, Stoltz, Tow, and Nina L. Youngs.

Major advisers in College of Science, Literature, and the Arts.—Professors Garver and Marget; Assistant Professor Myers.

Major sequence in the College of Science, Literature, and the Arts.—A student majoring in Economics is required to earn at least 33 credits in Senior College courses as follows: (1) required courses: Economics 103-104, 141, 161; (2) at least 6 credits from Economics 105, 106, 149, 176, 191-192; (3) at least 6 credits from Economics 154, 160, 172, 185; and (4) 9 additional credits from any Senior College economics courses listed in this bulletin. Students who expect to take postgraduate work in business or economics in this or another university are advised to include in their program the following courses: Economics 5 and 113-114 in statistics; and Economics 25-26 in accounting.

Modifications of this sequence will be permitted upon petition approved by the major adviser and the assistant dean for the Senior College.

(Prerequisites: Economics 3 and 6-7. In addition the student is urged to earn at least 9 credits in History, Political Science, or Sociology.)

Honors Course.—Students whose records show that they are capable of doing better than average work, and who wish to study for graduation honors or to pursue a special interest should consult a major adviser for modification of the sequential requirements.

Junior College Courses

No.	Title	Hour	Day	Bldg.	Instructor
1f	Introduction to Economics (5 cred.; fr. only; no prereq.)				
	Lect.	III	TTh	BuAud	Mr. Filipetti,
	Sec. 1	I	MWF	113VH	Mr. Heaton,
	2	I	MWF	221VH	and others
	3	I	TThS	205VH	
	4	II	MWF	221VH	
	5	II	TThS	14P	
	6	III	MWF	205VH	
	7	III	MWF	6VH	
	8	IV	MWF	101F	
	9	IV	MWF	112Bu	
	10	V	MWF	210VH	
	11	V	MWF	113VH	
	12	VI	MWF	113VH	
	13	VI	MWF	105VH	
	14	VII	MWF	301VH	
1w	Introduction to Economics (See 1f)				
	Lect.	III	TTh	166Ph	Mr. Filipetti,
	Sec. 1	I	TThS	301VH	Mr. Heaton,
	2	IV	MWF	4VH	and others
1s	Introduction to Economics (See 1f)				
		IV	MTWFS	211VH	

No.	Title	Hour	Day	Bldg.	Instructor
3f	Elements of Money and Banking (5 cred.; 2nd and 3rd qtr. fr., soph.; no prereq.)				
	Lect.	II	TTh	JAud	Mr. Stehman
	Sec. 1	I	MWF	205VH	and others
	2	II	MWF	211VH	
	3	III	MWF	2VH	
	4	III	TThS	113VH	
	5	V	MWF	2VH	
	6	VII	MWF	113VH	
3w	Elements of Money and Banking (See 3f)				
	Lect.	III	TTh	BuAud	Mr. Stehman
	Sec. 1	I	MWF	211VH	and others
	2	I	MWF	105VH	
	3	I	TThS	307VH	
	4	II	MWF	221VH	
	5	II	MWF	110F	
	6	II	TThS	211VH	
	7	III	MWF	113VH	
	8	III	MWF	205VH	
	9	IV	MWF	1 VH	
	10	IV	MWF	301VH	
	11	V	MWF	221VH	
	12	V	MWF	211VH	
	13	VI	MWF	210VH	
	14	VI	MWF	205VH	
	15	VII	MWF	207VH	
3s	Elements of Money and Banking (See 3f)				
	Lect.	IV	MW	150Ph	Mr. Stehman
	Sec. 1	I	MWF	2VH	and others
	2	III	MWF	211VH	
	3	III	TThS	6VH	
	4	VI	MWF	205VH	
	5	VII	MWF	205VH	
5f*	Elements of Statistics (5 cred.; 3rd qtr. fr., soph.; no prereq.)				
	Lect.	III	M	JAud	Mr. Kozelka
	Sec. 1	I	MWThF	301VH	and others
	2	II	MTWF	105VH	
	3	IV	MTWF	205VH	
	4	V	MTWF	205VH	
	5	VI	MWThF	210VH	
5w*	Elements of Statistics (See 5f)				
	Lect.	III	M	JAud	Mr. Kozelka
	Sec. 1	I	MWThF	221VH	and others
	2	IV	MTWF	2VH	
	3	VI	MWThF	113VH	
5s*	Elements of Statistics (See 5f)				
	Lect.	III	T	BuAud	Mr. Kozelka
	Sec. 1	I	MWThF	115VH	and others
	2	I	MWThF	211VH	
	3	II	MWThF	211VH	
	4	II	MWThF	221VH	
	5	III	MWThF	115VH	
	6	III	MWThF	112VH	
	7	III	MWThF	113VH	
	8	IV	MTWF	6VH	
	9	IV	MTWF	113VH	
	10	V	MTWF	211VH	
	11	V	MTWF	115VH	
	12	VI	MWThF	210VH	
	13	VI	MWThF	112VH	
	14	VII	MWThF	211VH	

* Not open to students who have received credit in Soc. 45 or B. A. 70.

No.	Title	Hour	Day	Bldg.	Instructor
6f-7w†§	Principles of Economics (10 cred.; soph., jr., sr.; no prereq.)				
	Lect.	II	F	BuAud	Mr. Marget
	Sec. 1	I	MWThF	115VH	and others
	2	I	MWThF	112VH	
	3	II	MTWTh	113VH	
	4	II	MTWTh	112VH	
	5	III	MWThF	115VH	
	6	III	MWThF	112VH	
	7	IV	MTWF	115VH	
	8	IV	MTWF	221VH	
	9	V	MTWF	115VH	
	10	V	MTWF	112VH	
	11	VI	MWThF	115VH	
	12	VI	MWThF	112VH	
	13 (fall only)	VI	MWThF	211VH	
	14	VII	MWThF	2VH	
	15	VII	MWThF	112VH	
6w-7s†	Principles of Economics (See 6f-7w)				
	Lect.	IV	T	150Ph	Mr. Marget
	Sec. 1	I	MWThF	113VH	and others
	2	II	MWThF	115VH	
	3	III	MWThF	2VH	
	4 (winter only)	IV	MWFS	210VH	
	5	V	MTWF	113VH	
	6	VI	MWThF	211VH	
	7	VII	MWThF	113VH	
6s†	Principles of Economics (1st qtr. of 6-7. See 6f-7w)				
	Lect.	II	F	4VH	Mr. Marget
	Sec. 1	II	MTWTh	112VH	and others
	2	VII	MWThF	112VH	
7f†	Principles of Economics (2nd qtr. of 6-7. See 6f-7w)				
	Lect.	IV	T	1 VH	Mr. Marget
	Sec. 1	II	MWThF	115VH	and others
	2	VII	MWThF	115VH	
8f-9w	General Economics (6 cred.; soph., jr., sr., open to Institute of Technology students only; no prereq.)				
	Sec. 1	I	MWF	2VH	Mr. Filipetti
	2 (fall only)	I	MWF	211VH	and others
	3	II	MWF	210VH	
	4	III	MWF	211VH	
	5	IV	MWF	211VH	
8w-9s	General Economics (See 8f-9w)				
		III	TThS	210VH	Mr. Filipetti and others
10f	An Introduction to Economic Analysis (3 cred., open to College of Pharmacy students only; no prereq.)				
		I	MWF	202Phm	Ar
20f¶	Elements of Accounting (3 cred.; 3rd qtr. fr., soph.; no prereq.)				
	Sec. 1	I	MWF	210VH	Mr. Heilman
	2	I	TThS	221VH	and others
	3	II	MWF	307VH	
	4	II	MWF	301VH	
	5	II	TThS	301VH	
	6	III	MWF	301VH	
	7	III	MWF	210VH	

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

§ The final examination in this course will conflict with that of any course having lectures the same hour on MW. Therefore, students must not register for two such courses.

¶ Students who have had high school training or other experience in bookkeeping and who pass a placement test may be exempt from this course and admitted to Econ. 25. This placement test will be given on the first day of each quarter. For further information consult the office of the dean of the School of Business Administration.

No.	Title	Hour	Day	Bldg.	Instructor
20f§	Elements of Accounting—*Continued*				
	8	III	TThS	301VH	
	9	IV	MWF	307VH	
	10	IV	MWF	301VH	
	11	V	MWF	221VH	
	12	VI	MWF	221VH	
	13	VII	MWF	221VH	
20w§	Elements of Accounting (See 20f)				
	Sec. 1	I	MWF	210VH	Mr. Heilman
	2	II	MWF	307VH	and others
	3	III	MWF	307VH	
	4	III	TThS	221VH	
	5	V	MWF	307VH	
	6	VII	MWF	307VH	
20s§	Elements of Accounting (See 20f)				
	Sec. 1	I	MWF	221VH	Mr. Heilman
	2	II	MWF	307VH	and others
	3	III	MWF	205VH	
	4	III	TThS	205VH	
	5	IV	MWF	115VH	
	6	VII	MWF	307VH	
25f-26w	Principles of Accounting (6 cred.; soph., jr., sr.; prereq. Econ. 20)				
	Sec. 1	II	TThS	307VH	Mr. Heilman
	2	III	TThS	205VH	and others
	3 (fall only)	V	MWF	211VH	
	4	VII	MWF	211VH	
25w-26s	Principles of Accounting (See 25f-26w)				
	Sec. 1	I	MWF	301VH	Mr. Heilman
	2	II	MWF	301VH	and others
	3	II	TThS	301VH	
	4	III	MWF	301VH	
	5	III	TThS	301VH	
	6 (winter only)	IV	MWF	307VH	
	7	VI	MWF	307VH	
	8 (winter only)	VII	MWF	1 VH	
25s	Principles of Accounting (1st qtr. of 25-26. See 25f-26w)				
	Sec. 1	I	MWF	210VH	Mr. Heilman
	2	II	TThS	210VH	and others
	3	III	MWF	307VH	
	4	IV	MWF	307VH	
26f	Principles of Accounting (2nd qtr. of 25-26. See 25f-26w)				
	Sec. 1	II	TThS	211VH	Mr. Heilman
	2	III	TThS	221VH	and others
	3	VII	MWF	307VH	
27s*	Accounting Survey (5 cred.; open to prelegal students only; no prereq.)				
	Sec. 1	IV	MTWFS	221VH	Mr. Miller
	2	VI	MTWThF	115VH	Mr. Miller
	3	VI	MTWThF	4VH	Mr. Dein
28f	Business Law (3 cred.; soph., jr., sr. with 6 cred. in econ. or sr. without econ. cred., open to Institute of Technology and College of Agriculture students only)				
		I	MWF	135E	Mr. Palmer
28s	Business Law (See 28f)				
		I	MWF	335EE	Mr. Palmer
29f	Principles of Accounting (3 cred.; soph., jr., sr., open to Institute of Technology students only; no prereq.)				
		IV	MWF	112VH	Mr. Lund
29s	Principles of Accounting (See 29f)				
		I	MWF	307VH	Mr. Lund

* Not open to students who have received credit in Econ. 20, 25-26.

§ Students who have had high school training or other experience in bookkeeping and who pass a placement test may be exempt from this course and admitted to Econ. 25. The placement test will be given on the first day of each quarter. For further information consult the office of the dean of the School of Business Administration.

No.	Title	Hour	Day	Bldg.	Instructor
30w	Elements of Retail Accounting (3 cred.; open to College of Pharmacy students only; prereq. Econ. 10)	II	MWF	211VH	Mr. Ostlund
32f-33w*†‡¶	Secretarial Training: Typewriting (2 cred.; 2nd qtr. fr., soph., jr.; prereq. consent of instructor)				
	Sec. 1	IV	MTWFS	209VH	Miss Lohren
	2 (presecretarial and pre-commercial education students only)	VII	MTWThF	209VH	Miss Lohren
32w-33s*†‡¶	Secretarial Training: Typewriting (See 32f-33w)	V	MTWThF	209VH	Miss Lohren
34f‡¶	Secretarial Training: Advanced Typewriting (1 cred.; soph., jr.; prereq. consent of instructor)	V	MTWThF	209VH	Miss Lohren
34s‡¶	Secretarial Training: Advanced Typewriting (See 34f)	VII	MTWThF	209VH	Miss Lohren
35s	Office Practice for Dental Hygienists (3 cred.; jr., sr., open to dental hygienists only; prereq. Econ. 32-33 or equiv.)	IV	MWF	209VH	Miss Kean
37f-38w-39s†‡¶**	Secretarial Training: Shorthand (9 cred.; soph., jr.; prereq. Econ. 33 or consent of instructor)				
	Secretarial students	II	MTWThF	209VH	Miss Donaldson
	Commercial education students	III	MTWThF	209VH	and others
40f-41w-42s†‡¶**	Secretarial Procedure (9 cred.; soph., jr.; prereq. Econ. 34 and 39 or consent of instructor)				
	Secretarial students	I	MTWThF	209VH	Miss Kean
	Commercial education students	VI	MTWThF	209VH	Miss Kean(f,w), Miss Donaldson(s)

Senior College Courses

82f§‖	Competition and Monopoly in Modern Industry (3 cred.; jr., sr.; no prereq.)	II	TThS	205VH	Mr. Vaile
83w§‖	The Inequality of Incomes (3 cred.; jr., sr.; prereq. Econ. 82)	II	TThS	205VH	Ar
84s	Comparative Economic Systems (3 cred.; jr., sr.; prereq. Econ. 6-7 or 83)	I	TThS	205VH	Mr. Upgren
97f,98w,99s	Honors Course in Economics (Cred. ar.; jr., sr.; prereq. consent of major advisers)	Ar	Ar	Ar	Ar
103f-104w†	Advanced Economics (6 cred.; jr., sr., grad., not open to School of Business Administration students; prereq. 20 cred. in soc. sci. including Econ. 6-7 or 83)	II	TThS	210VH	Mr. Garver
105	*History of Economic Ideas: The Classical Economists* (3 cred.; jr., sr., grad.; prereq. B. A. 101-102 or Econ. 103-104 or consent of instructor) *(Not offered)*				
106s	History of Economic Ideas: The Critics of the Classical Economists (3 cred.; jr., sr., grad.; prereq. B. A. 101-102 or Econ. 103-104 or consent of instructor)	VII	MWF	207VH	Mr. Stigler
108s	Applications of Economic Theory (3 cred.; jr., sr., grad.; prereq. B. A. 101-102 or Econ. 103-104)	VI	MWF	221VH	Mr. Stigler

* Students who have had one year of high school typewriting are admitted to Econ. 33.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $2.50 a quarter is charged students registering for one or more of these courses.

§ Not open to students who have received credit for Econ. 6-7.

¶ This course carries credit only if required in the student's major sequence.

‖ This course may not be included as a part of the Senior College work required for a minor in economics in the College of Science, Literature, and the Arts.

** Students who have had one year of high school shorthand are admitted to Econ. 38; those who have had two years of high school shorthand are admitted to Econ. 40.

No.	Title	Hour	Day	Bldg.	Instructor
110s	Industrial Price Control (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83 and 15 additional credits in economics and/or business administration. Econ. 160 or B. A. 155 is a desirable preceding course)	I	TThS	210VH	Mr. Garver
113w-114s†	Theory of Statistics (6 cred.; jr., sr., grad.; prereq. Econ. 5)	I	MWF	205VH	Mr. Mudgett
115w	Probability and Statistics (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	IV	MWF	112VH	Mr. Altschul
117w	Contemporary European Economic Problems (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	VII	MWF	205VH	Mr. Altschul
124	*Comparative Banking: British Systems* (3 cred.; jr., sr., grad.; prereq. Econ. 141 or B. A. 142) *(Not offered)*				
125	*Comparative Banking: European Systems* (3 cred.; jr., sr., grad.; prereq. Econ. 141 or B. A. 142) *(Not offered)*				
127	*Comparative Banking: South American Systems* (3 cred.; jr., sr., grad.; prereq. Econ. 141 or B. A. 142) *(Not offered)*				
128s	Business Cycle Theory in European Literature (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	IV	MWF	112VH	Mr. Altschul
131f	Introduction to Mathematical Analysis in Economics (3 cred.; sr., grad.; prereq. Econ. 6-7 or 83)	III	TThS	210VH	Mr. Altschul
140s	The Co-operative Movement (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	VI	MWF	1 VH	Mr. Vaile
141f	Monetary and Banking Policy (3 cred.; jr., sr., grad.; not open to School of Business Administration students; prereq. Econ. 3 and either Econ. 6-7 or 83)	I	TThS	210VH	Ar
144f	Cartels and Trusts (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	VII	MWF	205VH	Mr. Altschul
149f	Business Cycles (3 cred.; sr., grad.; prereq. Econ. 141 or B. A. 142 or consent of instructor)	III	TThS	1 VH	Mr. Marget
149w	Business Cycles (See 149f)				
	Sec. 1	I	MWF	1 VH	Mr. Marget
	2	VI	MWF	6 VH	Ar
149s	Business Cycles (See 149f)				
	Sec. 1	II	TThS	6 VH	Mr. Marget
	2	VI	MWF	105VH	Mr. Marget
154s	Public Utilities (3 cred.; jr., sr., grad., not open to School of Business Administration students; prereq. 20 cred. in soc. sci. incl. Econ. 6-7 or 83)	II	TThS	105VH	Mr. Garver
160w	The Modern Corporation (3 cred.; jr., sr., grad., not open to School of Business Administration students; prereq. Econ. 3 and either 6-7 or 83)	IV	MWF	205VH	Mr. Stehman
161f	Labor Problems and Trade Unionism (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)				
	Sec. 1	III	MWF	4VH	Ar
	2	IV	MWF	4VH	Mr. Yoder
161w	Labor Problems and Trade Unionism (See 161f)				
	Sec. 1	I	TThS	207VH	Mr. Schmidt
	2	II	MWF	4VH	Mr. Yoder
161s	Labor Problems and Trade Unionism (See 161f)				
	Sec. 1	I	TThS	207VH	Mr. Yoder
	2	IV	MWF	1 VH	Mr. Schmidt
162w	Labor and Socialist Movements (3 cred.; jr., sr., grad.; prereq. Econ. 161)	VI	MWF	221VH	Mr. Schmidt
164s	Labor Legislation and Social Insurance (3 cred.; jr., sr., grad.; prereq. Econ. 161)	III	TThS	211VH	Mr. Schmidt
172f	Economics of Transportation (3 cred.; jr., sr., grad.; prereq. 20 cred. in soc. sci. including Econ. 6-7 or 83)	II	TThS	221VH	Mr. Schmidt

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

No.	Title	Hour	Day	Bldg.	Instructor
176f	International Commercial Policies (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	I	MWF	207VH	Mr. Blakey
176s	International Commercial Policies (See 176f)	I	MWF	207VH	Mr. Blakey
185w	Economics of Marketing (3 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	I	MWF	6VH	Mr. Vaile
191f-192w†§	Public Finance (6 cred.; jr., sr., grad.; prereq. Econ. 6-7 or 83)	III	MWF	221VH	Mr. Blakey
193s	State and Local Taxation (3 cred.; jr., sr., grad.; prereq. Econ. 191-192 or B. A. 58)	III	MWF	221VH	Mr. Blakey

COURSES OPEN TO GRADUATE STUDENTS ONLY

203f-204w	Seminar in Economic Theory (6 cred.; grad.)	VIII½-IX	MW	307VH	Mr. Garver
206	*Seminar in Market Prices* (3 cred.; grad.) *(Not offered)*				
207s	Theory of Demand (3 cred.; grad.)	VIII½-IX	TTh	307VH	Mr. Stigler
208	*Production and Distribution* (3 cred.; grad.) *(Not offered)*				
233-234	*Seminar in Public Finance* (6 cred.; grad.) *(Not offered)*				
243f-244w	Seminar in Money and Banking (6 cred.; grad.)	VIII½-IX	TF	307VH	Mr. Marget
251s	Seminar in Industrial Relations (3 cred.; grad.)	VIII½-IX	MW	307VH	Mr. Yoder
257	*Seminar in Accounting Theory* (3 cred.; grad.) *(Not offered)*				
	Discussion of Papers in European Periodicals	VIII-IX	Th	210VH	Mr. Altschul

BUSINESS ADMINISTRATION

For advisers see the Bulletin of the School of Business Administration.

COURSES OPEN TO BUSINESS ADMINISTRATION STUDENTS ONLY

No.	Title	Hour	Day	Bldg.	Instructor
51f*	Business Law: Contracts (3 cred.; jr., sr.; prereq. Econ. 6-7)				
	Lect.	IV	T	BuAud	Mr. Gray
	Sec. 1	I	ThS	4VH	Mr. Gray
	2	I	ThS	2VH	Mr. Wattson
	3	II	ThS	4VH	Mr. Gray
	4	II	ThS	105VH	Mr. Wattson
	5	III	ThS	4VH	Mr. Wattson
52w*	Business Law: Agency, Partnership, and Corporations (3 cred.; jr., sr.; prereq. B. A. 51)				
	Lect.	IV	T	BuAud	Mr. Gray
	Sec. 1	I	ThS	4VH	Mr. Gray
	2	I	ThS	2VH	Mr. Wattson
	3	II	ThS	4VH	Mr. Gray
	4	II	ThS	2VH	Mr. Wattson
	5	III	ThS	4VH	Mr. Wattson
53s*	Business Law: Sales and Negotiable Instruments (3 cred.; jr., sr.; prereq. B. A. 51)				
	Lect.	IV	T	BuAud	Mr. Gray
	Sec. 1	I	ThS	4VH	Mr. Gray
	2	I	ThS	2VH	Mr. Wattson
	3	II	ThS	4VH	Mr. Gray
	4	II	ThS	2VH	Mr. Wattson
	5	III	ThS	4VH	Mr. Wattson

* No credit will be allowed for B. A. 51, 52, or 53 until all three are completed.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

§ Credit may not be received for both Economics 191-192 and B. A. 58.

No.	Title	Hour	Day	Bldg.	Instructor
54f-55w‖	Elementary Accounting—Combined course (8 cred.; jr., sr.; no prereq.)				
	Sec. 1	V	MTWF	207VH	Mr. Miller
	2 (fall only)	I	MTThS	307VH	Mr. Lund
56s	Property Rights and Obligations (3 cred.; jr., sr.; prereq. B. A. 53)				
		III	TThS	221VH	Mr. Cummins
57f¶	Money and Banking (3 cred.; jr., sr.; no prereq.)				
		III	MWF	113VH	Mr. Langum
58f§††	Elements of Public Finance (3 cred.; jr., sr.; prereq. Econ. 6-7)				
	Sec. 1	IV	MWF	207VH	Mr. Blakey
	2	VI	MWF	207VH	Mr. Borak
58w§††	Elements of Public Finance (See 58f)				
	Sec. 1	IV	MWF	207VH	Mr. Blakey
	2	VI	MWF	207VH	Mr. Borak
58s§††	Elements of Public Finance (See 58f)				
	Sec. 1	IV	MWF	207VH	Mr. Blakey
	2	VI	MWF	207VH	Mr. Borak
59f	Life Insurance (3 cred.; jr., sr.; prereq. Econ. 6-7)				
		III	TThS	211VH	Mr. Graves
60w	Fire and Marine Insurance (3 cred.; jr., sr.; prereq. Econ. 6-7)				
		III	MWF	6VH	Mr. Graves
61s	Casualty Insurance (3 cred.; jr., sr.; prereq. Econ. 6-7)				
		III	MWF	6VH	Mr. Graves
64w	Graphic Arts I: Elementary Principles of Design—Identical with Drawing and Descriptive Geometry 64 (3 cred.; jr., sr.; prereq. permission of adviser in School of Business Administration or in Department of Journalism)				
		IV	MWF	206E	Mr. Doseff
65f‡	Graphic Arts II: Processes—Identical with Drawing and Descriptive Geometry 65 and Journalism 65 (3 cred.; jr., sr.; prereq. permission of adviser in School of Business Administration or in Department of Journalism)				
		IV	MWF	105MurH	Mr. Barnhart
67s	Retail Store Management for Pharmacy Students (3 cred.; open to College of Pharmacy students only; prereq. Econ. 10 and 30)				
		I	MWF	6VH	Mr. Chute
68f	Sales Management (3 cred.; jr., sr.; prereq. B. A. 77)				
		II	TThS	1 VH	Mr. Chute
69f	Retail Store Management (3 cred.; jr., sr.; prereq. B. A. 77)				
		III	TThS	2VH	Mr. Chute
69w	Retail Store Management (See 69f)				
		II	TThS	1 VH	Mr. Chute
70f**	Statistics Survey (3 cred.; jr., sr.; prereq. Econ. 6-7)				
	Sec. 1	I	MWF	6VH	Mr. Graves
	2	VII	MWF	6VH	Mr. Graves
71f	Transportation: Services and Charges I (3 cred.; jr., sr.; prereq. Econ. 6-7)				
	Sec. 1	I	MWF	1 VH	Mr. Nightingale
	2	II	MWF	1 VH	Mr. Nightingale
	3	IV	MWF	1 VH	Mr. Nightingale
71w	Transportation: Services and Charges I (See 71f)				
	Sec. 1	III	TThS	1 VH	Mr. Nightingale
	2	VI	MWF	1 VH	Mr. Nightingale
71s	Transportation: Services and Charges I (See 71f)				
	Sec. 1	III	MWF	1 VH	Mr. Nightingale
	2	VI	MWF	113VH	Mr. Nightingale
72w	Transportation: Services and Charges II (3 cred.; jr., sr.; prereq. B. A. 71)				
		VIII	MWF	1 VH	Mr. Nightingale
72s	Transportation: Services and Charges II (See 72w)				
		I	MWF	112VH	Mr. Nightingale

‡ Journalism course. A fee of $1 per quarter is charged students taking courses in Journalism.
§ Credit may not be received for both Economics 191-192 and B. A. 58.
¶ Credit may not be received for both Economics 3 and B. A. 57.
‖ A combination of Economics 20, 25, and 26.
** Not open to students who have received credit in Economics 5.
†† Economics 191-192 (6 cred.) may be substituted for B. A. 58 as a core group requirement.

No.	Title	Hour	Day	Bldg.	Instructor
76w	Credits and Collections (3 cred.; jr., sr.; prereq. B. A. 77)				
		III	TThS	113VH	Mr. Chute
77f	Survey in Marketing (3 cred.; jr., sr.; prereq. Econ. 6-7)				
	Lect.	I	T	1 VH	Mr. Vaile
	Sec. 1	I	ThS	1 VH	Miss Canoyer
	2	I	ThS	6 VH	Mr. Chute
	3	VII	TTh	1 VH	Mr. Pickett
77w	Survey in Marketing (See 77f)				
	Lect.	IV	S	1 VH	Mr. Vaile
	Sec. 1	I	TTh	1 VH	Mr. Pickett
	2	VI	TTh	2 VH	Mr. Pickett
	3	VII	TTh	1 VH	Miss Canoyer
77s	Survey in Marketing (See 77f)				
	Lect.	I	T	1 VH	Mr. Vaile
	Sec. 1	I	ThS	1 VH	Mr. Pickett
	2	I	ThS	112VH	Miss Canoyer
	3	VII	TTh	1 VH	Mr. Pickett
86w	Office Management (3 cred.; jr., sr.; prereq. Econ. 6-7)				
		VII	MWF	210VH	Miss Donaldson
86s	Office Management (See 86w)				
		III	MWF	105VH	Miss Donaldson
88w	Advertising (3 cred.; jr., sr.; prereq. B. A. 77 and Psy. 56)				
		II	MWF	1 VH	Mr. Vaile
88s	Advertising (See 88w)				
		II	TThS	1 VH	Mr. Vaile
89f	Production Management (3 cred.; jr., sr.; no prereq.)				
	Sec. 1	II	MWF	4VH	Mr. Cummins
	2	III	TThS	207VH	Mr. Cummins
89w	Production Management (See 89f)				
	Sec. 1	II	MWF	6 VH	Mr. Filipetti
	2	III	MWF	1 VH	Mr. Cummins
89s	Production Management (See 89f)				
	Sec. 1	I	MWF	1 VH	Mr. Filipetti
	2	II	MWF	1 VH	Mr. Filipetti
	3	II	MWF	2 VH	Mr. Cummins
91f	Tabulating Equipment Laboratory (1 cred.; jr., sr.; prereq. Econ. 26 and either 5 or B. A. 70)				
	Sec. 1	IV-V	T	2VH	Mr. Gaumnitz
	2	VIII-IX	F	2VH	Mr. Gaumnitz
91w	Tabulating Equipment Laboratory (See 91f)				
		IV-V	T	6VH	Mr. Gaumnitz
91s	Tabulating Equipment Laboratory (See 91f)				
	Sec. 1	IV-V	T	2VH	Mr. Gaumnitz
	2	VIII-IX	M	2VH	Mr. Gaumnitz
92w	Accounting Practice Laboratory (1 cred.; jr., sr., open to accounting majors only; prereq. Econ. 26)				
	Sec. 1	V-VI	Th	301VH	Mr. Lund
	2	VI-VII	T	307VH	Mr. Lund
92s	Accounting Practice Laboratory (See 92f)				
	Sec. 1	III-IV	S	307VH	Mr. Lund
	2	VI-VII	T	307VH	Mr. Lund
93f	Accounting Laboratory (1 cred.; jr.; open to accounting majors only; prereq. Econ. 26)				
	Sec. 1	VI-VII	T	307VH	Mrs. Youngs
	2	VI-VII	Th	307VH	Mrs. Youngs
93w	Accounting Laboratory (See 93f)				
	Sec. 1	VI-VII	Th	307VH	Mrs. Youngs
	2	III-IV	S	307VH	Mrs. Youngs
93s	Accounting Laboratory (See 93f)				
		VI-VII	Th	301VH	Mrs. Youngs
94f	Cost Accounting Laboratory (1 cred.; jr., sr.; prereq. B. A. 152 or concurrent)				
	Sec. 1	III-IV	S	307VH	Mr. Lund
	2	VI-VII	T	301VH	Mr. Lund

No.	Title	Hour	Day	Bldg.	Instructor
94w	Cost Accounting Laboratory (See 94f)				
	Sec. 1	VI-VII	T	301VH	Mr. Peterson
	2	VII-VIII	Th	301VH	Mr. Peterson
94s	Cost Accounting Laboratory (See 94f)				
		VI-VII	T	301VH	Mr. Peterson
95f	Auditing Laboratory (1 cred.; jr., sr.; prereq. B. A. 135 or concurrent)				
		III-IV	T	307VH	Mr. Miller
95s	Auditing Laboratory (See 95f)				
		VII-VIII	Th	307VH	Mr. Miller
97f,98w,99s	Honors Course in Business Administration (Cred. ar.; jr., sr.; prereq. permission of the dean)				
		Ar	Ar	Ar	Ar
101f-102w†	Advanced General Economics (6 cred.; sr., grad.; prereq. Econ. 6-7)				
	Sec. 1	I	TThS	105VH	Mr. Stigler
	2	II	MWF	2VH	Mr. Stigler
	3	II	TThS	6VH	Mr. Boddy
	4	III	MWF	105VH	Mr. Mudgett
	5	IV	MWF	113VH	Mr. Stigler
	6	VII	MWF	105VH	Mr. Boddy
101w-102s†	Advanced General Economics (See 101f-102w)				
	Sec. 1	I	TThS	6VH	Mr. Boddy
	2	VII	MWF	6VH	Mr. Mudgett
109w	Business Policy (3 cred.; sr., grad.; prereq. B. A. 101-102)				
		II	MWF	105VH	Mr. Reighard
109s	Business Policy (See 109w)				
		II	MWF	105VH	Mr. Reighard
112f‡	Business Statistics (3 cred.; jr., sr., grad.; prereq. Econ. 5 or B. A. 70)				
	Sec. 1	I	TThS	207VH	Mr. Kozelka
	2	IV	MWF	105VH	Mr. Kozelka
	3	VI	MWF	6VH	Mr. Mudgett
112w‡	Business Statistics (See 112f)				
	Sec. 1	I	TThS	205VH	Mr. Kozelka
	2	II	MWF	205VH	Mr. Kozelka
	3	III	TThS	6VH	Mr. Kozelka
112s‡	Business Statistics (See 112f)				
	Sec. 1	II	MWF	6VH	Mr. Kozelka
	2	II	TThS	205VH	Mr. Kozelka
	3	VI	MWF	2VH	Ar
130f	Cost Accounting Survey (3 cred.; jr., sr., grad.; prereq. Econ. 25-26)				
		I	MWF	105VH	Mr. Ostlund
130s	Cost Accounting Survey (See 130f)				
		I	TThS	105VH	Mr. Ostlund
133s	Cost Accounting Methods (3 cred.; jr., sr., grad.; prereq. B. A. 130 or 153)				
		II	TThS	307VH	Mr. Ostlund
134f	Income Tax Accounting (3 cred.; jr., sr., grad.; prereq. B. A. 139 or 151)				
		I	MWF	4VH	Mr. Reighard
134w	Income Tax Accounting (See 134f)				
		III	TThS	211VH	Mr. Reighard
135f	Auditing and Public Accounting (3 cred.; jr., sr., grad.; prereq. B. A. 139 or 151)				
		III	MWF	207VH	Mr. Reighard
135s	Auditing and Public Accounting (See 135f)				
		III	TThS	207VH	Mr. Reighard
136s	Internal Auditing and Accounting Control (3 cred.; jr., sr., grad.; prereq. B. A. 139 or 151)				
		III	MWF	4VH	Mr. Reighard
139f‡	Advanced General Accounting (3 cred.; jr., sr., grad.; prereq. Econ. 25-26)				
	Sec. 1	IV	MWF	2VH	Mr. Heilman
	2	VI	MWF	4VH	Mr. Heilman

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
139w‡	Advanced General Accounting (See 139f)				
	Sec. 1	I	MWF	4VH	Ar
	2	VI	MWF	105VH	Mr. Heilman
139s‡	Advanced General Accounting (See 139f)				
	Sec. 1	III	TThS	1 VH	Mr. Heilman
	2	VII	MWF	105VH	Ar
142f	Advanced Money and Banking (3 cred.; jr., sr., grad.; prereq. Econ. 3 and 6-7)				
	Sec. 1	II	MWF	6VH	Mr. Upgren
	2	II	TThS	2VH	Mr. Langum
	3	VI	MWF	2VH	Mr. Langum
142w	Advanced Money and Banking (See 142f)				
	Sec. 1	II	TThS	105VH	Mr. Langum
	2	IV	MWF	6VH	Mr. Langum
142s	Advanced Money and Banking (See 142f)				
	Sec. 1	I	MWF	105VH	Mr. Langum
	2	III	TThS	105VH	Mr. Upgren
	3	VI	MWF	6VH	Mr. Langum
145s	Foreign Exchange (3 cred.; jr., sr., grad.; prereq. B. A. 142)				
		IV	MWF	205VH	Ar
146f	Investments (3 cred.; jr., sr., grad.; prereq. B. A. 155)				
		VI	MWF	1 VH	Mr. Upgren
147f	Bank Administration (3 cred.; jr., sr., grad.; prereq. B. A. 142)				
		IV	MWF	6VH	Ar
148w	The Securities Market (3 cred.; sr., grad.; prereq. B. A. 146 and Econ. 149)				
		II	TThS	221VH	Mr. Upgren
150f-151w†‡	Accounting Practice and Procedure (6 cred.; jr., sr., grad.; prereq. Econ. 25-26)				
		II	MWF	207VH	Mr. Heilman
150w-151s†‡	Accounting Practice and Procedure (See 150f-151w)				
		III	MWF	207VH	Mr. Heilman
152f-153w†	Cost Accounting (6 cred.; jr., sr., grad.; prereq. Econ. 25-26)				
		II	TThS	207VH	Mr. Ostlund
152w-153s†	Cost Accounting (See 152f-153w)				
		IV	MWF	105VH	Mr. Ostlund
155f	Corporation Finance (3 cred.; jr., sr., grad.; prereq. Econ. 3 and 6-7)				
	Sec. 1	III	MWF	1 VH	Mr. Stehman
	2	VII	MWF	207VH	Mr. Upgren
155w	Corporation Finance (See 155f)				
	Sec. 1	III	MWF	4VH	Mr. Stehman
	2	VI	MWF	4VH	Mr. Upgren
155s	Corporation Finance (See 155f)				
	Sec. 1	II	TThS	207VH	Mr. Stehman
	2	VII	MWF	1 VH	Mr. Upgren
156f	Finance Management (3 cred.; jr., sr., grad.; prereq. B. A. 155)				
		I	TThS	113VH	Mr. Stehman
158s	Governmental Accounting (3 cred.; sr., grad.; prereq. B. A. 139 or 151)				
		I	TThS	307VH	Mr. Heilman
159s	Public Utility and Railroad Accounting (3 cred.; sr., grad.; prereq. B. A. 139 or 151)				
		II	MWF	210VH	Mr. Stevenson
165f	Economics of Public Utilities (3 cred.; jr., sr., grad.; prereq. Econ. 3 and 6-7)				
	Sec. 1	I	TThS	211VH	Mr. Schmidt
	2	III	TThS	6VH	Mr. Garver
165w	Economics of Public Utilities (See 165f)				
	Sec. 1	I	TThS	211VH	Ar
	2	III	TThS	207VH	Mr. Garver
165s	Economics of Public Utilities (See 165f)				
	Sec. 1	I	MWF	4VH	Mr. Schmidt
	2	II	MWF	207VH	Mr. Garver
167f	Personnel Administration (3 cred.; jr., sr., grad.; prereq. Econ. 161)				
		II	MWF	205VH	Mr. Yoder

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

No.	Title	Hour	Day	Bldg.	Instructor
167w	Personnel Administration (See 167f)				
		III	TThS	105VH	Mr. Yoder
170w‡	Motion Economy (3 cred.; jr., sr., grad.; prereq. B. A. 184)				
		VI	MWF	301VH	Mr. Cummins
171s‡	Production Standards (3 cred.; jr., sr., grad.; prereq. B. A. 170)				
		VI	MWF	301VH	Mr. Cummins
177w	Foreign Trade (3 cred.; jr., sr., grad.; prereq. Econ. 176)				
		I	MWF	207VH	Mr. Blakey
180f-181w-182s	Senior Topics Courses (School of Business Administration seniors)				
	A. Accounting (6 cred.; fall and winter)				
		VI½-VII(f)	TTh	113VH	Mr. Rotzel
		I(w)	MWF	307VH	Mr. Reighard
	B. Business Finance (6 cred.; winter and spring)				
		VII	MWF	221VH	Mr. Upgren(w) Mr. Stehman(s)
	C. Marketing (9 cred.)				
	Sec. 1	VI½-VII	TTh	207VH	Mr. Vaile(f,w) Mr. Chute(s)
	2	VII-VIII½	MW	4VH	Mr. Vaile(f) Mr. Chute(w,s)
	D. Personnel Management (9 cred.)				
		VI½-VII	TTh	221VH	Mr. Yoder
	E. Secretarial Practice (6 cred.; fall and winter)				
	(Office management and secretarial students)	IV	MWF	210VH(f) 208VH(w)	Miss Donaldson
	(Commercial education students) (fall only)	VII	MWF	210VH	
	F. Statistics (9 cred.)				
		Ar	Ar	Ar	Mr. Mudgett, Mr. Kozelka
	G.§ Production Management (9 cred.)				
		VII	MWF	1 VH(f) 115VH(w,s)	Mr. Filipetti
	H. Insurance (3 cred.; spring)				
		IV	MWF	301VH	Mr. Graves
	I. Public Utilities and Transportation (6 cred.; fall and winter)				
		VI½-VII	TTh	205VH	Mr. Schmidt
	J. Office Management (3 cred.; spring)				
		IV	MWF	208VH	Miss Donaldson
183f,w,s	Practice Course (Cred. ar.; jr., sr., grad.; prereq. consent of adviser)				
		Ar	Ar	Ar	Members of the staff
184f§	Scientific Management in Industry (3 cred.; sr., grad.; prereq. Econ. 6-7)				
		VI	MWF	301VH	Mr. Filipetti
194s	Advanced Advertising Procedure (3 cred.; jr., sr., grad.; prereq. Econ. 5 and B.A. 88)				
		IV	MWF	2VH	Mr. Longstaff
194Af-194Bw-194Cs†	Advanced Advertising Procedure (1 cred. per qtr.; jr., sr., grad.; prereq. Econ. 5 and B.A. 88)				
		IV	T	105VH	Mr. Longstaff

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 is charged for this course.

§ Credit may not be received for both B. A. 181G and B. A. 184.

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The Bulletin of the
UNIVERSITY *of* MINNESOTA

Correspondence Study Courses Announcement for the Year 1940-1941

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GENERAL INFORMATION

CORRESPONDENCE STUDY

The last few years have demonstrated the effectiveness of university teaching by correspondence study. The foremost American universities have recognized this specific opportunity for educational service. In thus extending its functions, the University of Minnesota offers a plan of practical instruction whereby preparatory, vocational, and collegiate training is made available to those who of necessity must devote a part of their time to other duties. Teaching by correspondence study thus has become a part of the state educational system. It now is possible to contribute largely to the requirements for a Bachelor's degree by combining work in residence with correspondence study under the General Extension Division.

WHO MAY REGISTER

Correspondence study courses are open to all who are prepared to pursue them with profit. Students who expect to secure credit toward a university degree must, of course, satisfy all entrance requirements; in addition the prerequisites listed for each course must be met, at least in equivalents. But those who do not desire or expect such credit are permitted to register for any course in which they have an interest and sufficient preparation to enable them to do the work for the course. Students of this character are welcomed, and are given the same careful instruction and criticism as those who are candidates for a degree.

Students who have been dropped from the University or from any other college are not allowed to register in the Correspondence Study Department until they have been reinstated in the college from which they were excluded.

ADVANTAGES

The correspondence study method of study offers a number of advantages which make it particularly suited to the needs of the serious student, who is not able to take work in residence in any school, but who is interested in the mastery of a subject for purposes of credit or self-improvement.

The following advantages are apparent: correspondence study accommodates itself to a person's time schedule and personal conditions; it does not interfere with his vocational activities; it enables him to start a course at any time, to make use of his leisure moments, and to complete the course as rapidly as desired, within reasonable limits. By the correspondence study method the student concentrates upon one or two subjects, recites upon every part of every lesson, masters his material thoroly, and receives the individual attention of the instructor in his lesson reports. Correspondence study work involves skill in compassing the ideas of the study material; in arranging data for lesson papers; in thinking logically and in expressing one's self capably.

The writing of lesson reports helps the student to digest the significant points of a course, to put them into permanent form, and to make them accessible for future reference. The student's initiative, self-reliance, accuracy, and perseverance are increased by the correspondence study method. By this plan he may satisfy his special interests, prepare for special occupations, accumulate credits, or experience the thrill of mental and cultural growth.

THE INSTRUCTION

Upon the receipt of the application and fee for any course the first lessons are sent, together with instructions for the preparation of lessons and directions for making reports.

The teaching is done by professors from the various faculties in the University who are in continuous charge of similar courses in residence and who are familiar with the needs of nonresident students.

Each lesson assignment contains instructions, questions, references, and helps, so that the student may have accurate information regarding the ground to be covered.

Each lesson report is returned to the student with such corrections, explanations, and suggestions as may be needed. It is expected that these lesson papers will be carefully reviewed by the student for the purpose of avoiding errors in future lessons. Questions on any lesson point are welcomed.

COURSES AND LESSONS

Courses are divided into lesson assignments, varying in number from six to twenty-seven—the credits earned varying from one to five. These courses parallel the corresponding day courses in content, as well as in the number of credits allowed for them.

Each lesson is planned to consume about six clock hours of preparation time. The hope is that a student will finish at least one lesson per week, which will involve, therefore, one hour of work a day for six days. (See further remarks under Amount of Work Carried, page 10.)

SELECTION OF COURSES

In selecting courses for university credit, it is advisable that the student secure a copy of the bulletin of the college he expects to enter, so that he may conform to the prescribed course of study. Bulletins may be secured by addressing the registrar, University of Minnesota, Minneapolis.

BOOKS AND OUTFIT

All necessary textbooks, drawing outfits and apparatus *must be procured by the student. Do not send money to the University* for the purchase of texts and other materials. There will accompany the first lesson, instructions regarding texts and how to order them.

UNIVERSITY MATRICULATION

Admission to the schools and colleges of the University which accept students directly from the high school is either by certificate or by examination. Matriculation is completed with the registrar.

The applicant must present a certificate of graduation from an accredited preparatory school, or certificates showing that he has passed examinations in high school subjects previously given by the Minnesota State Board, or corresponding examinations in another state provided these examinations are recognized by the state university in that state. Certificates representing examinations given by the College Entrance Board or the Regents of the State of New York, are likewise accepted.

The University of Minnesota entrance requirements are described in detail in the General Information Bulletin to be obtained from the registrar.

A preparatory unit represents the equivalent of one year's work in a subject, for five classroom periods each week. Twelve units of senior high school work, selected from five specific groups, are required for entrance in any case; the particular requirements of the several colleges vary.

Then how can a student who has not sufficient entrance units enter the University? There are only three ways:

1. Obtain provisional admission by tests. Applicants for admission to the University who are high school graduates but who fail to meet the University's requirement with reference to specific subjects, and applicants who are not high school graduates but who are nineteen years of age or older may be admitted provisionally and subject to one year of satisfactory work at the University upon passing the following tests:

   a. College aptitude test
   b. Test of proficiency in English
   c. Such special placement tests as the school or college to which the candidate desires admission may prescribe.

2. Obtain credits by passing the examinations of college entrance examination boards, given in various states.

3. The University does not grant a high school diploma for work done by correspondence study, but the Correspondence Study Department of the University can help a student to obtain entrance credits in three different ways:

   a. If he is a high school graduate but lacks one or more of the required entrance credits, he may obtain the necessary credits by correspondence study.
   b. If he has not completed high school and wishes to apply for entrance, correspondence study courses will help him prepare for the English test and placement test required of such applicants for admission.
   c. With the permission of the high school concerned, correspondence study courses may be used to complete the requirements for high school graduation.

Whether or not a state teachers college will accept the entrance or preparatory credits obtained from this department and apply them toward a diploma, and the extent to which such credits will be accepted and applied, depends entirely upon the rules of the school concerned.

LIST OF PREPARATORY COURSES

Below is a list of the courses offered by correspondence study which may be taken for credit toward college entrance. Certain subjects, such as elementary courses in languages, may be taken *either for entrance or for college credit, but not for both;* a subject presented for entrance may not be repeated for college credit.

Group A: English

English Composition A, B, C, and D
English Literature A, B, C, and D

Group B: Languages

Courses marked with an asterisk under German, Romance Languages, and Scandinavian Languages.

Group C: History and Social Science
- American History A and B
- World History A and B
- Social Science A and B

Group D: Mathematics
- Algebra A and B
- Plane Geometry A and B
- Solid Geometry
- Higher Algebra

LOAN LIBRARY FACILITIES

The student should first secure the assistance of his local library. Librarians are willing to co-operate, and will often secure a needed reference book, if future use will seem to justify such a purchase.

Some reference books may be borrowed from the University Library. Such loans are necessarily limited to books which are not at that time in use in classes. The library does not loan textbooks. *The period of loan is one month.* In case the book is urgently needed for university use it may be immediately recalled. The student is expected to pay express or postage both ways. Special book request blanks will be sent with the first lesson assignments of each course. These should be filled out carefully and mailed directly to the librarian, University of Minnesota, Minneapolis.

The State Department of Education operates a loan library service, through which students may obtain some reference books. This service is available only to residents of Minnesota living outside of Minneapolis and St. Paul. Application should be made to the Library Division, State Department of Education, State Office Building, St. Paul.

The General Extension Division operates a loan library service in connection with certain courses. A rental fee is charged for the service. Details of this plan will be furnished with the first lesson of the courses for which these reference books are available.

REGISTRATION PROCEDURE

The student who wishes to undertake correspondence study should first select such a course or courses as he may desire to take. He should then fill out in ink the application blank which has been sent to him and return it with the required fee to the Correspondence Study Department, University of Minnesota, Minneapolis. The student himself should fill out the blank.

HOW TO SEND MONEY

Payment should be made by post-office or express money order, personal check, or draft. *Make all checks and money orders payable to the University of Minnesota.* The remittance should cover the exact amount of the fee.

SPECIAL CLUB AND GROUP SERVICES

The Correspondence Study Department offers special help in the form of club study programs, reading courses, group study by correspondence study, and courses acceptable for Extension Division certificates. Ask for further information.

ACTIVITIES OF THE GENERAL EXTENSION DIVISION

Extension or evening classes in the Twin Cities, Duluth, and other cities of Minnesota.

Correspondence study courses, available twelve months of the year.

Community Service Bureau: provides lectures, lyceum courses, concerts, entertainments; lends lantern slides and films for visual instruction; gives advice on selection and production of plays; operates a radio broadcasting station for educational purposes.

Municipal Reference Bureau: maintained for the benefit of municipalities of Minnesota and their officers; offers consultation service to city councils.

Short courses and special institutes.

AGRICULTURAL EXTENSION SERVICE

The Agricultural Extension Service includes the county agricultural agents, the home demonstration agents, and the 4-H Club agents working in the counties, as well as the subject-matter specialists working out of the state office. The purpose of the Agricultural Extension Service is to assist farm people in improving farm and home conditions through the adoption of improved practices in accord with plans of work prepared by their own groups. Various short courses are held by the College of Agriculture, Forestry, and Home Economics. For these services address the Agricultural Extension Division, University of Minnesota, University Farm, St. Paul, Minnesota.

REGULATIONS

NOTE OF CAUTION

All correspondence study students should give especial attention to the rules on time (see below); Reinstatement (p. 11); Refunds (p. 11); Transfer of Credits (p. 12); Examinations (p. 12).

ADMISSION

Correspondence study courses are open to anyone who can carry the work. A student who plans to work for a degree from the University of Minnesota and who has not matriculated as a regular student should have official copies of his high school and college credits sent directly to the registrar for examination. He will then be notified of his classification. He is not required to do this before enrolling for a correspondence study course altho it is advisable for him to do so.

No student registered in classes at the University of Minnesota or any other institution of learning may register for a correspondence study course without the approval of the proper authorities in that institution. The notice of such approval must be sent in writing to the Correspondence Study Department.

The department reserves the right to advise a student to change or discontinue a registration if it finds that the course selected is not for the best interests of the student. Whenever a registration is rejected or discontinued, the fee for the course is returned.

AMOUNT OF WORK CARRIED

Not more than two courses may be taken by correspondence study at one time.

The maximum number of lessons that will normally be accepted from a student is four per week. This rule holds regardless of whether one or two courses are being carried.

Accordingly, students pursuing more than ten credits of work in both kinds of extension study should have their work approved by the Students' Work Committee through the Correspondence Study Department office.

TIME

A student may begin a correspondence study course at any time, and should complete the course within one year from the date of enrolment. If the course is not completed within this limit the registration is considered expired. (See Reinstatement below.)

During the summer months the department cannot guarantee the prompt return of lesson papers. While instructors are on vacations their work may be carried by substitutes, or the work may be temporarily discontinued. In the latter case an extension of time for the completion of the course affected will be allowed.

The student should endeavor to send in at least one lesson report every week. If it is not possible to do this the department should be notified. Temporary delays are, however, unavoidable in a busy person's work, and no student should become discouraged because of them. Each report should

be sent in as completed, and not held until others are finished. The latter practice will cause delays in their return; and in addition, the instructor's corrections and criticisms will not be available before the student proceeds with advanced lessons.

PREPARATION OF LESSON REPORTS

Lesson reports, which are the evidence of the study given to assignments, must represent the student's own work. Success in the final examination, which is conducted under supervision, and on which credit for a course is finally based, will depend on the amount and quality of the student's work on all the lessons in the course.

REINSTATEMENT

Any student who has failed to complete a course within the prescribed time of one year, through causes not within the control of the University, may be reinstated with the consent of the department on payment of one dollar for each course and each year involved since the expiration of the registration. Such reinstatement holds for one year. Reinstatements for only two extra years will be allowed.

TRANSFER OF REGISTRATION

Any student may have the privilege of transferring his registration from one correspondence study course to another by the payment of a fee of one dollar. A transfer will be allowed only within three years from the date of registration. In case reports have been made on the lessons of the original course, a fee of sixty-five cents will be charged for each lesson completed. After two months from date of registration, the difference in cost, if there is such, will be retained as a credit. In case the transfer is recommended by the department, no charge will be made.

A registration, or the fees therefore, may not be transferred to or from (a) extension classes, (b) any other division of the University, or (c) another person.

FEES

All fees are payable in advance. The fee for each course may be found following the description of the course.

POSTAGE

The student prepays postage on all mail sent *to* the University; mail sent *from* the University to the student is prepaid by the Correspondence Study Department.

REFUNDS

Two dollars of each fee is the non-refundable portion withheld to cover expenses of registration. *No fee will be refunded after two months* from the date of registration or after the student has completed one half of the course for which he has registered. If an application for instruction is rejected, the entire fee is returned. If lessons have been completed before the cancellation of a course, a charge of sixty-five cents for each lesson will be made in addition to the two dollars above mentioned.

CREDIT

Students who undertake correspondence study work for university credit should state this fact in advance and must comply with all requirements of the University, including the prerequisites for each course. Credits allowed in this connection will be recorded separately until the student matriculates at the University, when they will be recorded permanently as university credits.

Those seeking a university degree must conform to all the requirements exacted by the college or school in which such a degree is sought. The bulletin of any college or school may be obtained from the registrar.

A maximum of one half of the required credits for the bachelor of arts degree may be accumulated through correspondence study. The work of the earlier part of the curriculum is more likely to be available for correspondence study. A student working for a degree must earn at least one year's credit in residence in this University. If the term of residence is only one year, that year must be the senior year; and in any case he must spend two quarters of the senior year in residence. (Only three credits in a major sequence (courses numbered 50 or above) may be earned through correspondence study and applied toward a degree in the College of Science, Literature, and the Arts.)

The School of Business Administration (Senior College) accepts toward a degree only nine credits earned through correspondence study. (See page 14 for full statement.) This limited number of credits does not apply to subjects listed in the prebusiness curriculum of the College of Science, Literature, and the Arts.

The Institute of Technology accepts up to nine credits in correspondence study in English and mathematics (College Algebra, Trigonometry, and Analytical Geometry), or in subjects not required in the curriculum in which the student is registered.

Entrance credit is allowed for courses of high school grade. See Preparatory Courses, pages 7-8.

No credits may be earned by correspondence study to apply on the Master's degree, or any other graduate degree. However, if probationary credits are demanded before a student enters the Graduate School, nine credits in the major or minor field may be earned by correspondence study. In this work a grade of B must be maintained.

TRANSFER OF CREDITS

Acceptance of credits transferred to another institution depends wholly upon the regulations of that institution. Students who expect to apply credits elsewhere should first make sure of the rules of the other school or college, and of the definition of credit in that school.

A University of Minnesota credit now means work carried for one fifty-minute classroom period per week for a "quarter," or twelve weeks. Three "quarter" credits are equivalent to two "semester" credits.

EXAMINATIONS

A student, on completing any course, will be given an examination either at the University, at the extension offices in Minneapolis, St. Paul, or Duluth, or under approved supervision. The supervisor must be the county superintendent of schools, the principal or superintendent of a public high school, or an official in a state school.

Success in the examination is requisite to credit.

Deferred examinations.—Examinations should be taken after preparation and immediately following the completion of the course. If taken any time before the expiration of the registration, there is no extra charge; after this expiration the regular reinstatement fee of one dollar will be charged.

GRADES AND HONOR POINTS

In addition to the recognition, by the use of *credits,* of the *amount* of work done, there is a further recognition of *quality,* through the use of *grades* and *honor points.* Four grades are employed: D is used on work of mediocre merit, which may be counted toward a degree only when averaged with work of higher grades in other courses; C indicates the quality of work acceptable for graduation; B and A are given to work of especial merit.

Work below D in merit is marked E (condition) or F (failure). A condition is a temporary grade, representing a deficiency which may be removed by a subsequent examination. The fee for this condition examination is one dollar. The final grade, however, may not be higher than C; *and unless the condition examination be taken within three months the grade becomes a failure.* A course in which a final grade of F has been received must be repeated before any credit is given.

RESIDENT STUDENTS

Registration for correspondence study courses will not be accepted from resident or extension class students of the University of Minnesota or of any other institution of learning unless specific permission is granted by the institution concerned.

No registration for a correspondence study course for the purpose of removing a condition or a failure will be accepted except upon the written consent of the proper authorities in the school concerned.

STUDENTS' WORK COMMITTEE

The Students' Work Committee of the General Extension Division will be glad to give assistance to correspondence study students in their selection of courses to meet their immediate needs and also in their problems of building a program to meet the requirements for a degree.

Students living in the vicinity of the University may come to the office, 419 Administration Building, for interviews. Students living at a distance may write to the Correspondence Study Department.

DESCRIPTION OF COURSES*

ANTHROPOLOGY

41. Introduction to Anthropology. Characteristics of the human races; fossil men; prehistory. The life of primitive peoples; economics, religious, social activities, and other phases of culture. The bearings of anthropology on present-day thought and problems.
    Twenty-seven lessons (five credits). $17.00. Mr. Mandelbaum.

ART EDUCATION

1. Fundamental Experiences in Design. The fundamental principles applied to a series of interesting and practical problems using a variety of techniques; a basic course that is useful in public school teaching and as a foundation for other art courses. No prerequisites.
    Sixteen lessons (three credits). $10.00. Mrs. Lewis.
15. Interior Decoration (Introduction to Art II). Design principles in relation to the home. Identification of period and modern furniture. Subjects discussed include wall treatment, floor coverings, color schemes, furniture arrangement, window treatment, and the use of accessories. Of interest to sales people, homemakers, and decorators. No prerequisite.
    Sixteen lessons (three credits). $10.00. Mrs. Lewis.
22. Advanced Interior Decoration (Second Year Design). Continuation of Art Education 15, emphasizing color theory and the study of decorative fabrics. Trends in materials considered. Glassware, china, silver accessories studied. Prerequisite for credit: Art Education 15.
    Sixteen lessons (three credits). $10.00. Mrs. Lewis.
    Registrations accepted after October 1, 1940.
31. Orientation in Handicrafts—Textile Crafts. A practical course in needlework and other textile crafts suitable for use in homes, schools, camps, playgrounds, and for those interested in adult education.
    Sixteen lessons (three credits). $10.00. Miss Ross.

ASTRONOMY

11. Descriptive Astronomy. A descriptive course designed to give accurate general information regarding the solar system and the stellar universe. It emphasizes the basic facts of the physical universe, rather than the technical details of the work of a professional astronomer. A small telescope or even a field glass will be helpful but is not essential.
    Twenty-seven lessons (five credits). $17.00. Mr. Luyten.

BUSINESS ADMINISTRATION

(For courses in other business subjects, see page 19, Economics.)

The number of credits that may be earned by correspondence study toward the bachelor of business administration degree is limited to nine. For work carried in the Correspondence Study Division a student will be granted

* The letter c appearing after the course number indicates that the particular course is not given in residence.

"transfer" credit in the School of Business Administration, i.e., in the transfer of credits for application toward the bachelor of business administration degree surplus honor points will not be considered. A student enrolled in the School of Business Administration should consult his adviser before registering for a correspondence study course.

1c. Business English. A practical course for people in business or those preparing to enter it. The ways of developing effective letter-writing habits are analyzed and presented in a study of diction, grammar, and the mechanics of letter forms. Practice in writing the more common types of letters and criticism of their effectiveness.

Sixteen lessons (three credits towards extension certificate only). $10.00. Mr. Haga.

†51. Business Law—Contracts and Agency. Contracts: Formation of contracts, the essentials thereof, the operation and interpretation of contracts. Agency: Methods of forming the relation and liabilities of agency.

The general rules of contracts being fundamental to all work in business law, this course must precede Business Law 52, 53, and 54.

Sixteen lessons (three credits). $10.00. Mr. Jackman.

†52. Business Law—Partnerships, Corporations, and Bankruptcy. Partnerships: formation of partnerships and application of uniform partnership act. Joint stock companies; how distinguished from ordinary partnerships; how like ordinary partnerships; statutory requirements.

Corporations: formation, rights and liabilities. Prerequisite: Business Law 51.

Sixteen lessons (three credits). $10.00. Mr. Jackman.

†53. Business Law—Sales, Bailments, Negotiable Instruments, Personal Property. Prerequisite: Business Law 51.

Sixteen lessons (three credits). $10.00. Mr. Jackman.

54c. Business Law—Real Property, Mortgages. Classification of property, distinction between real and personal property; estates in land as to quantity, quality, and time of enjoyment; conveyances, mortgages and liens. Prerequisite: Business Law 51.

Sixteen lessons (three credits). $10.00. Mr. Jackman.

58. Elements of Public Finance. Government expenditures, revenues, and debts. This includes a study of the nature of public expenditures, various kinds of non-tax public revenues, various forms of taxation, shifting and incidence of taxation, budgetary and legislative control, and fiscal reforms. Prerequisites for credit: Principles of Economics I and II.

Sixteen lessons (three credits). $10.00. Mr. Borak.

59. Life Insurance. Nature, uses, and kinds of life insurance, and the fundamental principles involved in the measurement and underwriting of life risks. Prerequisites for credit: Principles of Economics I and II.

Sixteen lessons (three credits). $10.00. Mr. Graves.

60. Fire and Marine Insurance. Nature of fire and marine risks and of the types of underwriters, forms of insurance contracts, analysis of policy provisions, and principles and methods of rate making. Prerequisites for credit: Principles of Economics I and II.

Sixteen lessons (three credits). $10.00. Mr. Graves.

† No credit will be granted until all three courses are completed.

61. Casualty Insurance. Types of coverage which have been developed in this field; analysis of policy provisions and treatment of the important factors involved in the making of rates for each of these types of insurance. Prerequisites for credit: Principles of Economics I and II.
    Sixteen lessons (three credits). $10.00. Mr. Graves.

69. Retail Store Management. A course in retail merchandising and store management. Lessons consist of discussions of actual problems encountered in retail stores, together with methods of studying and solving the problems. (A practical course for the active merchant.) Prerequisites for credit: Principles of Economics I and II, or equivalent.
    Sixteen lessons (three credits). $10.00. Miss Canoyer.

76. Credits and Collections. A study of the nature and types of credit and credit instruments and agencies; qualifications and work of the credit manager; valuation and use of financial statements and credit reports; collection methods and correspondence; bankruptcy and adjustments; credit limits and control. Prerequisites for credit: Principles of Economics I and II.
    Sixteen lessons (three credits). $10.00. Mr. Chute.

86. Office Organization and Management. A general course dealing with (1) the place of the office in business, (2) functional analysis, (3) personnel, hiring, and training, (4) planning, production control, (5) standardization, (6) scientific management. Prerequisites for credit: Principles of Economics I and II.
    Sixteen lessons (three credits). $10.00. Miss Donaldson.

88. Elementary Advertising. An elementary course in advertising emphasizing the retail point of view. This course discusses the economics of advertising, advertising and retail sales promotion, advertising media and technique. Prerequisites for credit: Principles of Economics I and II, or equivalent.
    Sixteen lessons (three credits). $10.00. Miss Canoyer.

130. Cost Accounting. The uses of cost information to modern industry, the accounting mechanism of costs, types of cost systems, the definition of cost terms. The use of the factory ledger. The accounting for materials, their purchase, storage, use, the stores ledger, and the calculation of materials costs. The accounting for labor with particular reference to applying labor costs to production. The accumulation and analysis of overhead and its application to product. The methods of process costs. Cost reports and statements for the management. Prerequisites: Economics 25 and 26.
    Sixteen lessons (three credits). $10.00. Mr. Peterson.
    Registrations accepted after August 1, 1940.

146. Investments. Study of the principles of investment and their application to actual cases. Lessons developed out of concrete examples to develop critical appraisal of specific securities and add to working knowledge of investment issues. Principal emphasis on the most important groups of securities—railroad, industrial, public utility, and governmental issues. Prerequisites for credit: Elements of Money and Banking and Corporation Finance. Recommended to business men to whom it is open without prerequisite.
    Sixteen lessons (three credits). $10.00. Mr. Upgren.

155. Corporation Finance. A study of the organization and financial management of corporations, with reference to types of securities, conditions under which they should be issued, and facilities for marketing them. Prerequisites for credit: Principles of Economics I and II, and Elements of Money and Banking.

Sixteen lessons (three credits). $10.00. Mr. Stehman.

CHILD WELFARE

(Offered in co-operation with the Institute of Child Welfare.)

1c. Child Care and Training. Physical growth and care of young children. Mental development, personality, and behavior. The management of young children with reference to the establishment of desirable habits of behavior. Play, toys, games, stories, and music. Intended primarily for the parents of young children.

Sixteen lessons (no credit). $1.00. Mrs. Cummings.

2c. The Older Child and Adolescent. This course follows the course in Child Care and Training. Physical, intellectual, and emotional development of older children. Influences on the personality of the child, his vocational and educational interests, his recreations and friendships discussed with a view to showing how they affect the process of growing up.

Sixteen lessons (no credit). $1.00. Mrs. Faegre.

40. Child Training. A brief study of the physical and mental development of the young child is followed by a discussion of the training of young children. Behavior problems in their various aspects, and the techniques of good and bad management will be considered. Prerequisites for credit: General Psychology I and II.

Sixteen lessons (three credits). $10.00. Mrs. Cummings.

50. The Guidance of Children's Interests. How the child's development may be furthered by directing his natural activities and interests. Stories, music, art, and dramatics, as well as the use of tools, toys, and a variety of occupational materials are discussed. The value of play and activities initiated and carried out by the children is stressed. Prerequisite for credit: Course 40.

Sixteen lessons (three credits). $10.00. Mrs. Cummings.

80. Child Psychology. A survey of child psychology from infancy to adolescence. Development of motor skills, language, and intellectual skills; emotional behavior, personality, social behavior, and character. Learning and adjustment. While designed primarily for teachers, the context is of interest to the general student and to parents.

Sixteen lessons (three credits). $10.00. Mr. Anderson

82. Later Childhood and Adolescence. What it means to grow up; the effect of physical, mental, and emotional growth on the developing personality; guidance of youth's interests and social life—sex, recreation, friends, and vocation. Prerequisite for credit: Course 40 or 80 or equivalent. Not open to those who have completed Education 58.

Sixteen lessons (three credits). $10.00. Mrs. Faegre.

CLASSICS

GREEK

†1. Beginning Greek I. The declensions and conjugations and the simpler rules of syntax together with translation of sentences from Greek into idiomatic English and from English into Greek.
Twenty-seven lessons (five credits). $17.00. Mr. Heller.

†2. Beginning Greek II. Course continued; general principles, inflections, word formations, syntax, elementary readings, composition. Prerequisite: Course 1.
Twenty-seven lessons (five credits). $17.00. Mr. Heller.

3. Beginning Greek III. Course continued. Prerequisite: Courses 1 and 2.
Twenty-seven lessons (five credits). $17.00. Mr. Heller.

52. Epic Poetry—Elementary Course in Homer. Selections from the *Iliad;* mythology, scansion, dialectical forms. Prerequisite: Course 3 or the equivalent.
Sixteen lessons (three credits). $10.00. Mr. Heller.

71. Dramatic Poetry—Elementary Course in the Drama. Euripides' *Alcestis* or *Medea;* translation, scansion, study of mythology and of Greek life. Prerequisite: Course 51 or 52.
Sixteen lessons (three credits). $10.00. Mr. Heller.

111. History—Herodotus. Selected readings from Herodotus' *History;* syntax, dialectical forms, the irregular verb; collateral work. Prerequisite for credit: Course 14, 51 or 52, or equivalent.
Sixteen lessons (three credits). $10.00. Mr. Heller.

LATIN

Students desiring to take courses for university credit should take Courses 1, 2, 3, and 9, or their equivalent, but should omit 10 and follow 9 by 11. Courses 1, 2, 3, and 9 satisfy the Junior College requirements in Latin.

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before credit will be allowed for a course.

1. Beginning Latin I. Inflections; translation of easy Latin prose; the study of elementary syntax; Latin composition.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.

2. Beginning Latin II. A continuation of Course 1. Translation of selections from Eutropius; syntax; Latin composition. Prerequisite: Latin I or its equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.

3. Caesar. Translation of the Campaign against the Belgians (Book II entire); and of the manners and customs of the Gauls and Germans (Book VI, chs. 9-29); syntax; composition; life of Caesar. Prerequisites: Courses 1 and 2 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.

9. Cicero I. Translation of the First and Second Orations against Catiline and of selected Letters; syntax; composition; life of Cicero. Prerequisites: Two years of preparatory Latin or Course 3.
Twenty-seven lessons (five credits). $17.00. Mr. Cram.

† Both courses must be completed before credit is allowed for either.

10. Cicero II. Translation of the Oration for the Manilian Law (the equivalent of two orations) the Archias, and the Marcellus; syntax; composition. Prerequisite: Course 9.
    Twenty-seven lessons (five credits). $17.00. Mr. Cram.
11. Vergil's *Aeneid* I. Translation and interpretation of Books I and II of the *Aeneid;* syntax; principles of Latin versification; life of Vergil. Prerequisites: Three years of preparatory Latin or Course 9.
    Twenty-seven lessons (five credits). $17.00. Mr. Cram.
12. Vergil's *Aeneid* II. Translation of Books IV and VI of the *Aeneid;* a very brief consideration of Vergil's influence. Prerequisite: Course 11.
    Twenty-seven lessons (five credits). $17.00. Mr. Cram.
21. Livy. Translation of Book I; syntax, life, and literary style of Livy. Prerequisites: Four years of preparatory Latin or Course 12.
    Twenty-seven lessons (five credits). $17.00. Mr. Cram.
23. Roman Comedy. Translation of the Menaechmi of Plautus and the Phormio of Terence; syntax, literary styles of Plautus and Terence; outline of the history and technique of Roman drama. Prerequisite: Course 21.
    Twenty-four lessons (four and one-half credits). $15.00. Mr. Cram.

ECONOMICS

3. Elements of Money and Banking. An introduction to the study of modern financial institutions; the nature and functions of money, its types and methods of control; recent efforts to change and regulate the value of money; chief emphasis upon the American financial system, including the mechanism of the money market, investment banking, the functions of trust companies, savings institutions and commercial banks, the federal reserve system including recent modifications, and agricultural credit institutions.
    Twenty-seven lessons (five credits). $17.00. Mr. Myers.

†6. Principles of Economics I. A course dealing with the underlying principles affecting the production and exchange of goods and services. Organization and regulation of production; the determination of costs and prices under conditions of competition and monopoly and public control of industry.
    Twenty-seven lessons (five credits). $17.00. Mr. Graves

†7. Principles of Economics II. A continuation of Principles of Economics I. Financial organization of society; the distribution of wealth and income; the economic significance of labor organization; labor legislation; socialism; taxation; foreign trade. Prerequisite: Principles of Economics I.
    Twenty-seven lessons (five credits). $17.00. Mr. Graves.

20. Elements of Accounting. The form and content of financial statements; ledgers; debit and credit; journals; control accounts; special books; the trial balance; adjusting and closing entries; the work sheet; and the preparation of financial statements. Each lesson will include a reading assignment in a text and a number of problems to work.
    Sixteen lessons (three credits). $10.00. Mr. Lund.

† Courses 6 and 7 must be completed before credit will be allowed for either.

25. Principles of Accounting I. A large part of the course has to do with corporation accounting. Formation of a corporation; types of stock; opening entries; donated and other treasury stock; surplus; dividends; reserves; surplus statement; valuation of stocks and bonds. The remainder of the lessons will consider peculiarities of accounting for partnership. Prerequisite: Elements of Accounting.
    Sixteen lessons (three credits). $10.00. Mr. Lund.
    Registrations accepted after August 15, 1940.
26. Principles of Accounting II. Realization of income; inventory problems; perpetual inventory; methods of estimating inventory; statements, accounts, and closing entries for a manufacturing concern; depreciation methods and their application; depletion; valuation and amortization of leaseholds and patents; other intangibles; statement classification and analysis. Prerequisite: Principles of Accounting II.
    Sixteen lessons (three credits). $10.00. Mr. Lund.
    Registrations accepted after October 1, 1940.
161. Labor Problems and Trade Unionism. Deals primarily with the labor problem in the United States. Special attention is given to current problems such as unemployment, technological and cyclical; unemployment insurance and workmen's compensation; structure, aims, policies, and methods of trade and industrial unions and employers' associations; labor legislation relating to injunctions, yellow-dog contracts, strikes, and boycotts. Prerequisites for credit: Principles of Economics I and II, or equivalent.
    Sixteen lessons (three credits). $10.00. Mr. Schmidt.

TEXTILES

(See page 35.)

EDUCATION

NOTE.—See Courses 1 and 2 under Psychology.

*51A. Introduction to Secondary School Teaching I (Educational Psychology). A survey of the fundamental facts of human nature involved in educational activities. Psychological and educational measurements, learning, factors related to efficiency of learning, personality, and problems of adjustment. Prerequisite: Psychology I and II.
    Sixteen lessons (three credits). $10.00. Mr. Polmantier.

*51C. Introduction to Secondary School Teaching III (The High School). A comprehensive study of the modern secondary school. Origin and growth of secondary education, comparisons with modern European secondary schools, the student body, aims and objectives, present status and types of organization, the relation of the secondary school to mores and attitudes, the secondary school as a social institution, the teacher's place in the social and economic order, the program of study and activities, classification and guidance, and certain administrative features. Prerequisites: Psychology I and II and five credits in Education.
    Sixteen lessons (three credits). $10.00. Mr. Carlson.

* This course is part of a three-quarter sequence in the College of Education, credit for which is granted only when the complete sequence is taken and student has passed the qualifying examination. See the Bulletin of the College of Education.

54(Agr.Ed.). Rural Education and Community Leadership. The organization and administration of a progressive program of rural education. Problems involving the school plant, the curriculum, the teachers, and guidance for rural youth. The school as a community center; organizing educational, social, and recreational activities. The objectives, organization, and operation of youth programs, clubs, fairs, festivals, and the many other desirable educative features of rural community life.

Sixteen lessons (three credits). $10.00. Mr. Field.

58. Psychology of Adolescence. A study of changes characterizing the transition from childhood to adult life. Discussion of physical, mental, social, and emotional development during the adolescent years, with emphasis on the relation of this development to the problems of adolescents in our society. The influence of the secondary schools on good adjustment of adolescents, and implications for guidance during the period of secondary education. (This course is listed in the bulletin of the College of Education as Ed. Psy. 158; it is not open to those who have completed Child Welfare 82.) Prerequisite: Ed. 51a or its equivalent.

Sixteen lessons (three credits). $10.00. Miss Edwards.

60. Introduction to Statistical Methods. A study of elementary statistical methods. The commonly used statistical terms and methods are covered in this course. Prerequisites: 6 credits in psychology.

Sixteen lessons (three credits). $10.00. Mr. Fattu.

*61A. Introduction to Elementary School Teaching I (Educational Psychology). A survey of fundamental facts of human behavior involved in educational activities. This survey includes the following topics: psychological and educational measurements, habit formation, transfer of training. Prerequisites: Psychology I and II.

Sixteen lessons (three credits). $10.00. Mr. Polmantier.

67. Junior High School. A study of the origin and growth and the special purposes of this institution and of the appropriate reorganization to achieve those purposes, including the organization and content of the curriculum, provisions for individual differences, advisory system, social organization (extra-curricular activities), methods of teaching, departmentalization, promotion, staff, plant, etc. Comparisons with secondary schools of Europe. This course may be substituted for Ed. 167 in undergraduate curricula. Not open to those who have had Introduction to Secondary School Teaching III. Prerequisites: Psychology I and II and five credits in Education.

Sixteen lessons (three credits). $10.00. Mr. Carlson.

69. Extra-curricular Activities. Consideration is given to developing guiding principles of pupil participation in the extra-curricular phase of school life. Purpose of extra-curricular activities; membership in clubs; meetings and programs; officers of organizations; financing extra-curricular activities; student government; publications and journalistic organizations; social, moral leadership and guidance clubs. Prerequisites: ten hours in Education including Education 51a.

Sixteen lessons (three credits). $10.00. Mr. Carlson.

* This course is part of a three-quarter sequence in the College of Education, credit for which is granted only when the complete sequence is taken and student has passed the qualifying examination. See the Bulletin of the College of Education.

73. Educational Sociology. General sociological principles and their application to the schools; the study of the community and the adjustment of the teacher to varying types of communities; factors in the development of personality and the relation of personality to the larger social group; a systematic survey of educative aspects of the home, church, recreation, industry, and community, as well as of the school; the problems of the place of education in social progress and the varying viewpoints.

Sixteen lessons (three credits). $10.00. Mr. McCune.

81. Historical Foundations of Modern Education. The history of education in ancient and medieval times. The study includes the development of educational theories and practices among the Greeks and the Romans and the ancient Hebrews and during the Middle Ages and ends with the recovery of the classical heritage in the sixteenth century. Textbook assignments and supplementary readings. This course may be substituted for H. Ed. 101 in undergraduate curricula. Prerequisites: junior standing in college or university.

Sixteen lessons (three credits). $10.00. Miss Alexander.

82. History of Modern Secondary Education. A historical study of secondary schools in western Europe and America in modern times, including such topics as the revival of classical learning; the reorganization of secondary schools in the sixteenth century; the rise of scientific inquiry; types of secondary schools in England, France, and Germany; the American Latin grammar school and academy; the rise of the high school. Textbook assignments and supplementary readings. This course may be substituted for H. Ed. 102 in undergraduate curricula. Prerequisites: junior standing in college or university.

Sixteen lessons (three credits). $10.00. Miss Alexander.

†83. History of Modern Elementary Education. Theory and work of the great educators, such as Comenius, Pestalozzi, Herbart, and Froebel; the rise of state school systems in Germany, France, England, and the United States; the development of the common school and of educational practices. Textbook assignments and supplementary readings. This course may be substituted for H. Ed. 103 in undergraduate curricula. Prerequisites: junior standing in college or university.

Sixteen lessons (three credits). $10.00. Miss Alexander.

90. Basic Principles of Measurement. Principles of measurement applied to the construction, administration, and interpretation of educational and psychological tests. The course will involve the construction of achievement tests in the student's particular field of teaching. This course may be substituted for Ed. Psy. 120 in undergraduate curricula. Prerequisite: Introduction to Statistical Methods.

Sixteen lessons (three credits). $10.00. Mr. Cook.

94. Adult Education. This survey course in the field of adult education is designed for supervisors and teachers of adults in both public and private agencies. It deals with history, philosophy, programs, and trends in the broad fields of adult education with special emphasis on the work done by such agencies as: public schools, university extension, agricultural extension, vocational education, libraries, worker's education, correspondence schools, radio, museums, and educational programs of churches,

† Not open to those who have had History of Education 71 (Brief Course in History of Education).

clubs, and social agencies. Each student will be given an opportunity to devote part of his time to the field of his special interest. This course may be substituted for Ed. 104 in undergraduate curricula.

Sixteen lessons (three credits). $10.00. Mrs. May.

Registrations accepted after September 15, 1940.

INSTITUTE OF TECHNOLOGY

The Institute of Technology embraces the College of Engineering and Architecture, the School of Chemistry, and the School of Mines and Metallurgy. The Institute of Technology accepts up to nine credits in correspondence study in English and mathematics (College Algebra, Trigonometry, and Analytical Geometry), or in subjects not required in the curriculum in which the student is registered.

ENGINEERING

MECHANICAL DRAWING

1. Engineering Drawing. Elements of drafting including methods of representation, geometry, lettering, sketching, dimensioning, and working drawings. Prerequisite: Solid Geometry.

   Sixteen lessons (three credits). $10.00. Mr. French.

2. Engineering Drawing. Sections, auxiliary views, conventions, standards, tolerance dimensioning, working drawings, tracing. Prerequisite: Drawing 1.

   Sixteen lessons (three credits). $10.00. Mr. French.

44. Freehand Lettering. Practice in freehand commercial Gothic lettering as used by draftsmen and engineers and in offices, stores, hospitals, libraries, schools, etc.

   Six lessons (one credit). $5.00. Mr. French.

GENERAL ENGINEERING

70. Slide Rule. Practical course for engineers and office workers. Position of decimal point in computations stressed.

   Six lessons (one credit). $5.00. Mr. French.

MATHEMATICS

For additional credit courses in mathematics see pages 38-39.

1c. Shop Mathematics I. Arithmetic from fractions through proportion. Problems in areas, volumes, weights of materials, screw threads and gear. Practical man's course. Also, valuable for the teacher who is preparing to teach applied mathematics under the Smith-Hughes Act.

   Sixteen lessons (no credit). $10.00. Mr. Edwards.

2c. Shop Mathematics II. Logarithms, algebra, and geometry from a shop standpoint. Practical problems.

   Sixteen lessons (no credit). $10.00. Mr. Edwards.

9c. Higher Algebra. Review of elementary algebra, linear equations, determinants, ratio and proportion, variation, quadratic equations, graphs, progressions, binomial theorem. Prerequisite: one year of elementary algebra.

   Twenty lessons (one-half entrance unit). $12.50. Mr. Priester.

10c. Solid Geometry. Standard theorems and exercises. Practice in special proofs and original exercises to develop imagination and initiative. Prerequisite: one year of plane geometry.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

NOTE.—Courses 9c and 10c meet the entrance requirements in mathematics of the Institute of Technology.

11. College Algebra. Theory of quadratic equations, interpretation of complex results, graphical representation, indeterminate equations, ratio, proportion, variation, progressions, series, undetermined coefficients, binomial theorem, logarithms, theory of equations, Horner's method. Prerequisite: Course 9c.

Twenty-seven lessons (five credits). $17.00. Mr. Priester.

12. Trigonometry. Graphical representation of functions, computation by logarithms. Trigonometric functions, plane right triangles, reduction formulas, fundamental relations, addition formulas, double angles, half angles, identities and equations, inverse functions, oblique triangles, DeMoivre's theorem, spherical right triangles. Prerequisite: Course 11.

Twenty-seven lessons (five credits). $17.00. Mr. Edwards.

13. Analytical Geometry—Plane and Solid. Co-ordinate systems, locus and equation, straight line, circle, parabola, ellipse and hyperbola. Transformation of co-ordinates and simplification of equations. Polar co-ordinates, higher plane curves, tangents, normals. Prerequisites: Courses 11 and 12.

Twenty-seven lessons (five credits). $17.00. Mr. Edwards.

24. Differential Calculus. Discussion of limit and continuity of a function, derivative of algebraic and transcendental function. Simple application of derivatives, maxima and minima, differentials, rates, velocities and acceleration, radius of curvatures. Law of the mean, indeterminate forms, partial differentiation, series. Prerequisites: Courses 11, 12, and 13.

Twenty-seven lessons (five credits). $17.00. Mr. Edwards.

25. Integral Calculus. Integration of standard elementary forms, definite integral, rational fractions, integration by substitution, by parts, reduction formulas, application to areas, surfaces, and volumes. Use of integral tables. Prerequisite: Course 24.

Twenty-seven lessons (five credits). $17.00. Mr. Edwards.

MECHANICS

1c. Elementary Mechanics. Short practical course in elementary mechanics for those who have not had calculus. Numerical and simple graphical calculations of the action of forces on machines. Components of forces; analysis of stresses in simple structure; centroids and moments of inertia of plane areas. Prerequisites: Shop Mathematics I and II or Trigonometry.

Sixteen lessons (three credits toward extension certificate only). $10.00. Mr. Priester.

26. Technical Mechanics: Statics. Characteristics of a force, parallelogram law, moments, couples, resultant of a force system, equilibrium of a force system, friction, centroids, moments of inertia, catenary. Prerequisite: Integral Calculus.

Twenty-seven lessons (five credits). $17.00. Mr. Priester.

127. Technical Mechanics: Dynamics. Force, mass acceleration, translation and rotation, gyroscope, governors, work, energy, power, conservation of energy, impulse, momentum, loss of kinetic energy, conservation of momentum. For those who wish to apply the principles of dynamics and kinematics to engineering problems. Prerequisite: Technical Mechanics: Statics.

Twenty-seven lessons (five credits). $17.00. Mr. Priester.

128. Strength of Materials. Mechanical and elastic properties of materials of construction, beams, shafts, columns, combined stresses, hollow cylinder rollers, plates, curved bars, springs, dynamic stresses, true stresses. Prerequisites: Courses 25 and 26.

Twenty-seven lessons (five credits). $17.00. Mr. Priester.

AERONAUTICAL ENGINEERING

1c. Elementary Aeronautics. This course offers the basic principles of aviation in an elementary way. History of aviation; the airplane and its parts; principles of aerodynamics; theory of flight; airfoils, slots, and flaps; aerodynamic resistance; stability and control; aircraft engine operation; propellers; flight maneuvers; aircraft construction; seaplanes and flying boats; military and commercial aircraft applications; radio; accessories; instruments. No prerequisite of mathematics is required altho a knowledge of high school algebra will be helpful.

Sixteen lessons (no credit). $10.00. Mr. Barlow.

CIVIL ENGINEERING

1c. Elementary Structural Steel Design. An introductory course covering the analysis of simple structures and their design. Algebraic and graphical methods of analysis of the treatment of dead, live, and moving loads; the design of simple tension and of compression members, beams, girders, and riveted and welded connections. Application of these principles is made to roof and bridge trusses. While this course is a complete unit, it would be advisable for the student to follow up his work by taking Courses 2c or 5c or both. Prerequisites: Mechanics 26 and 128, or satisfactory evidence of ability to do the work of this course.

Sixteen lessons (three credits). $10.00. Mr. Wise.

2c. Steel Bridge Design. A course in the theory and practice of the design of statically determinate bridges. Stress analysis of parallel and curved chord trusses, trusses with subdivided panels, K-trusses, Whipple trusses, cantilevers, three-hinged arches, and skew trusses; and of the design of floor systems; riveted and pin-connected trusses; lateral and sway bracing; portals and end bearings. Prerequisite: Elementary Structural Steel Design or its equivalent. Courses 1c and 2c should provide a satisfactory elementary training for draftsmen, mechanics, and others who desire to enter the field of bridge design.

Sixteen lessons (three credits). $10.00. Mr. Wise.

5c. Steel Building Design. A course in the theory and practice of the design of the structural steel framework of buildings—shop, factory, office buildings, and warehouses. The various systems of framing, and connections, balconies, roof framing, footings, fire protection, and erection. Prerequisites: Elementary Structural Steel Design or equivalent. Courses 1c and

5c should provide a satisfactory training for draftsmen, mechanics, and others who wish to obtain a start in building design work. Equivalent to lecture portions of C.E. 33 and 38.

Sixteen lessons (three credits). $10.00. Mr. Wise.

46c. Plain Concrete. Properties of concrete and concrete materials. Subjects discussed include portland cement, special cement, aggregates, proportioning, mixing, placing, field control, admixtures, durability, volumetric changes, tests and testing procedure, cold weather construction, etc. Prerequisite: knowledge of arithmetic.

Sixteen lessons (three credits). $10.00. Mr. Hughes.

49c. Advanced Reinforced Concrete Design. A course intended for civil engineers who are thoroly familiar with elementary reinforced concrete design. It takes up in detail the exact design of continuous beams and rigid frames as applied to reinforced concrete structures, the theory and design of flat slabs, and of retaining walls, footings and mat foundations by the more exact methods based on recent studies in the elasticity and strength of materials. Prerequisite: Satisfactory evidence of familiarity with elementary reinforced concrete design.

Sixteen lessons (three credits). $10.00. Mr. Wise.

ELECTRICAL ENGINEERING

1c. Direct Current Machinery I. An elementary study of magnetism and electricity. Simple laws of magnetism, and the relation of magnetism to direct current electricity are developed. Series and parallel circuits, and combinations of both, simple wiring and armature winding are taken up. Prerequisites: Elementary Algebra A and B.

Sixteen lessons (three credits toward extension certificate only). $10.00. Mr. Edwards.

MECHANICAL ENGINEERING

1c. Steam Power Plants I. A course for boiler operators. Combustion; coal; firing methods; boiler construction and fittings; power and care of boilers; pipes and pipe covering; steam tables.

Sixteen lessons (three credits toward extension certificate only). $10.00. Mr. Martenis.

NOTE.—For those engaged in boiler room work and who may wish to take an examination for a chief engineer's license, Shop Mathematics, Course 1c is of the utmost importance.

2c. Diesel Engines. A study of stationary and mobile Diesel engines from an engineering standpoint. Fundamental engine mechanisms, pistons, connecting rods, valves, cylinder heads, Diesel fuels, fuel pumps, and injection systems; combustion chambers and combustion systems. Details of modern Diesel engines. Engine operation, analysis of engine troubles, engine repairs. Prerequisites: Elementary Mechanics and Trigonometry or permission of instructor.

Sixteen lessons (no credit). $10.00. Mr. Robertson.

3c. Elementary Air Conditioning. A course arranged to present the fundamentals of air conditioning to those interested in designing, installing, selling, or recommending the modern type of appliances for heating, cooling, humidifying, or otherwise conditioning the air for residences

and other buildings. The subject-matter of this course deals with the comfort conditions of the human body; the laws of temperature, pressure, humidity, etc.; calculation of heat transmission losses and heating loads; calculation of cooling loads including sensible heat load, effect of solar radiation, and latent heat load; humidification and dehumidification; air distribution and air motion; air duct design including pressure losses, friction losses, size of ducts, air velocities, and duct construction. Prerequisite: Beginning Algebra or permission of instructor.

Sixteen lessons (three credits). $10.00. Mr. Algren, Mr. Jordan.

6c. Heating and Ventilating. The principles and installation of heating and ventilating apparatus. Introduction and study of heat; heat losses; ventilation practice; air conditioning; heating systems of various kinds; piping systems; central station heating; and heating accessories.

Sixteen lessons (three credits). $10.00. Mr. Martenis.

16c. Refrigeration. A comprehensive study written in style that can readily be understood. Study of heat; cooling processes; principles of refrigeration; refrigerants; compression and absorption; systems; automatic and domestic machines; theory of refrigeration; heat insulation, ice making; cold storage; air conditioning; brine systems and piping; prime movers; economics of refrigeration; problems in refrigeration.

Sixteen lessons (three credits). $10.00. Mr. Martenis.

ENGLISH

PREPARATORY COURSES

1. English Composition A. This course, and the three following, are suited to the needs of those persons who do not have a good foundation in English, and hence need training in the correct use of the language. It covers that part of the work in composition usually given in the freshman year in high schools. It gives practice in writing compositions on simple subjects, with special attention to the development of sentence structure and a unified paragraph; special drill to overcome errors in grammar, spelling, punctuation, etc.; training in the use of the dictionary.

Twenty lessons (one-half entrance unit). $12.50. Mr. Voelker.

2. English Composition B. This course is a continuation of the work of the first year, and covers the equivalent of the sophomore work in composition in high schools. Prerequisite: Course 1 or equivalent.

Twenty lessons (one-half entrance unit). $12.50. Mr. Voelker.

3. English Composition C. This course is a continuation of Courses 1 and 2, but it is more advanced and presupposes the ability to do more thoughtful work, as it covers the composition work of the junior year of the high school. Composition forms a large part of the course. In it emphasis is placed on gathering material and organizing it into longer themes than those of the first year. Drill in spelling, punctuation, etc. Includes more difficult points than those covered in the first year. Prerequisites: Courses 1 and 2 or equivalent.

Twenty lessons (one-half entrance unit). $12.50. Mr. Voelker.

4. English Composition D. This course is a continuation of Course 3, and corresponds to high school senior English composition. Prerequisites: Courses 1, 2, and 3 or their equivalent.

Twenty lessons (one-half entrance unit). $12.50. Mr. Voelker.

5. English Literature A. The object of this course is to arouse in the student an interest in the reading of good literature and to assist him to a knowledge and appreciation of some of the masterpieces in the various forms of literature. It includes the study of a volume of short stories, a volume of poetry, Shakespeare's *Merchant of Venice,* and Scott's *Ivanhoe.* The reading of an additional volume of each type is required of the student and questions are used to assist as well as to test his understanding of the works read. The course corresponds to the literature part of high school freshman English.

   Twenty lessons (one-half entrance unit). $12.50. Miss Grandy.

6. English Literature B. The aim of this course is similar to that of English Literature A but the material studied is more difficult and the standard of work higher. The works studied are Poe's *Tales,* Shakespeare's *Julius Caesar,* Dickens' *Tale of Two Cities,* Lowell's *Vision of Sir Launfal,* and Coleridge's *Rime of the Ancient Mariner.* Outside reading from literature of each type is also required. This course corresponds to the literature part of high school sophomore English. Prerequisite: Course 5 or equivalent.

   Twenty lessons (one-half entrance unit). $12.50. Miss Grandy.

7. English Literature C. This is a course in American literature. The works of well-known American authors, including those of recent date, are studied according to type rather than in chronological order. Some knowledge of the authors' lives as well as of their works is required. The course corresponds to the literature half of high school junior English. Prerequisites: Courses 5 or 6 or equivalent.

   Twenty lessons (one-half entrance unit). $12.50. Miss Grandy.

8. English Literature D. This course, which corresponds to high school senior English literature, consists of a chronological study of the outstanding writers of English literature, their chief works and the periods in which they lived. It aims to establish standards of appreciation for the student's later reading, and to stimulate him to further reading of good literature. Prerequisites: Courses 5, 6, and 7 or equivalent.

   Twenty lessons (one-half entrance unit). $12.50. Miss Grandy.

COLLEGE COURSES

Literature

†1c. Freshman Literature I. Intended for students who have had work in composition equivalent to that of English A-B-C, but who have not had the study of English classics included in that course. This course carries university credit for the work in literature of English A. It includes a study of the drama as illustrated by Shakespeare's *Henry IV,* Part I, *Romeo and Juliet,* and several plays of modern dramatists.

   Sixteen lessons (three credits). $10.00. Miss Grandy.

†2c. Freshman Literature II. This course carries university credit for the work in literature (prose writers) of English B. It includes a study of the works of Macaulay, Huxley, Newman, and Stevenson.

   Sixteen lessons (three credits). $10.00. Miss Grandy.

† The material covered in Composition 4, 5, 6 and Freshman Literature I, II, III is equivalent to that given in classes in English A, B, C. Students completing these six courses through correspondence study will be entitled to fifteen credits. No credit toward graduation is allowed for Freshman Literature I, II, III until Composition IV, V, VI are completed.

†3c. Freshman Literature III. This course carries university credit for the work in literature of English C. It includes a study of various types of poetry from early ballads to dramatic monologs and free verse.

Sixteen lessons (three credits). $10.00. Miss Grandy.

*21. Introduction to Literature I. An intensive study of the leading writers of poetry and prose and of their historical background. The entire course of three terms begins with Marlowe and ends with Arnold. A knowledge of English history from Elizabeth to Edward VII is required. The first term includes Marlowe, Spenser, Bacon, Browne, Milton, Bunyan, and Dryden. Prerequisites for credit: Composition 4, 5, 6.

Twenty-seven lessons (five credits). $17.00. Mr. Hessler.

*22. Introduction to Literature II. A continuation of 21. Addison and Steele, Swift, Pope, Fielding, Johnson, Boswell, and Sheridan.

Twenty-seven lessons (five credits). $17.00. Mr. Hessler.

*23. Introduction to Literature III. A continuation of 22. Wordsworth Lamb, Byron, Shelley, Keats, Carlyle, Browning, and Arnold.

Twenty-seven lessons (five credits). $17.00. Mr. Hessler.

38. Twentieth-Century Literature II. Readings in British and American literature since the 1890's. The course comprises poetry and drama. The following texts will be used: Sanders and Nelson, *Chief Modern Poets of England and America* (Macmillan). Chandler and Cordell, *Twentieth-Century Plays: American* (Nelson). Prerequisites for credit: Composition 4, 5, and 6.

Sixteen lessons (three credits). $10.00. Mr. Sanford.

39. Twentieth-Century Literature III. The novel since Thomas Hardy. The course covers at least the following three English novels: Thomas Hardy's *Tess of the D'Urbervilles,* Joseph Conrad's *Lord Jim,* Arnold Bennett's *The Old Wives' Tale;* and the following three American novels: Ernest Hemingway's *A Farewell to Arms,* Thomas Wolf's *Of Time and the River,* John Steinbeck's *The Grapes of Wrath.* Prerequisites for credit: Composition 4, 5, and 6.

Sixteen lessons (three credits). $10.00. Mr. Sanford.

Registrations accepted after October 1, 1940.

§52. The English Novel I. The development of the novel from Defoe to Scott. Emphasis on the reading of a number of important novels and excerpts from others, supplemented by biographical and literary information obtained from a textbook and from one of the ordinarily accessible encyclopedias. The following novels are read: *Robinson Crusoe, Joseph Andrews, Humphry Clinker, Evelina, Pride and Prejudice,* and *The Heart of Midlothian.* Prerequisites: Composition 4, 5, 6, or exemption.

Sixteen lessons (three credits). $10.00. Mr. Sanford.

§53. The English Novel II. Method as in Course 52, except that no excerpts will be read. The reading consists of *Bleak House, Vanity Fair, Jane*

* Students must take either 21 and 22 or 22 and 23 to receive credit. Two quarters are required as a prerequisite for a major sequence; the second and third quarters are required for a teacher's certificate.

† The material covered in Composition 4, 5, 6 and Freshman Literature I, II, III is equivalent to that given in classes in English A, B, C. Students completing these six courses through correspondence study will be entitled to fifteen credits. No credit toward graduation is allowed for Freshman Literature I, II, III until Composition IV, V, VI are completed.

§ Parts I and II must be completed before credit will be allowed for either.

Eyre, Wuthering Heights, Adam Bede, Barchester Towers, Mary Barton, Richard Feverel. Prerequisites: Composition 4, 5, 6, or exemption, and English Novel I.

Sixteen lessons (three credits). $10.00. Mr. Sanford.

†55. Shakespeare I. Shakespeare's development as a dramatist. A careful study of the Comedies. Prerequisites: Composition 4, 5, 6, and six additional credits in English.

Sixteen lessons (three credits). $10.00. Mr. Nichols.

†56. Shakespeare II. A continuation of Course 55, with emphasis on Tragedy.

Sixteen lessons (three credits). $10.00. Mr. Nichols.

†73. American Literature I. A survey of American literary development in the seventeenth, eighteenth, and early nineteenth centuries. Prerequisites for credit: Composition 4, 5, 6, and six additional credits in English.

Sixteen lessons (three credits). $10.00. Mr. Nichols.

†74. American Literature II. A continuation of 73. A survey of American literary development from Hawthorne to the end of the nineteenth century.

Sixteen lessons (three credits). $10.00. Mr. Nichols.

Composition

NOTE.—All lesson reports in English composition must be returned to the Correspondence Study Department before credit will be allowed for a course.

A. Subfreshman Composition. A course in the simple fundamentals of correct English, intended to give additional drill to high school graduates who need further preparation for college English.

Twelve lessons (no credit). $7.50. Mrs. del Plaine.

4. Composition IV. Practical training in the art of writing, the principles of structure, and analysis of specimens of good prose. Practice in writing papers, most of them expository. Composition 4, 5, 6 fulfill the freshman English requirement.

Sixteen lessons (three credits). $10.00. Mr. Clark.

5. Composition V. Continuation of Course 4. This is the second quarter of the required work in English. It includes careful study of the paragraph and further work in theme writing. Prerequisite for credit: Composition 4.

Sixteen lessons (three credits). $10.00. Mrs. McFadyen.

6. Composition VI. Continuation of Course 5. Study of diction, and practice in writing exposition and narration. Completion of this course satisfies the university requirement in English composition. Prerequisites for credit: Composition 4 and 5.

Sixteen lessons (three credits). $10.00. Mrs. McFadyen.

†27. Advanced Writing I—Exposition. Study and writing of essays with emphasis on structure and organization. Prerequisites for credit: English A-B-C or Composition 4, 5, 6, or exemption from requirement.

Sixteen lessons (three credits). $10.00. Mr. Sanford.

†28. Advanced Writing II—Narration and Description. Study of principles of description and narration with analysis of specimens and exercises in writing. Prerequisite for credit: Advanced Writing I.

Sixteen lessons (three credits). $10.00. Mr. Sanford.

† Parts I and II must be completed before credit will be allowed for either.

†69. Short Story Writing I. A study of short story technique with careful analysis of typical stories. Exercises in plot, setting, and characterization. Prerequisites for credit: Composition 4, 5, 6, 27, and 28.

Sixteen lessons (three credits). $10.00. Mr. Briggs.

†70. Short Story Writing II. A continuation of Short Story Writing I, with analysis of stories and emphasis upon the student's completion of several stories of his own composition. Prerequisite for credit: Short Story Writing I.

Sixteen lessons (three credits). $10.00. Mr. Briggs.

80c. Independent Writing. Specifically designed for the student who neither needs nor desires the formal restrictions of a traditional composition course. The student is given complete freedom. The instructor will criticize any writing which the student submits and will offer individual suggestions for study and reading calculated to aid the writer in his particular problems. No formal prerequisites; but the student must have mastered the fundamentals of composition. It is to the student's advantage that he submit a sample of his writing for the approval of the instructor before actually registering for this course.

Sixteen installments of a total of approximately 15,000 words (no credit). $10.00. Mr. Avery.

ESPERANTO

1. Beginning Esperanto. Grammar and simple composition. The course aims to give the student sufficient knowledge of elementary Esperanto to enable him after a few months' study to read, write, and speak simple Esperanto. A feature of the course will be an early correspondence with foreign Esperantists.

Sixteen lessons (no credit). $10.00. Dr. Wendell.

2. Advanced Esperanto. A continuation of Course 1. Designed for those who wish to write and speak Esperanto, not merely sufficiently well to be understood, but in good style. The student will continue to correspond, and will do more original work in connection with a study of the best Esperanto literature, in order to acquire the style and elegance of expression which the language, like national languages, has in its own way. Prerequisite: Course 1.

Sixteen lessons (no credit). $10.00. Dr. Wendell.

GEOLOGY

8. Introductory Geology. An introductory treatment of the materials of the earth and of geologic processes; principles of earth sculpture, glaciation, volcanic activity, mountain building, etc., as a key to the interpretation of the surface features and the history of the earth. No prerequisites.

Twenty-seven lessons (five credits). $17.00. Mr. Thiel.

† Parts I and II must be completed before credit will be allowed for either.

GERMAN

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before credit will be allowed for a course.

*1. Beginning German I. Grammar and easy composition. The course aims to give the student a knowledge of the elements of German grammar, the facility to read easy German, and to write simple German sentences.
Twenty-seven lessons (five credits). $17.00. Mr. Burkhard.

*2. Beginning German II. A continuation of Course 1. Prerequisite: Course 1.
Twenty-seven lessons (five credits). $17.00. Mr. Burkhard.

*3. Beginning German III. Grammar and composition continued; selected readings in easy prose and verse. Prerequisites: Courses 1 and 2 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Burkhard.

*4. Intermediate German. Selections from modern narrative and descriptive prose. Assigned outside readings and reports. Prerequisites: Courses 1, 2, and 3 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Downs.

25-26. Chemical German. Review of grammar. Reading of works on chemistry. Vocabulary exercises. Prerequisite: Course 24, 1, or one year of preparatory German.
Course 25—Twenty lessons (four credits). $13.50. Mr. Meessen.
Course 26—Twenty lessons (four credits). $13.50. Mr. Meessen.

30. Medical German I. This course is intended primarily for medical students. Articles on anatomy, biology, embryology, comparative anatomy, surgery, and other fields of medicine. Prerequisite: German 3, given in the College of Science, Literature, and the Arts.
Sixteen lessons (three credits). $10.00. Mr. Burkhard.

31. Medical German II. A continuation of Course 30.
Sixteen lessons (three credits). $10.00. Mr. Burkhard.

32. Medical German III. A continuation of Course 31.
Sixteen lessons (three credits). $10.00. Mr. Burkhard.

†50. Elementary Composition I. A thoro review of the fundamentals of German grammar with particular attention to, and practice in the use of, the idioms and characteristics of conversational and written German. Prerequisite: Course 4 or 40, or equivalent.
Eleven lessons (two credits). $7.00. Mr. Munro.

†51. Elementary Composition II. Translation and grammar review. Prerequisite: Course 50.
Eleven lessons (two credits). $7.00. Mr. Munro.

63. Drama I. Study of the present-day drama in Germany. Selected plays of Hebbel, Hauptmann, or Sudermann, with assigned readings and reports. Open to those who have completed Courses 1, 2, 3, and 4.
Twenty-four lessons (four and one-half credits). $15.00.
Mr. Downs.

* May be taken for one entrance unit.

† Both courses must be completed before credit is allowed for either.

64. Drama II. Study of the German drama of the eighteenth century and through the classic period. Selected plays of Lessing, Goethe, or Schiller, with assigned readings. Prerequisites as in Course 63.

Twenty-four lessons (four and one-half credits). $15.00.

Mr. Downs.

GREEK

(See Classics.)

HISTORY

PREPARATORY COURSES

1. American History. Similar to the third or fourth year of high school course. Part A—Social and economic life of the colonists, English colonial policy, the Revolution, the establishment of the new government, the West in national growth. Part B—Rise of sectional interests and the resultant conflict, economic development after the Civil War, and awakening interest in foreign affairs, American imperialistic adventures, the cause and results of the World War, the boom and depression years.

Part A, twenty lessons (one-half entrance unit). $12.50.

Mr. McCune.

Part B, twenty lessons (one-half entrance unit). $12.50.

Mr. McCune.

2. World History. Corresponds to the second or third year of high school course. Survey of the development of civilization from prehistoric man to the present. Part A through 1815, stresses oriental, Greek, Roman, and medieval civilizations, the Reformation, rise of national states, colonial rivalry, the French, the Revolution, Napoleon, and the Congress of Vienna. Part B stresses the Industrial Revolution, modern democracy in the various countries of Europe, imperialism, the World War, post-war problems and social, economic, and political conditions in the world today.

Part A, twenty lessons (one-half entrance unit). $12.50.

Mr. McCune.

Part B, twenty lessons (one-half entrance unit). $12.50.

Mr. McCune.

COLLEGE COURSES

1. European Civilization I (formerly called Modern World I). A survey of European civilization from the decline of Rome to the outbreak of the French Revolution. Emphasis is placed on the period since 1500.

Twenty-seven lessons (five credits). $17.00.

2. European Civilization II (formerly called Modern World II). A survey of European civilization from 1789 to the present. Stress is laid on forces such as nationalism, liberalism, and imperialism which have helped in shaping present-day Europe.

Twenty-seven lessons (five credits). $17.00.

†4. English History I—England in the Middle Ages. A survey of English history from the earliest times to 1485. Special attention is paid to the growth of English nationalism and of such national institutions as the monarchy, the common law courts, and parliament.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

† All parts of the sequence to which this course belongs must be completed before credit is allowed for any part of it.

†5. English History II—Expansion of England 1485-1748. The Reformation and the growth of the modern state; the constitutional struggle and the development of the overseas empire; the beginning of the wars with France.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

†6. English History III—The Modern Empire and the Commonwealth of Nations. The Seven Years War and the dissolution of the First Empire; the Industrial Revolution; the struggle with Napoleon and the growth of the Second Empire; the development of democracy and of the Commonwealth of Nations.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

17. Europe in the Middle Ages (800-1500). A study of western European history from the fall of the Roman Empire to the rise of the modern states. Prerequisites: ten credits in history for freshmen; others, no prerequisites.

Twenty-seven lessons (five credits). $17.00. Mr. Kane.

†20. American History I (1763-1815). (Formerly Hist. 7.) This course covers the period from 1763 to the close of the War of 1812, and includes the background of the Revolution, the War for Independence, and the formation of the national government, the growth of parties, and the conflicts over foreign policies, the development of democracy and of nationalism. Prerequisites: ten credits in history for freshmen; others, no prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

†21. American History II (1815-1865). (Formerly Hist. 8.) A survey of the development of the United States from the close of the War of 1812 to the close of the Civil War. Special emphasis upon the westward movement, the new democracy, the tariff and public land questions, sectionalism and slavery conflicts, and the background of the Civil War. Careful study of the social and economic changes of the period. Prerequisites: ten credits in history for freshmen; others, no prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

†22. American History III (1865-1917). (Formerly Hist. 9.) A survey of American history from the close of the Civil War to the entry of the United States into the World War. Special emphasis is laid on the economic changes of the period and their reaction upon politics. Prerequisites: ten credits in history for freshmen; others, no prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

†50. Ancient History I. The Ancient Near East. Survey of the stages of human existence in the prehistoric ages, the development of organized societies and great civilizations in Egypt and Mesopotamia, and formation of the great world empires of Assyria and Persia. Prerequisites: nine credits in history. Open to juniors and seniors without prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

†51. Ancient History II. Greece. Prerequisite: History 50. Open to juniors and seniors without prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

† All parts of the sequence to which this course belongs must be completed before credit is allowed for any part of it.

†52. Ancient History III. Rome. Prerequisite: History 51. Open to juniors and seniors without prerequisites.

Sixteen lessons (three credits). $10.00. Mr. Kane.

†83. American Economic History I—Colonial Period. Two sets of influences meet to produce the early economic history of America; the first, what the colonist brought with him from Europe; the second, what he found here upon arrival. The origins and development of colonial economic life. Prerequisites: fifteen credits in history or ten credits in economics, political science, or sociology.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

†84. American Economic History II—Early National Period. The struggle for political and economic independence, the protection of economic interests afforded by the new Constitution, the influence of the Supreme Court upon economic development, and the early westward movement. Prerequisite: History 83.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

†85. American Economic History III—Later National Period. The economic history of the Civil War and the expansion of American business at home and abroad; the recent history of the Supreme Court. Prerequisite: History 84.

Sixteen lessons (three credits). $10.00. Mrs. Mudgett.

92. History of Minnesota. The course covers Minnesota's history since the coming of the French, but with primary emphasis on the period following statehood. It surveys the development of the state's principal industries, the growth of its cities, its racial composition, and its changes in social and political attitudes. Access to Folwell's *History of Minnesota* and the magazine *Minnesota History* will be required for registration.

Sixteen lessons (three credits). $10.00. Miss Clapesattle.

HOME ECONOMICS

(For courses in Interior Decoration see Art Education.)

2. Introduction to Textiles. A course for store people and consumers. Study of materials in the store as used in garments and home furnishings. Rayon, wool, silk, cotton, and linen. Woven and knitted materials—processes of manufacture, features of construction and finish which affect the price, appearance, and serviceability of the fabric. Fiber identification. Trade terms used in newspaper and magazine advertising. Access to a compound microscope desirable but not imperative. A laboratory fee of $1.00 required, payable at time of registration.

Sixteen lessons (three credits). $10.00. Miss Caplin.

HOME LANDSCAPING AND GARDENING

G.C.163. Home Landscape Planning. A course for those who want to know how to plan the home grounds for greater use and enjoyment, with an introduction to the principles of landscape design, their use, and importance in the arrangement and decoration of the home grounds. This

† All parts of the sequence to which this course belongs must be completed before credit is allowed for any part of it.

course will be an artistic approach to the problems and prospects of home landscaping. It will also serve as a background for the pursuit of the popular hobby of gardening. There will be an independent student project of planning either a hypothetical home plot or the home place of the student. In this project the student will be guided by the instructor. The course will give the home owner and others interested in home landscaping a practical program of study.

Sixteen lessons (three credits). $10.00. Mr. Phillips.

HYGIENE

1c. Maternal and Child Hygiene. Prepared by the Division of Child Hygiene of the Minnesota Department of Health. The lessons take up personal hygiene and home hygiene with special emphasis on maternal and child welfare; diseases of infancy and childhood and care of sick in the home; prenatal hygiene, care of the mother, common complications and how to avoid them, preparation for confinement and after-care of the mother and child; infant care and feeding, weaning and later feeding, growth, development, and training. This course is given in co-operation with state agencies without charge. Offered to residents of Minnesota only.

Fifteen lessons (no credit). Free. Dr. Hartley.

INTERIOR DECORATION

(See Art Education.)

JOURNALISM

1c. Rural Community Reporting. Gathering and writing news of the rural neighborhood for the local community newspaper, sometimes called country correspondence; analysis of rural neighborhood groups and their news interests; study of the obligations of the rural reporter, to his neighborhood, and to his newspaper; practical exercises in the gathering and writing of rural news.

Sixteen lessons (three credits). $10.00. Mr. Barnhart.

†13. Newspaper Reporting I. Study of the newspaper audience; structure and writing of the news story; study of news values; exercises in journalistic style; analysis of newspapers; news gathering and reportorial methods. Numerous writing assignments.

Sixteen lessons (three credits). $10.00. Mr. Charnley.

†14. Newspaper Reporting II. Continued study of the news gathering and of writing the "straight" news story; the human interest or feature story; analysis of newspapers; special types of reporting; "made" news and advanced interviewing. Numerous writing assignments. Prerequisite: Course 13.

Sixteen lessons (three credits). $10.00. Mr. Charnley.

†15. Newspaper Reporting III. Study of newspaper law, including libel, rights of the press, study of "privilege," and so on; advanced reporting; the interpretative story; the series news story. Numerous writing assignments. Prerequisite: Course 14.

Sixteen lessons (three credits). $10.00. Mr. Charnley.

† No credit will be given until Courses 13, 14, and 15 are completed.

68. Radio Writing. Study and practice in the several forms of radio writing, including news, advertising, and dramatic scripts. Radio analyses and surveys. Numerous writing assignments.
    Sixteen lessons (three credits). $10.00. Mr. Charnley.
73. Newspaper and Magazine Articles I. A study in the writing of facts and opinion articles, interviews and expository articles, both serious and feature, for newspapers and magazines. Main emphasis is laid on the journalistic type of article rather than the essay type.
    Sixteen lessons (three credits). $10.00. Mr. Steward.
74. Newspaper and Magazine Articles II. A continuation of Course I, including a study of typical first-class magazines and newspapers, both of specialized and general interest, including trade publications.
    Sixteen lessons (three credits). $10.00. Mr. Steward.
82. The Supervision of School Publications. A practical consideration of the problems of the high school teacher, especially of the teacher who is inadequately prepared for such work, who supervises the newspaper, or yearbook. Editorial content; staff organization; editing; headlines; typography; make-up; business management; costs; engraving; photography; and other subjects are considered.
    Sixteen lessons (three credits). $10.00. Mr. Kildow
104c. Editorial Writing I. Study of the style and structure of editorials; practice in writing various types of editorials. Prerequisite: English A-B-C, or Composition 4, 5, 6, or exemption from English requirement.
    Sixteen lessons (three credits). $10.00. Mr. Nafziger.
105c. Editorial Writing II. The writing of editorials is continued with the study of the editorial page, its functions and special problems. Prerequisite: Editorial Writing I.
    Sixteen lessons (three credits). $10.00. Mr. Nafziger.

LATIN

(See Classics.)

LETTERING

(See page 23.)

LIBRARY TRAINING

The courses in Library Training are not part of the curriculum of the Division of Library Instruction. Those students, therefore, who major in library training will not be allowed to apply credits earned in these subjects towards graduation. These courses may be taken as elective credits, and in addition, the credits earned in them will be accepted by the State Department of Education to apply toward a teacher-librarian certificate.

52. Elementary Cataloging. The forms and principles involved in making a dictionary card catalog. Based primarily upon the Cataloging Rules of the American Library Association, with reference to other codes. Directions for the use of the printed Library of Congress cards.
    Sixteen lessons (three credits). $10.00. Miss Ihm.

54. Elementary Classification. Based on the unabridged edition of the Dewey Decimal Classification. Aims to give an understanding of the standard classification scheme and its use in a library. Considerable attention is given to modifications and adaptations useful in various types of libraries. Includes Cutter-Sanborn author numbers, accession, and card shelf-list records.

Sixteen lessons (three credits). $10.00. Miss Ersted.

MATHEMATICS

PREPARATORY COURSES

1. Elementary Algebra A. A beginning course. Treats positive and negative numbers; addition, subtraction, multiplication, and division of monomials and polynomials; simple equations in one unknown quantity; elementary special products and factoring; highest common factor and lowest common multiple. Prerequisite: common school arithmetic.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

2. Elementary Algebra B. Treats addition, subtraction, multiplication, and division of fractions including complex fractions; equations in one unknown quantity which involve fractions; graphical representation; simultaneous equations of the first degree; square roots and quadratic surds; quadratic equations in one unknown quantity. Prerequisite: Course 1.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

3. Plane Geometry A. The work of this course is elementary geometry, Books I and II. Rectilinear figures and the circle, with the miscellaneous original exercises and some elementary construction problems. Prerequisites: Courses 1 and 2.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

4. Plane Geometry B. This course treats proportion, similar triangles, proportional properties of line segments, proportional properties of chords and secants, trigonometric ratios, areas of polygons, regular polygons and circles. Prerequisite: Course 3.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

5. Solid Geometry. Standard theorems and exercises. Practice in special proofs and original exercises to develop imagination and initiative. Prerequisites: Courses 3 and 4, or equivalent.

Twenty lessons (one-half entrance unit). $12.50. Mr. Edwards.

COLLEGE COURSES

*1. Higher Algebra. A review and a collegiate treatment of the topics of elementary algebra for those who have had one year of elementary algebra. Open for credit to any student offering not more than one-half year of high school higher algebra for entrance.

Twenty-seven lessons (five credits). $17.00. Miss Carlson.

†6. Trigonometry. A beginning course of collegiate grade in plane trigonometry and logarithms. Solutions of triangles with applications to surveying and physics. Emphasis on properties of trigonometric functions,

* May be taken for one entrance unit.

† No student may receive credit for both Course 6 and Course 9c, or both Course 8 and Course 9c.

identities, and equations. Prerequisite: Mathematics 1, or high school higher algebra.§ Open for credit to students offering high school trigonometry for entrance.

Twenty-seven lessons (five credits). $17.00. Miss Thorp.

7. College Algebra. Quadratic equations, simultaneous quadratic equations, progressions, mathematical induction, the binomial theorem, permutations, combinations, probability, determinants, the theory of equations, infinite series, and partial fractions. Prerequisite: Mathematics 6.

Twenty-seven lessons (five credits). $17.00. Miss Gibbens.

†8. Commerce Algebra. Logarithms and selected topics in college algebra. A preparatory course for Mathematics 20. Prerequisite: Mathematics 1 or high school higher algebra.§

Twenty-seven lessons (five credits). $17.00. Miss Gibbens.

†9c. Logarithms. Definition and fundamental properties of logarithms. Use of logarithms in computing. Prerequisite: Mathematics 1 or high school higher algebra.

Six lessons (one credit). $5.00. Miss Gibbens.

20. Mathematics of Investment. The mathematical theory of simple interest, simple discount, compound interest and annuities certain. The applications deal with promissory notes, banking practice in the lending of money, the discharge of debts by periodic payments, depreciation funds, perpetuities, capitalization problems, and bonds. Prerequisites: Mathematics 6 and 7, or 7 and 9c, or 8.

Twenty-seven lessons (five credits). $17.00. Miss Gibbens.

30. Analytic Geometry. The elements of plane analytic geometry including the geometry of the conic sections, with a brief introduction to solid analytic geometry. Prerequisites: Courses 6 and 7.

Twenty-seven lessons (five credits). $17.00. Mr. Underhill.

50. Calculus I. Differential Calculus. Limits, continuity, differentiation, maxima and minima, applications to geometry and physics, differentials, law of the mean, indeterminate forms, convergence of series, expansions and partial differentiation. Prerequisites: Mathematics 30.

Twenty-seven lessons (five credits). $17.00. Mr. Underhill.

51. Calculus II. Integral Calculus. Indefinite integrals, definite integrals, convergence of improper integrals, the definite integral as the limit of a sum, multiple integrals and applications to geometry and mechanics. Prerequisite: Mathematics 50.

Twenty-seven lessons (five credits). $17.00. Mr. Underhill.

62. Theory of Equations I. Complex numbers, the general solution of cubic and quadratic equations, numerical solution of equations, and relations between algebraic equations and geometric constructions by ruler and compasses. Prerequisite: Mathematics 50.

Sixteen lessons (three credits). $10.00. Miss Carlson.

106. Differential Equations. Prerequisites: Mathematics 51.

Sixteen lessons (three credits). $10.00. Mr. Underhill.

† No student may receive credit for both Course 6 and Course 9c, or both Course 8 and Course 9c.

§ A *substantial* high school course in advanced algebra for one semester is sufficient. However, some students with less than one year of advanced high school algebra may prefer to take Mathematics 1 before 6 or 8.

MUSIC

4. Harmony I. Sixteen lessons (three credits). $10.00. Miss Malcolm.
5. Harmony II. Sixteen lessons (three credits). $10.00. Miss Malcolm.
6. Harmony III. Sixteen lessons (three credits). $10.00. Miss Malcolm.

These courses are the equivalent of those given at the University of Minnesota for resident students in the Department of Music. Consist of the study of scales, intervals, chords, their structure and progression, harmonization of given basses, and melodies.

Registration accepted only upon approval of previous preparation in music, which must be fully stated in the application.

65. (Music Education). Instrumentation and Orchestration. A practical study of the standard instruments of band and orchestra; their compass, key, particular difficulties, characteristic passages, effective use in combinations, substitution for missing parts; reading and writing of scores and individual parts; all with reference particularly to the small orchestra and to school organizations. Prerequisites: Music 3, 4 (Harmony) or its equivalent.

    Sixteen lessons (three credits). $10.00. Mr. Pepinsky.

76. Form and Analysis. The analysis of well-known musical compositions with regard to their formal structure and content. Review of the literature of the preclassical period. Interpretation of musical ornaments. Decadence of polyphony and the development of the homophonic style and forms. Classic music. Influences on the Romantic movement. Tendencies in modern music. The meaning of music. Prerequisites: Courses 4 and 5, and General Psychology I and II.

    Sixteen lessons (three credits). $10.00. Mr. Pepinsky.

ORIENTATION

2. An Introduction to the Social Sciences. A survey course introducing the student to the social sciences of sociology, social anthropology, social psychology, human geography, government, and economics. The objective of this course is to so enlarge the resources of the student that he may know and use the vocabulary, methods, and tools of the social sciences in order that independent reading in these fields may be undertaken with understanding. An attempt is made to show the interrelations of all of the social sciences with the aim of securing a more thoro explanation of modern social problems.

    Sixteen lessons (three credits). $10.00. Mr. Miller.
    Registrations accepted after July 1, 1940.

PHILOSOPHY

2. Logic. There is a difference between "straight" and "crooked" thinking. Logic is the study of these differences. What is a fallacy? How many pitfalls beset the attempt to think straight? When is a term properly defined? Why are sound definitions important? What is meant by a "syllogism"? What is meant by a "dilemma"? What do you understand by proof? When is proof of a statement called for? When is it complete? What is a hypothesis? How many of these do you use in an

average conversation? What is meant by "scientific thinking"? Logic is the *systematic analysis* of these and other related questions. The study of logic will show you what is involved in straight thinking. No prerequisites. (Credit not allowed pre-legal students.)

Sixteen lessons (three credits). $10.00. Mr. Castell.

PHYSICAL EDUCATION

32. Introductory Principles of Physical Education. Principles and problems connected with the philosophy, organization, administration, program construction, and methods of teaching physical education.

Sixteen lessons (three credits). $10.00. Mr. Bartelma.

56. Nature and Function of Play. A fundamental background course for either recreation or physical education. Proceeds from an understanding of the biological play drive, theories and philosophies of play, to the place of play in the modern world and its function in building an integrated personality.

Sixteen lessons (three credits). $10.00. Mr. Haislet.

63. Organization and Administration of Physical Education. Problems of organization, administration, and supervision. Arrangement of programs in physical education activities. Discussion of place of athletics in the program; schedule making; construction, equipment, and care of gymnasia and athletic fields.

Sixteen lessons (three credits). $10.00. Mr. Piper.

83. Course in School Health Education, Method and Content, listed below, is open to both men and women.

COURSES FOR WOMEN

82. Principles and Curriculum of Physical Education. In this course principles of philosophy, curriculum, method, and evaluation are studied in the light of their psychological, biological, and social significance.

Sixteen lessons (three credits). $10.00. Miss Baker.

83. School Health Education, Method and Content. Study of principles, materials, and problems of health education in preparation for health teaching. Unit of safety education.

Sixteen lessons (three credits). $10.00. Miss Starr.

95. Administration of Physical Education. Study of the care and use of facilities and equipment; organization of the physical education program from the standpoint of classification of the students, appraisal of activities, management of class with particular emphasis upon the program for girls and women. Relationship of the physical education program to the community.

Sixteen lessons (three credits). $10.00. Miss Snell.

PHYSICS

3. Elements of Mechanics. An elementary university course in the fundamental principles of mechanics. Theoretical course without laboratory work. Prerequisites: Trigonometry and one year of high school physics.

Sixteen lessons (three credits toward graduation in the College of Science, Literature, and the Arts). $10.00. Mr. Buchta.

NOTE.—Elements of Mechanics may be taken for credit toward a degree

only when it is to be counted as purely elective. It is not accepted for credit in any professional course, nor in any course where physics is a required subject or is prerequisite to any other subject. All applications for physics are subject to approval by the Department of Physics.

29. Introduction to Meteorology. Fundamental physical principles and first elements underlying meteorological study, weather map analysis and construction; also local meteorological observation. Prerequisite: permission of instructor.
    Sixteen lessons (three credits). $10.00. Mr. Miller.

POLISH

1c. Beginning Polish. An introductory course for students with no previous knowledge of Polish. Pronunciation, grammar, vocabulary drill, questionnaires, and easy conversation. No prerequisite.
    Sixteen lessons (no credit). $10.00. Miss Krolowna.

2c. Advanced Polish. Intended for prospective teachers of Polish in secondary schools. Review of grammar, written composition, and book reports, suggestions on methods of teaching Polish. Prerequisites: two years of high school Polish or the equivalent, or 1c.
    Sixteen lessons (no credit). $10.00. Miss Krolowna.

3c. History of Polish Literature. Survey of the literary movements and the most prominent authors through the eighteenth century. Written reports on the books read.
    Sixteen lessons (no credit). $10.00. Miss Krolowna.

4c. Modern Polish Literature. The literary currents prevailing in Polish literature from 1863. Written reports on the books read.
    Sixteen lessons (no credit). $10.00. Miss Krolowna.

POLITICAL SCIENCE

†1. American Government and Politics I. Introductory study of the system of government—national, state, and local. Constitutional basis; units and areas of government and their interrelations; forms of government and their historical development; citizenship and private right; participation in politics; parties and elections. No prerequisites.
    Sixteen lessons (three credits). $10.00. Mr. Kirkpatrick.

†2. American Government and Politics II. A continuation of Political Science 1. The constitutional position of legislative bodies in the United States; their organization, powers, and procedures; the office of the American executive; administrative organization and problems of administrative reorganization; the civil service; the role and functions of the courts; problems of judicial review. Prerequisite for credit: Course 1.
    Sixteen lessons (three credits). $10.00. Mr. Christensen.

3. American Government and Politics III. A continuation of Political Science 1 and 2. A critical examination of the expansion of the functions of government with emphasis on the changing relations of government to the social and economic order; the constitutional, political, and

† Both parts must be completed before credit is allowed for either part.

administrative problems in the relations of government to business, social services and planning, national defense, foreign relations, agriculture, and labor. Prerequisites for credit: Courses 1 and 2.

Sixteen lessons (three credits). $10.00. Mr. Christensen.

7. Comparative European Government. A descriptive and comparative study of the governments of the greater European powers: Great Britain, France, Italy, Germany, and Russia. Constitutions; electorates and elections, parliaments (structure and procedure); executives; civil services; political parties; courts; local government; economic constitutions. The emphasis is upon the present-day structure and functioning of the European governments, not their historical development. Prerequisite for credit: Course 1.

Twenty-seven lessons (five credits). $17.00. Mr. Starr.

15. Elements of Political Science. An analysis of the character and purpose of government, of the principles which underlie adequate political activity, and of the practices and organization which make for sound political conditions in the modern world. The course deals with both principles and practices, purposes and institutions. It endeavors to determine the place which the modern state should occupy in society and the means for the attainment of that position. Prerequisite for credit: Course 1.

Twenty-seven lessons (five credits). $17.00. Mr. Starr.

25. World Politics. (The world since 1919.) An explanation of contemporary events in Europe and the Far East by a study of their causes, including the policies of the Great Powers; the influence of geography on world affairs; political and economic nationalism; imperialism; the role of armaments and alliances; and the reasons for the failure of internationalism. The principal problems of the 1919 and the next peace conference are studied, the problems of Czechoslovakia and Poland. Reference is made to the pre-1914 period only when it is necessary to understand the present situation. Prerequisites for credit: Political Science 1 or History 2 or 3. Course 25 may be taken simultaneously with Political Science 2 or 3.

Sixteen lessons (three credits). $10.00. Mr. Mills.

144. American Parties and Politics. The policies, composition, organization, activities, and functions of the political parties of today; suffrage, elections, and related subjects; evaluation of the party as a force in American government. Prerequisites for credit: Courses 1, 2, 3, or equivalent.

Sixteen lessons (three credits). $10.00. Mr. Starr.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

50. Public and Personal Health. Causes of diseases and of physical defects; fundamental principles and working methods of health conservation and disease prevention. (Open to those who have not taken Course 3, 4, or Human Biology in the General College; no prerequisite.)

Sixteen lessons (three credits). $10.00. Dr. Hinckley.

52. Health Care of the Family. Factors affecting the health of the family as a unit; environmental factors, including elementary sanitation; prevention of accidents; communicable diseases, their transmission and prevention; prenatal and infant hygiene and care; principal problems in preschool and school hygiene; care of the sick room; observation and care

of the patient; elementary symptomatology. (Not open to students who have taken Course 50 or 51.) Prerequisite: Bact. 53, Human Physiol. 4.
Sixteen lessons (three credits). $10.00. Dr. Lange.

PSYCHOLOGY

†1. General Psychology I. The purpose of this course is to acquaint the student with the general characteristics and laws of mental life and with the aims and methods of modern psychology.
Sixteen lessons (three credits). $10.00. Mr. White.

†2. General Psychology II. The study of mental development in its relation to heredity and training, with an investigation of the facts and theories of childhood and adolescence with special reference to their bearing on education. Prerequisite: Course 1.
Sixteen lessons (three credits). $10.00. Mr. White.

3. Psychology Applied to Daily Life. A technical course in the use of psychological methods in solving such problems as come up in the treatment of ill health, in the courtroom, in business offices and factories, in advertising, in education, in social and political life, in artistic creation and esthetic enjoyment. Prerequisites: General Psychology I and II.
Sixteen lessons (three credits). $10.00. Mr. White.

EDUCATIONAL PSYCHOLOGY

(See pages 20, 21.)

SOCIAL PSYCHOLOGY

(See page 48.)

ROMANCE LANGUAGES

FRENCH

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before credit will be allowed for a course.

*†1. Beginning French I. French grammar and reader; modern texts.
Twenty-seven lessons (five credits). $17.00. Mr. Clefton.

*†2. Beginning French II. A continuation of Course 1, which is prerequisite to it.
Twenty-seven lessons (five credits). $17.00. Mr. Clefton.

*3. Intermediate French I. Review of grammar; composition; reading of representative authors. Prerequisites: Courses 1 and 2 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Clefton.

*4. Intermediate French II. A continuation of Course 3. Prerequisite: Course 3.
Twenty-seven lessons (five credits). $17.00. Mr. Clefton.

53. Elementary French Composition. Translations of passages of connected prose dealing with everyday life in France. Prerequisites: Courses 3 and 4.
Sixteen lessons (three credits). $10.00. Mr. Clefton.

* May be taken for one entrance unit.

† Both courses must be completed before credit will be allowed for either.

63. Advanced French Composition. A continuation of Course 53. It affords practical exercises in prose composition. Prerequisite: Course 53 or equivalent.
Sixteen lessons (three credits). $10.00. Mr. Clefton.

ITALIAN

†1. Beginning Italian I. Elements of pronunciation, grammar, and suitable readings. Emphasis upon accurate translation and composition.
Twenty-seven lessons (five credits). $17.00. Mr. Brackney.

†2. Beginning Italian II. Completion of grammatical survey, and further readings. Prerequisite: Beginning Italian I.
Twenty-seven lessons (five credits). $17.00. Mr. Brackney.

SPANISH

*†1. Beginning Spanish I. Grammar and reading. In this course stress will be laid upon grammar, accurate translation, and composition.
Twenty-seven lessons (five credits). $17.00. Mr. Grismer.

*†2. Beginning Spanish II. Continuation of Course 1, which is prerequisite.
Twenty-seven lessons (five credits). $17.00. Mr. Grismer.

*3. Intermediate Spanish I. Review of grammar; composition, reading of modern Spanish texts. Prerequisites: Courses 1 and 2 or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Grismer.

*4. Intermediate Spanish II. A continuation of Course 3. Prerequisites: Courses 1, 2, and 3, or equivalent.
Twenty-seven lessons (five credits). $17.00. Mr. Grismer.

53. Elementary Spanish Composition. Connected prose composition dealing with everyday life in Spain. The aim is the ability to write Spanish. Prerequisites: Courses 1, 2, 3, and 4 or equivalent.
Sixteen lessons (three credits). $10.00. Mr. Grismer.

60. Advanced Spanish Composition. A continuation of Course 53, which is prerequisite.
Sixteen lessons (three credits). $10.00. Mr. Grismer.

SCANDINAVIAN LANGUAGES

NOTE.—All lesson reports in language courses must be returned to the Correspondence Study Department before credit will be allowed for a course.

NORWEGIAN

*1. Beginning Norwegian I. Complete survey of Norwegian grammar. Composition. Reading of easy prose.
Twenty-seven lessons (five credits). $17.00. Miss Farseth.

*2. Beginning Norwegian II. Study of short stories and Björnson's *En Glad Gut*. Reading and composition. Prerequisite: Course 1 or equivalent.
Twenty-seven lessons (five credits). $17.00. Miss Farseth.

*3. Intermediate Norwegian. Continuation of Course 2. Based on Björnson's *Synnöve Solbakken*. Reading and composition. Prerequisite: Course 2.
Twenty-seven lessons (five credits). $17.00. Miss Farseth.

* May be taken for one entrance unit.
† Both courses must be completed before credit will be allowed for either.

*4. Advanced Norwegian. Based on *Norge Gjennem Tiderne IV*. Reading of representative poetry and prose, literary and historical. Prerequisite: Course 3 or equivalent.

Twenty-seven lessons (five credits). $17.00. Miss Farseth.

25. Introduction to Norwegian Literature. Brief view of the entire field of Norwegian literature. Reading of four representative plays or books. Prerequisite: Course 3 or 4 or equivalent.

Twenty-seven lessons (five credits). $17.00. Miss Farseth.

51. Modern Norwegian Literature. History of Norwegian literature. A rapid survey of the earlier periods of Norwegian literature and the reading of representative works by later and modern authors, including Holberg, Asbjörnsen and Moe, Ibsen, Björnson, Lie, and Kielland. Prerequisite: Course 5 or reading knowledge of Norwegian.

Twenty-seven lessons (five credits). $17.00. Miss Farseth.

62. Ibsen. This course is given entirely to the study of the life and works of Henrik Ibsen. Selected dramas read and interpreted. Emphasis on the chronological order and historical setting of his works. Prerequisite: Course 3 or 25 or reading knowledge of Norwegian-Danish.

Sixteen lessons (three credits). $10.00. Miss Farseth.

63. Björnson. Study of the life and works of Björnstjerne Björnson. Reading of selected plays, novels, and poems. Prerequisite: Course 3 or 25 or reading knowledge of Norwegian-Danish.

Sixteen lessons (three credits). $10.00. Miss Farseth.

SWEDISH

*7. Beginning Swedish I. Grammar and composition; select readings in easy prose and verse.

Twenty-seven lessons (five credits). $17.00. Mr. Gustafson.

*8. Beginning Swedish II. A continuation of Course 7, which is prerequisite.

Twenty-seven lessons (five credits). $17.00. Mr. Gustafson.

*9. Intermediate Swedish. Grammar; composition; easy reading. Prerequisites: Courses 7 and 8.

Twenty-seven lessons (five credits). $17.00. Mr. Gustafson.

10. Advanced Swedish I. The reading of selected authors in prose and poetry. Prerequisites: Courses 7, 8, and 9, or equivalent.

Twenty-seven lessons (five credits). $17.00. Mr. Gustafson.

11. Advanced Swedish II. A continuation of Course 10, which is prerequisite.

Twenty-seven lessons (five credits). $17.00. Mr. Gustafson.

107. Swedish Literature I. A history of Swedish literature from the seventeenth century to the present time. Selections from representative authors are studied. Prerequisites: Courses 7, 8, 9, 10, and 11 or equivalent.

Sixteen lessons (three credits). $10.00. Mr. Gustafson.

108. Swedish Literature II. Continuation of Course 107, which is prerequisite.

Sixteen lessons (three credits). $10.00. Mr. Gustafson.

109. Swedish Literature III. Continuation of Course 108, which is prerequisite.

Sixteen lessons (three credits). $10.00. Mr. Gustafson.

* May be taken for one entrance unit.

SOCIAL SCIENCE

PREPARATORY COURSE

1. Social Science A. This course aims to give citizens an insight into the world in which they are living through the study of the economic, social, and political forces of everyday existence, as brought out in the presentation of fundamental economic, social, and business principles underlying the present organization of society.

   Twenty lessons (one-half entrance unit). $12.50. Mr. Christianson.

2. Social Science B. The purpose of this course is, through a factual basis of understanding, to stimulate a desire and ability to recognize and appreciate sociological problems and something of the forces that affect the everyday welfare of individuals, through the study of heredity, human nature, the family, the community, education, religion, standards of living, social progress, and related topics.

   Twenty lessons (one-half entrance unit). $12.50. Mr. Christianson.

SOCIOLOGY

1. Introduction to Sociology. An objective analysis of culture viewed as the product of group living. A survey of the fundamental parts of culture: culture traits, complexes, and patterns. Culture dynamics in terms of the inventive process, diffusion, and problems attendant on culture change. The rôle of biological and geographical factors in social change; the relation between race and culture. The fundamental social institutions such as the family and the state; an attempt to indicate how they are affected by changes in the culture. This course is intended to introduce the student to the fundamental concepts of sociology and to give him a better understanding of the contemporary social order.

   Twenty-seven lessons (five credits). $17.00. Mr. Monachesi.

6. Social Interaction. The influence of social interaction on the development of personality with special reference to the family and community. The rôle of attitude and prejudices with special reference to race problems, forms of social opposition including competition, class tension, and war. Social change with reference to co-operation, public opinion, leadership, and social institutions. Prerequisite: Sociology 1.

   Sixteen lessons (three credits). $10.00. Mr. Kirkpatrick.

14. Rural Sociology. A study of rural society, dealing with the relationships of rural and urban individuals and groups. A presentation of such factual data as may be considered fundamental to the understanding of the problems of rural life. Prerequisite: Sociology 1 or special permission of instructor.

    Sixteen lessons (three credits). $10.00. Mr. Nelson.

49. Social Pathology. The scientific approach to the study of poverty, physical diseases and defectiveness, feeble-mindedness, insanity, vagrancy, etc. Prerequisites: ten credits in sociology or Sociology 1 and ten credits in social sciences or psychology.

    Sixteen lessons (three credits). $10.00. Mr. Quackenbush.

60. Social Protection of the Child. Study of social obligations to the child, covering the period from prenatal development down through adolescence; development of the child-saving movement in the United States. Prerequisites: Sociology 1 and 49.

Sixteen lessons (three credits). $10.00. Mrs. Doyle.

90. The Field of Social Work. A study of the historical background and development of the major movements for social betterment. Attention will be focused on such aspects of professional social work as can be studied in local and nearby communities. Prerequisites: Sociology 1 and 49.

Sixteen lessons (three credits). $10.00. Mrs. Doyle.

100. Social Psychology. An analysis of the social aspects of personality growth and personality interaction. There is consideration of personality motivation and adjustment in the group situation. Prejudice, public opinion, propaganda, leadership, are analyzed. Attention is given to the psychological aspects of social problems such as personality disorganization, crowd behavior, social control, family adjustment, and war.

Sixteen lessons (three credits). $10.00. Mr. Kirkpatrick.

Registrations accepted after March 1, 1941.

101. Social Organization. Study of the organization and structure of social groups; development of social ideals and basic social processes of integration and disintegration of social institutions such as business units, church, family, local political institutions, school, and welfare institutions. Prerequisite: Course 1 or equivalent.

Sixteen lessons (three credits). $10.00. Mr. Hoffman.

110. Rural Community Organization. This course is intended for those working in the rural community and small towns. It considers more technical problems than those discussed in the course in Rural Sociology. The subjects covered include co-operation, organization for health and sanitation, the social work of the church and schools, organized recreation clubs, social centers, the organization and co-operation of rural social agencies, small town and county organization, social surveys. Should be preceded by Course 14 (Rural Sociology), but may be taken independently by those who have a special interest in the subject.

Sixteen lessons (three credits.) $10.00. Mr. Nelson.

119. The Family. Origin and forms of mating and family life; historical origins of the modern family; experiences and problems of the average person during his or her life cycle in the family situation; theories of family change. Prerequisite: Course 1 or its equivalent.

Sixteen lessons (three credits). $10.00. Mr. Kirkpatrick.

120. Social Life and Cultural Change. A study of the conditions, causes, and criteria of social progress, with the probable limits thereto. Besides the lessons based on the assigned reading, the student will be expected to prepare a paper, either in fundamental criticism of some work on social progress, or in the nature of an original study based on the critical use of library materials. This course is open only to those who have taken Introduction to Sociology and Social Organization, either by correspondence study or in residence.

Sixteen lessons (three credits). $10.00. Mr. Schneider.

SPEECH

1c. Speech Composition. Designed for individuals who wish assistance in the preparation of speeches that they may be called upon to deliver. The work is divided into three parts: (1) a study of the theory of speech composition; (2) an examination of contemporary speeches; (3) practice in writing short speeches.

Sixteen lessons (no credit). $10.00. Mr. Fulton.

Registrations accepted after July 15, 1940.

115. Playwriting. A detailed analysis of the structure of the play. A study of the fundamentals of character portrayal, dramatic crisis, dialog, and plot involvement. Functioning of the play as an organic unit. Assignments will be in the nature of writing of units that go to make up the fundamentals of playwriting technique. A study of modern play models and a classic survey of traditional techniques in drama. Prerequisite for credit: Speech 31 and permission of the instructor.

Sixteen lessons (three credits). $10.00. Mr. Lees.

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The Bulletin of the
UNIVERSITY *of* MINNESOTA

The College of Agriculture, Forestry, and Home Economics
Announcement of Courses for the Years 1940-1942

Volume XLIII, Number 37 May 6, 1940

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CURRICULA

THE COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

FACULTY

ADMINISTRATION

Guy Stanton Ford, Ph.D., Litt.D., LL.D., L.H.D., President
Malcolm M. Willey, Ph.D., University Dean and Assistant to the President
Walter C. Coffey, M.S., LL.D., Dean of the Department of Agriculture
Edward M. Freeman, Ph.D., Dean of the College of Agriculture, Forestry, and Home Economics
Edward E. Nicholson, M.A., Dean of Student Affairs
Anne D. Blitz, M.A., LL.D., Dean of Women
Rodney M. West, B.A., Registrar

AGRICULTURAL BIOCHEMISTRY

Professors Ross A. Gortner, Ph.D., D.Sc., Clyde H. Bailey, Ph.D., William F. Geddes, Ph.D., Leroy S. Palmer, Ph.D.; Associate Professors David R. Briggs, Ph.D., Cornelia Kennedy, Ph.D., W. Martin Sandstrom, Ph.D.; Assistant Professor Paul P. Merritt, B.S.; Instructors James Evans, M.S., Henry Reitz, Ph.D.

AGRICULTURAL ECONOMICS

Professors Oscar B. Jesness, Ph.D., Austin A. Dowell, Ph.D., Warren C. Waite, Ph.D.; Associate Professor George A. Pond, Ph.D.; Assistant Professors Rex W. Cox, Ph.D., E. Fred Koller, Ph.D.; Instructors Selmer A. Engene, B.S., Percy M. Lowe, M.S., G. Leroy Peterson, M.A.

AGRICULTURAL EDUCATION

Professor Albert M. Field, Ph.D.; Assistant Professor George F. Ekstrom, Ph.D.; Instructor Leigh H. Harden, M.S.

AGRICULTURAL ENGINEERING

Associate Professor Arthur J. Schwantes, M.S. in A.E. (Acting Chief); Professors William Boss, Emeritus, Harry B. Roe, C.E.; Assistant Professors Andrew Hustrulid, Ph.D., James B. Torrance, B.S. in Agr., Arthur G. Tyler, B.S., Hall B. White, M.S.; Instructors Clarence H. Christopherson, M.A., J. Grant Dent, Philip W. Manson, B.S. in C.E., Loren W. Neubauer, M.S. in C.E., Joseph K. Park, B.S. in A.E., Charles G. Snyder, B.Ag.E., John Strait, B.S. (M.E.)

AGRONOMY AND PLANT GENETICS

Professors Herbert K. Hayes, D.Sc., Forrest R. Immer, Ph.D., Harold K. Wilson, Ph.D.; Associate Professors Albert C. Arny, M.S., Charles R. Burnham, Ph.D.; Instructor Royse P. Murphy, M.S.

ANIMAL AND POULTRY HUSBANDRY

Animal Husbandry

Professors Walter H. Peters, M.Agr., Evan F. Ferrin, M.Agr., Laurence M. Winters, Ph.D.; Assistant Professors Philip A. Anderson, B.S. in Agr., Alfred L. Harvey, M.S., Donald W. Johnson, Ph.D.; Instructors Ralph E. Comstock, Ph.D., Willard W. Green, Ph.D.

Poultry Husbandry

Professor Hubert J. Sloan, Ph.D.; Instructor Thomas H. Canfield, M.S.

DAIRY HUSBANDRY

Professors James B. Fitch, M.S., Willes B. Combs, M.A., Harold Macy, Ph.D., William E. Petersen, Ph.D.; Assistant Professors Nat N. Allen, Ph.D., Samuel T. Coulter, Ph.D., Thor W. Gullickson, Ph.D.; Instructor Joe C. Olson, B.S.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

Professors William A. Riley, Ph.D., D.Sc., Arthur G. Ruggles, M.A., Maurice C. Tanquary, Ph.D.; Associate Professors Alexander A. Granovsky, Ph.D., Clarence E. Mickel, Ph.D.; Assistant Professors Alexander C. Hodson, Ph.D., Harold H. Shepard, Ph.D., Gustav Swanson, Ph.D.; Instructors Donald M. Hatfield, Ph.D., Mykola H. Haydak, Ph.D.

FORESTRY

Professors Henry Schmitz, Ph.D., John H. Allison, Ph.B., M.F., Edward G. Cheyney, B.A.; Associate Professors Frank H. Kaufert, Ph.D., Thorwald Schantz-Hansen, Ph.D.; Assistant Professors Randolph M. Brown, B.S., M.F., Louis W. Rees, Ph.D.; Instructors Dwight Bensend, B.S., Henry Hansen, B.S.

HOME ECONOMICS

Professor Wylle B. McNeal, M.A.; Associate Professors Alice Biester, M.A., Harriet I. Goldstein, Jane M. Leichsenring, Ph.D., Isabel Noble, Ph.D., Ethel L. Phelps, M.S.; Assistant Professors Margaret Brew, M.S., Eva Donelson, Ph.D., Frances Dunning, M.S., Vetta Goldstein, Lucy Studley, M.A.; Instructors Carlotta Brown, Evelyn Chambers, M.S., Doris E. Cox, M.A., Margaret Davis, M.S., Ethel R. Gorham, M.A., Hope Hunt, Ph.D., Kathleen M. Jeary, M.A., Hedda Kafka, M.A., Mildred King, M.S., Elizabeth Lamoreaux, M.S., Ruth F. Segolson, M.S., Emma F. Shepek, M.S., Barbara W. Weismann, B.E., Marian M. Worline, M.S.

HOME ECONOMICS EDUCATION

Professors Wylle B. McNeal, M.A., Clara M. Brown, M.A.; Associate Professor Harriet I. Goldstein; Assistant Professor Ella J. Rose, M.A.; Instructors Gladys L. Gilpin, B.S., Mary Frances Inman, M.S., Anna M. Krost, M.S.

HORTICULTURE

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

PLANT PATHOLOGY AND BOTANY

Professors Edward M. Freeman, Ph.D., Jonas J. Christensen, Ph.D., Rodney B. Harvey, Ph.D., Elvin C. Stakman, Ph.D.; Assistant Professors Clyde M. Christensen, Ph.D., Louise Dosdall, Ph.D., Carl J. Eide, Ph.D., Helen Hart, Ph.D., Alvin H. Larson, B.S., Eric G. Sharvelle, Ph.D.; Instructors Raymond H. Landon, Ph.D., Matthew B. Moore, M.S., Ian W. Tervet, B.S.

PUBLICATIONS AND RURAL JOURNALISM

Assistant Professor Harold L. Harris, B.S.

RHETORIC

Associate Professor Robert C. Lansing, M.A.; Assistant Professor William J. Routledge, B.A.; Instructors James I. Brown, M.A., Ralph G. Nichols, M.A., William Randel, M.A., Marjorie H. Thurston, M.A.

SOILS

Professors Frederick J. Alway, Ph.D., Clayton O. Rost, Ph.D.; Assistant Professor Paul R. McMiller, M.S.

VETERINARY MEDICINE

Professor Willard L. Boyd, D.V.S.; Associate Professor Howard C. H. Kernkamp, D.V.M., M.S.

For faculty of departments in other colleges contributing required and elective courses see the respective catalogs of those colleges.

AFHE 1940-42

GENERAL INFORMATION

ADMISSION

New students are admitted at the opening of any quarter provided a suitable program can be arranged. Prospective students, however, are advised to enter at the opening of the fall quarter if possible.

All students entering for the first time must submit their credentials to the registrar's office, University Farm, St. Paul.

Admission is either by certificate (in the case of graduates of accredited schools) or by examination.

For details of admission requirements see the Bulletin of General Information.

Graduates of the schools of agriculture of the University of Minnesota who have completed the two summers of supervised work offered in the school course, one additional school year, and one additional summer's work, or the equivalent thereof, will be admitted to the College of Agriculture, Forestry, and Home Economics.

Applicants for admission to Forestry, Science Specialization, Food Technology, or Wildlife Management are urged to complete higher algebra in high school. Exemption from college mathematics requirements, except for students electing Applied Mathematics, Ag. Eng. 11, in curricula permitting such election, will be made in accordance with the placement tests of the Department of Mathematics (see page 99). Students in Forestry and in Wildlife Management presenting at least one-half entrance unit in high school trigonometry and at least one-half entrance unit in advanced high school algebra will not be required to take the placement test and will be exempt from the freshman mathematics requirement. Students in Science Specialization and Food Technology presenting at least one-half entrance unit in high school trigonometry and at least one-half unit in advanced high school algebra may register for College Algebra without placement test. For any exemption in mathematics a student will be required to substitute an equivalent number of credits (mathematics or electives) as approved by his adviser.

Beginning with the year 1941-42 all students entering any of the curricula in Agriculture or Forestry will be required to present one unit each of high school algebra and geometry and one unit of natural sciences (Group E) for entrance to this college (see General Information Bulletin, p. 35). There is no change in the entrance requirements for Home Economics.

Every prospective student in agriculture is urged to obtain, before entering college, at least six months' practical experience on a farm. Entering students whose farm experience credentials are not satisfactory will be examined as to their familiarity with farm practices, and farm experience will be required during the college course in accordance with the results of these examinations. For students who major in dairy husbandry, at least three of the six months of approved farm experience must be on an accredited dairy farm or in a well-organized dairy manufacturing plant. For students majoring in agricultural education see farm experience requirement under Agricultural Education Curriculum, page 27.

ADVANCED STANDING

Advanced standing credit is allowed provisionally subject to one year of satisfactory work in residence. Credits in courses from any recognized institution of college grade are accepted so far as such courses are equivalent in subject-matter to required or elective work of the curriculum. Students desiring to transfer to this college after completing two years or less in a junior college or an institution in which the technical courses are not available may do so with little or no loss of credit by arranging their work to correspond as closely as possible with the following suggestions:

Pre-Agriculture and Pre-Forestry Courses in Junior Colleges

Students from accredited junior colleges who have completed the general requirements described below will be admitted to the junior class in the agricultural and forestry courses. The amount of additional time required to complete the work for the degree of bachelor of science will depend (1) upon the quality and quantity of work which such students can do and (2) upon the special curriculum which they elect. Many of these curricula may be completed in two years by students who maintain at least the average quality and quantity of work. Additional work in summer sessions or regular quarters may be necessary in some of the special curricula. Since a large number of fields of specialization are open to students, and since these curricula vary so greatly in the subject-matter courses required, it is impossible to make any more specific statement. The requirements given below can be satisfied in the average junior college which offers a fundamental arts and science curriculum. Students in some junior colleges can select additional subjects which may be directly applicable and very helpful in the field of specialization to be followed later. Students who have not completely met the requirements will be given proportional credit.

1. A total of 90 quarter credits (1 semester credit = 1.5 quarter credits)
2. Required courses:
   (a) Botany 9 to 15 credits; general chemistry 10 to 15 credits; zoology 9 to 15 credits; rhetoric and English 9 to 15 credits.
   (b) At least two of the following: Mathematics 9 to 15 credits; economics 9 to 15 credits; modern language 15 credits.
   (c) Electives. Sufficient to bring total credits to a minimum of 90.

The following is a general list of electives applicable in one or more of the specialization fields: sociology, psychology, economics, physics, history, advanced mathematics, technical business, agriculture and engineering subjects, advanced English, public speaking, mechanical drawing, freehand drawing, surveying, qualitative, quantitative, and organic chemistry, advanced courses in zoology and botany, bacteriology, modern language (especially French and German). These subjects are, of course, not equally applicable in all fields. For prospective forestry students, physics, mechanical drawing, higher algebra, trigonometry, and, especially, surveying are recommended.

Home Economics Courses in Junior Colleges

In planning the work in the Junior College with the idea of transferring to one of the Home Economics Curricula the prospective transfer student should keep in mind that home economics, English, physical, biological, and social science courses are required in the freshman and sophomore years.

The prospective student should be familiar with the general requirements and attempt to satisfy them when planning the program of the first two years.

Credit may be allowed for such courses as listed above and for elective credits not listed.

REGISTRATION

In planning registration note particularly (a) prerequisites, (b) classes of students (fr., soph., jr., or sr.) to which courses are offered, (c) number of credits, (d) quarter or quarters offered, and be sure that provision is made in registration for the proper sequence of continuation courses.

Registration for courses as electives in other colleges of the University must be in conformity with regulations of the college offering the course.

Elective courses in the College of Science, Literature, and the Arts are separated into Junior College courses (numbered 1 to 49) open to freshmen and sophomores, and Senior College courses (numbered 50 to 99) open to juniors and seniors. In addition to satisfying other prerequisites a minimum of 90 credits and an honor point ratio of at least 1.0 must be earned before registering for a Senior College elective.

PSYCHOLOGICAL EXAMINATION

All new students are required to take a psychological examination on entrance as a part of the matriculation procedure. Admission, however, does not depend upon the results of the examination.

EXAMINATION IN ENGLISH COMPOSITION

All freshman students are required to take the placement test in English. Students with exceptionally high scores may be exempted from part or all of the courses in freshman rhetoric.

PLACEMENT TESTS

The college desires to bring about the best correlation possible between the technical courses in the fields of agriculture, forestry, and home economics, as taught in the schools of agriculture, in the high schools, and in other institutions. Where students have taken considerable work in these technical courses, it may be desirable for them not to be required to repeat a part or all of this work in the elementary courses in the college. The amount of work taken in the preparatory school and the quality of that work, and, finally, the question as to whether or not the subject-matter course has been used for entrance to the University, must be taken into consideration. In general, two possibilities for placement tests are offered:

1. For subjects not used for entrance to the University and in which the student has had adequate training, examinations may be taken for full credit in the elementary technical course in the college. These examinations may be taken during the first six weeks of residence without fee. After that time, a five-dollar fee is required.

2. For subjects which the student has used for entrance to the University, the student may, by satisfactory examination or by the presentation of other satisfactory evidence, be given permission to omit the elementary subject in the college course, substituting therefor credits in other subjects and taking immediately the more advanced courses in this field.

FEES

Tuition fee, per quarter	
Residents of Minnesota	$20.00
Nonresidents	40.00
Credit hour tuition fee (for students registered for less than full work)	
Residents of Minnesota	1.50
Nonresidents	3.00
Students in Agricultural Business Administration will pay the fees of the School of Business Administration in their junior and senior years.	
Incidental fee, per quarter	8.50
Matriculation deposit‡ (first quarter only)	10.00
Special fees	
Cloquet tuition (juniors in forestry)	
Residents of Minnesota	20.00
Nonresidents	40.00
Health fee	1.00
Itasca Park tuition (freshmen in forestry) prorated on basis of regular quarter tuition per quarter of 12 weeks	
Residents of Minnesota	10.00
Nonresidents	20.00
Health fee	1.00
Examination for removal of condition	1.00
Examination for credit (after the first six weeks in residence)	5.00
Special examination	5.00
Graduation fee	7.50

Laboratory fees—for individual courses. The amounts are specified in the course announcements.

Privilege fees.—The fee for the privilege of late registration or late payment of fees is $2 through the third day of classes. On the fourth day the fee is $2.50 and then increases 50 cents per day to a maximum of $5.

Change of registration.—A fee of $2 is charged for late change of registration (if student is responsible for change and if change is made on third day of quarter). Change of registration is allowed without charge on first and second day of each quarter. No fee is charged for cancellation.

Important.—The regulations require that no student be allowed to register after the quarter opens except by special committee action.

FACULTY REGULATIONS

Students are held responsible for compliance with all faculty regulations. These regulations are published in a booklet issued to students at the time of registration.

GRADING SYSTEM AND HONOR POINTS

There are four passing grades, A, B, C, and D, of which A is highest and D lowest. In addition there are the following nonpassing grades: E (condition), F (failure), and I (incomplete). For rules governing the nonpassing grades see the booklet of Faculty Regulations.

Honor points are awarded on the following basis: each credit hour with a grade of A counts three honor points; each credit hour with a grade of B counts two honor points; and each credit hour with a grade of C counts one honor point. A grade of D counts no honor points.

‡ Such charges as may be incurred for lockers, library penalties, laboratory breakage, etc., will be deducted from the amount of this deposit and the balance will be refunded by mail upon graduation or after the beginning of the first quarter the student fails to return to the University. Provided that students registered for less than 5 credits shall pay a $5 matriculation deposit.

REQUIREMENTS FOR GRADUATION AND DEGREES

Candidates will be recommended for graduation after completion of the following requirements:

A. The prescribed curriculum including all the required amount and quality of work and the required amount of elective work to make the total number of credits given below.

B. One honor point per credit (i.e., the cumulative honor point average must be 1.0 or more). For additional quality requirements, see statements of prescribed curricula.

C. The English requirement for graduation (Rhetoric 51 or equivalent—see below).

D. A total of not less than 18 credits (inclusive of courses required in the various curricula) in social science courses included in the following departments—Anthropology, Economics, Agricultural Economics, Geography, History, Political Science, Sociology, and Philosophy. (Not required of candidates in the Professional Curriculum in Agricultural Engineering.)

The number of elective credits required for graduaton will be decreased by one for each five honor points in excess of those required to reach an honor point ratio of 1.7. This provision does not apply to candidates in the professional curriculum in Agricultural Engineering.

Course of Study	Credit Requirement	Degree Conferred
Technical Agriculture	204	Bachelor of science
Science Specialization	192	Bachelor of science
Food Technology	192	Bachelor of science
Wildlife Management	192	Bachelor of science
Agricultural Education	204 or 210	Bachelor of science
Forestry	204	Bachelor of science
Home Economics	185	Bachelor of science
Agricultural Extension	204	Bachelor of science
Agricultural Engineering (Professional)	210	Bachelor of agricultural engineering
Agricultural Business Administration	192	Bachelor of business administration in agriculture
Agricultural Journalism	192	Bachelor of science

ENGLISH REQUIREMENT FOR GRADUATION

Every student before graduation must demonstrate an acceptable proficiency in English composition. This is comparable or equivalent to the completion of Rhetoric 51. If this is not accomplished before the end of the sophomore year, the student must complete Rhetoric 51, three credits, in the junior or senior year.

Students, upon entering the college, are registered in Rhetoric 1 or 2 according to their tests in proficiency in English. Those students who maintain a very high standard in Rhetoric 2 and 3 and who complete suitable tests, may be exempted from the requirement of Rhetoric 51.

SCHOLARSHIP AND CLASS REQUIREMENTS

1. Students must present for graduation at least one honor point for each credit; i.e., the cumulative honor point average must be 1.0 or more.

2. Freshman students with an honor point average of less than 0.25 obtained in two or three quarters of work in this college and sophomore students with an honor point average of less than 0.5 obtained in six quarters in this college or of five quarters if entering in the winter quarter, shall be dropped for one year unless continued by special permission of the Students' Work Committee.

3. Classified students who have completed 90 credits with an honor point average of less than 1.0 but more than 0.5 may be permitted to take additional courses to attain the required honor point ratio of 1.0, but shall not be permitted to register for junior-senior courses without the approval of the adviser and the Students' Work Committee.

4. A student who has completed 90 credits with an honor point ratio of at least 1.0 will be classified as a junior and will be admitted to candidacy for the Bachelor's degree from this college.

Students (except transfers with junior class standing) shall not be given classification in the junior class unless all required work of the freshman-sophomore years has been completed or postponement thereof covered by appropriate and approved petitions.

Degree with distinction.—The degree of bachelor of science with distinction is granted to graduates of this college who have attained excellence in scholarship as evidenced by an average grade of two honor points per credit for the entire four-year curriculum. Transfer students with less than two years of work in this college shall not be eligible. Recommendations to the faculty for the degree with distinction shall be made through the Students' Work Committee on the basis of scholarship and other evidence of satisfactory achievement and advancement in the courses pursued.

Degree with high distinction.—The degree of bachelor of science with high distinction is granted to graduates of this college who have attained special excellence in scholarship as evidenced by an average of two and one-half honor points per credit for the entire curriculum. The same conditions for residence and recommendation apply as for the degree with distinction.

BOARD AND ROOM

Sanford Hall.—A dormitory for university women is located near the Minneapolis campus. It accommodates 225 women, about one half of whom are freshmen. Applications should be sent to the director of Sanford Hall, University of Minnesota.

College Girls' Dormitory, University Farm.—A dormitory residence for girls in the College of Agriculture, Forestry, and Home Economics is located on the University Farm campus. All applications for residence must be for the entire school year. About fifty students may be accommodated. The dormitory is closed during vacations.

The charge per quarter is $30 for a single room and $24 per student for a double room. The room rent for each quarter is payable the first week of every quarter. The number of single rooms is limited. Meals are not served at the dormitory, but can be obtained at the University Farm cafeteria at reasonable rates.

Necessary bedding is provided and the bed linen laundered. Girls should provide their own coach covers.

Applications for rooms should be made early. A deposit of $5 is made when the room is engaged. Communications regarding reservations or further information should be addressed to Superintendent, School of Agriculture, University Farm, St. Paul, Minnesota.

Private houses.—For information concerning approved boarding and rooming houses, address the Housing Bureau, University of Minnesota, Minneapolis, Minnesota.

STUDENTS' BOOKSTORE

The University owns and operates the Students' Bookstore at University Farm for the convenience and accommodation of students and faculty of the College of Agriculture, Forestry, and Home Economics.

A student agency for the sale of used or second-hand books is maintained in the office of the Y.M.C.A. in the Administration Building, at University Farm.

EXPLANATION OF TERMS AND COURSE NUMBERS

The quarters in which courses are offered are indicated by the letters f (fall), w (winter), s (spring), and su (summer) following the course number. For example: 5f,w,s indicates that Course 5 is given in the fall quarter and is repeated in the winter and again in the spring quarter; 5f-6w indicates a two-quarter course extending through the fall and winter quarters; and 5f,w-6w,s indicates that Course 5-6 is given in the fall and winter quarters and repeated through the winter and spring quarters.

All undergraduate courses are numbered from 1 through 99; 1 through 49 open to freshmen and sophomores; 50 through 99 open to juniors and seniors.

Numbers following the descriptive name of a course indicate the number of credit hours.

Course numbers in parentheses, following the number of credit hours, indicate prerequisite courses.

Descriptions of the courses listed in the following outline of the curricula, together with those of additional courses offered as electives, will be found on pages 66-112. The program of classes is printed in the Combined Class Schedule. The divisional statements are arranged alphabetically according to the names of the divisions.

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 quarter.

Honor points.—See page 9 for definition.

A *major* is a series of courses equivalent to from 24 to 36 credit hours chosen from one of the elective groups.

A *minor* is a series of courses equivalent to 18 credit hours (12 credit hours in Science Specialization Curriculum) chosen from one of the elective groups.

A *required* course is a course required of all students for graduation irrespective of their major sequence.

A *limited elective* course is an elective which may not be chosen from the same group as the major or minor.

A *free elective* course may be chosen from any courses offered in the University for which the student has completed the prerequisites.

CURRICULA

A. ALL-COLLEGE

(See pages 17-19)

Science Specialization.—This curriculum provides for more intense specialization, particularly in the sciences basic to many fields of agriculture. Only that amount of technical training in practical agriculture is required which deals with the special science or field selected. Selection of the Science Specialization Curriculum should, in practically all cases, be followed by graduate study to at least the Master's degree. Students who do not have a high school record considerably above average should not attempt the Science Specialization Curriculum. For special scholarship requirements of this curriculum, see page 17.

B. AGRICULTURE

(See pages 20-35)

I. Technical Agriculture.—These curricula are arranged for students who plan to follow one or more of the technical or applied fields of agriculture immediately upon graduation. Students may, however, continue in graduate work for further specialization. Training is offered for all types of farming in this area, for county agent and extension work, and for technical agricultural work in agricultural industries in dairy and animal husbandry, agronomy and plant industries, horticulture, agricultural engineering, landscape gardening, farm management, agricultural economics, and business.

Students may also select the Technical Agriculture Curricula for special technical preparation in the agricultural sciences or fields represented by the various divisions of the college. After such specialization graduate work is usually advised. (For more intense and restricted specialization in the agricultural sciences, see Science Specialization Curriculum.)

For special training for teaching agriculture in high schools and for agricultural extension and county agent work, see Agricultural Education Curriculum and Agricultural Extension Curriculum.

II. Food Technology.—This curriculum provides special training in preparation for industrial fields such as meat packing; processing, storage, and distribution of fruits, vegetables, and other perishables; canning and pickling. It includes also milk products and the products of milling and related industries. While this is a normal four-year curriculum certain scientific specialties may demand graduate work.

While the employment possibilities are probably chiefly in the various food industries, additional opportunities exist in research and in teaching in connection with various federal, state, and municipal government bureaus and offices as well as in colleges and in private research institutions.

III. Wildlife Management.—The curriculum will be selected and built up with the aid of an adviser for the special vocational or professional objectives which the student has in mind. The work involves a wide range of activities including the management of upland game, big game, waterfowl, fish, and fur bearers in parks and forests, and on wildlife preserves and privately owned lands; it also includes the artificial propagation of game and fur species and the encouragement

of non-game species. Students in this curriculum may prepare themselves for teaching in colleges and universities, for research and experimental work in various state and federal departments, and for management and extension work in state and federal departments concerned with utilization of our natural resources. (See also Game Management in Forestry Curriculum.)

IV. Pre-Veterinary Medicine.—One year of college training is required for admission to the various colleges of veterinary medicine. As a result of increase in registration it has become necessary for many of such colleges to limit the enrolment in the freshman year.

The various fields open to graduate veterinarians include: (1) practice; (2) veterinarians and junior veterinarians in the United States Bureau of Animal Industry; (3) research and teaching positions in agricultural and veterinary colleges; (4) veterinarians in the United States Army; (5) positions with livestock sanitary boards and municipal health boards; and (6) commercial positions.

This curriculum of one year may vary in accordance with the veterinary college to be selected by the student. In general, the requirements follow the plan of the Science Specialization Curriculum, but special variations from this curriculum may be provided upon recommendation of the adviser.

V. Agricultural Education.—Designed especially for those who plan to teach agriculture in the public schools. This curriculum (given jointly with the College of Education) follows in general the technical agriculture groups and permits emphasis on majors in special technical agriculture fields, such as dairying, horticulture, farm management, etc. In addition, it offers special training in education and leads to certificates for teaching agriculture and sciences in high and elementary schools of the state.

VI. Agricultural Extension.—Designed for training for agricultural county agents, extension specialists, boys' and girls' club leadership, and other specialties in agricultural extension. No single curriculum is prescribed because of the numerous variations which are possible and desirable. In general, the student is advised to select a curricular pattern in Technical Agriculture or in Agricultural Education. Around the selected pattern the student, with the help of his adviser, may build the curriculum best suited to his needs. A wide range of valuable subject-matter is available in this and other colleges of the University. For a more complete discussion, see page 30.

VII. Agricultural Engineering (Professional).—Offered jointly with the Institute of Technology. This is a technical engineering course leading to the degree of bachelor of agricultural engineering. The first year is spent in work in the Institute of Technology and the last three years in work in both colleges. High school mathematical preparation required for all engineering curricula is also required here. The Agricultural Engineering (Professional) Curriculum is designed to train specialists in various types of engineering fundamental to agricultural practices and industries.

Students desiring a major in agricultural engineering with special reference to the technical application and without the professional engineering training should register for a Technical Agriculture Curriculum.

VIII. Agricultural Engineering Business Administration.—Offered jointly with the Institute of Technology and the School of Business Administration. This is a technical engineering and business curriculum with emphasis in the field of agriculture. The preliminary requirements are similar to those of the Professional Course in Agricultural Engineering. In addition to the required professional work in engineering a complete sequence of business courses is required together with

a sequence of agricultural courses. Students completing this curriculum will receive the degrees both of bachelor of agricultural engineering and bachelor of business administration.

Students interested in this course should consult the head of the Division of Agricultural Engineering, University Farm, St. Paul, Minnesota.

IX. Agricultural Business Administration.—Offered jointly with the School of Business Administration. Designed for those who wish to prepare for some branch of agricultural business, such as marketing, finance, farm real estate, merchandising, and so forth. More opportunity is offered for business and economic courses than in the Technical Agriculture Curricula, where greater stress is on the agricultural subjects. In the first two years students register in the College of Agriculture, Forestry, and Home Economics; in the last two years in this college and in the School of Business Administration.

X. Agricultural Journalism.—Offered jointly with the Department of Journalism of the College of Science, Literature, and the Arts. Designed for those who wish to prepare especially for some field of journalism relating to agriculture. The student is offered general courses in technical agriculture, but the major part of the time is occupied with special preparation for technical journalism. Particular stress is also laid on economic and business courses related to agriculture.

C. FORESTRY

(See pages 36-43)

Three professional and two technological curricula are offered in forestry.

A. FIVE-YEAR PROFESSIONAL CURRICULA*†

I. General Forestry.—Preparation for technical work in public and private forest management.

II. Range Management.—Preparation for technical work in public and private forest range management.

III. Game Management.—Preparation for technical work in public and private forest and game management.

B. FOUR-YEAR TECHNOLOGICAL CURRICULA†

IV. Commercial Lumbering.—Preparation for work in various phases of the lumber industry.

V. Wood Technology.—Preparation for technical and research work in the pulp and paper and other wood using industries and in wood preservation.

* The professional curricula are designed to meet the increasingly rigid requirements for the practice of professional work in the several technical fields of actual forestry. The wide range of information and training required in the fundamental biological and physical sciences, in social sciences, together with the increasing number of technical and professional courses in forestry call for not less than five years of college work. Keener competition in the future can be successfully met only by more adequate and better professional training.

† All forestry students classified by the registrar as seniors at the beginning of the fall quarter in 1940-41 will be entitled to complete their work for the degree on the basis of the four-year curriculum. Beginning with the year 1941-42, the four-year Professional Forestry Curricula will be definitely abandoned.

D. HOME ECONOMICS

(See pages 44-65)

I. General Home Economics.—A four-year program of home economics and general education courses designed for those who do not wish to fit themselves for any specialized field in home economics but are interested chiefly in preparation for homemaking.

II. Dietetics.—For persons expecting to become hospital dietitians. Students selecting this course should be sure of an aptitude for, and ability in, the physical and biological sciences and should have a high school record of better than average.

III. Home Economics Education.—Offered jointly with the College of Education. For those who wish to teach home economics in the high schools and obtain a teacher's certificate. Students should have a high school record better than average. A high scholastic average is required for college work.

IV. Home Economics in Business.—For students who wish to use their training in business where a knowledge of home economics is essential. Given with the co-operation of other colleges.

V. Institution Management.—Preparation for management of such institutions as tearooms, cafeterias, dormitories, and institutional homes, etc.

VI. Home Economics and Nursery School Education.—A combination course designed for those who have ability and interest in the two fields. Opportunities for placement are limited.

VII. Preparation for Research in (a) Textiles and Clothing or (b) Foods and Nutrition.—An undergraduate preparation for graduate work as a basis for more intense specialization in fields of home economics research. For those who plan a scientific research career in home economics. Students who do not have a high school record or a college freshman record considerably above the average should not attempt this course. Graduate work to at least the Master's degree is assumed.

VIII. Home Economics Related Science.—Opportunity is offered for emphasis on the sciences basic to certain fields in home economics. It is assumed that the student will take graduate work at least to the Master's degree. This curriculum should be chosen only by those who have an excellent high school record and an aptitude for science.

(For Science Specialization Curriculum, see page 17.)

A. ALL-COLLEGE CURRICULA

SCIENCE SPECIALIZATION

This curriculum is designed as a preparation for teaching in colleges and universities, for research and experimental work in experiment stations, for regulatory, experimental, and extension service in the state and federal departments of agriculture, forestry, and home economics, and in the industries related to these fields. For opportunities offered in the various fields the student is advised to consult with the various divisions and with the dean of the college.

Only those students who have a high school record considerably above the average and who are capable of maintaining a high scholarship record and who desire to delve deeply into specialized science fields should attempt to follow this curriculum. In general it is assumed that students who complete this undergraduate curriculum subsequently will spend one or more years in graduate study. Success in graduate study usually is predicated upon an undergraduate scholarship record which is distinctly above the average. In order to qualify for possible graduate fellowships or assistantships it is essential that the student on completing this curriculum should have maintained an honor point average approximating 2.0 or better.

The attention of the student is called to the modern language requirement for graduate students. In most divisions either German or French is required for the Master's degree. In all divisions *both* German and French are required for the degree of doctor of philosophy. Proficiency in at least one modern language (preferably German) should be acquired during the undergraduate years. Beginning German may be taken in either the 1-2-3 (15 credits) or 24a-25a-26a (12 credits) sequences.

The modern trend in the physical sciences is more and more toward a mathematical interpretation. Higher mathematics including calculus has proved a very potent scientific tool in many fields. Those students who plan to major in either biochemistry or forestry should ordinarily plan to secure more mathematics than is represented in the required list of subjects, and students specializing in these fields will also be expected to include a number of physics courses in their study program.

REQUIREMENTS

All-college requirements for students in this college. See page 10.

This curriculum requires 192 credit hours for graduation and is made up of (1) freshman-sophomore required courses with such options as are indicated in the freshman and sophomore years, and (2) a major, a minor, and electives in the junior and senior years in accord with the schedule given below.

In the freshman and sophomore years a grade of C must be earned in Mathematics 1-6-7, Chemistry 1-2-3 (9-10), Zoology 1-2-3 (14-15 and 3 additional credits of zoology or physiology or economic entomology and zoology), in Botany 1 plus six additional credits in botany, Bacteriology 53, Agricultural Biochemistry 4, 5 (or 6).*

In the junior and senior year the major and minor sequence must be completed with an average honor point ratio of 1.5.*

* These regulations became effective fall quarter, 1938-39, for all new high school and advanced standing students and for students in residence 1937-38 or before who became juniors in the fall quarter, 1938-39 or later.

Special attention of every student is called to the faculty requirements for classification in the junior class, pages 10-11.

FRESHMAN YEAR

General courses.—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.

Bot. 1f,w,s,† General Botany, 4, and 6 cred. selected from the following: Bot. 2, 5, 7, 21, 22.

Inorg. Chem. 1f-2w-3s, General Inorganic Chemistry, 12. Students presenting a year of high school chemistry may omit this course and register for Inorg. Chem. 9-10.

Inorg. Chem. 9f,w-10w,s, General Inorganic Chemistry, 10 (1 yr. of high school chem.) Those required to take Inorg. Chem. 1-2-3 may omit this course.

Math. 1f,w,s,*§ Higher Algebra, 5; Math. 6f,w,s, Trigonometry, 5 (Math. 1 or equiv.); and Math. 7f,w,s, College Algebra, 5 (Math. 6)

Modern language,§†† 15 cred. or special sequence of 12.

Orient. 1f,w,s, Freshman Orientation Lectures, 1 (See page 101.)

P.M.&P.H. 3f,w,s,¶ Personal Health, 2.

Rhetoric 1f,w,s-2w,s,f-3s,f,w, Rhetoric, 9.

Zoology 1f-2w-3s,† General Zoology, 10 or Zool. 14f-15w, General Zoology, 6 and 3 additional credits of zoology or physiology or economic entomology and zoology. Ent. 5f,w,s, 5 cred. suggested.

SOPHOMORE YEAR

General courses.—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.

Agr. Biochem. 4f,w, Introduction to Organic and Biochemistry, 5 (Inorg. Chem. 10 cred.)

Agr. Biochem. 5s, Plant Biochemistry, 5 (Agr. Biochem. 4, Soils 9); or Agr. Biochem. 6f, Animal Biochemistry, 5 (Agr. Biochem. 4, Soils 9)

Agr. Econ. 1f,w, Principles of Economics I, 3

Agr. Econ. 2w,s, Principles of Economics II, 5 (Agr. Econ. 1)

Bact. 53f,w,s, General Bacteriology, 5 (chem., zool.)

Bot. 1f,w,s,† General Botany, 4, and 6 cred. selected from the following: Bot. 2, 5, 7, 21, 22.

Math. 1f,w,s,* Higher Algebra, 5; Math. 6f,w,s, Trigonometry, 5 (Math. 1 or equiv.); and Math. 7f,w,s, College Algebra, 5 (Math. 6) if not taken in freshman year.

Modern language, 15 cred. or special sequence of 12, if not taken in the freshman year.

Rhet. 11f,s, Argumentation, 3 (Rhet. 3, Rhet. 22 advised) or Rhet. 22f,w,s, Public Speaking, 3 (Rhet. 3)

Soils 9w, Soils I, 4 (Agr. Biochem. 4)

Zoology 1f-2w-3s,† General Zoology, 10 or Zool. 14f-15w, General Zoology, 6 and 3 additional credits of zoology or physiology or economic entomology and zoology. Ent. 5f,w,s, 5 cred. suggested.

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* Students will be exempt from the required mathematics courses only in accordance with the placement tests given by the Department of Mathematics (see page 99). For any exemption the student will be required to substitute an equivalent number of credits (mathematics or elective) as approved by his adviser.

† One of these two, botany or zoology, must be taken in the freshman year and the other in the sophomore year.

§ One of these two, mathematics or modern language, must be taken in the freshman year and the other in the sophomore year.

¶ Three credits of physical education are required for women in this curriculum.

†† In general, "modern language" will be interpreted to mean either German or French unless some other language is recommended by the student's major adviser.

JUNIOR AND SENIOR YEARS

1. Rhet. 51f,w,s, Exposition, 3 (Rhet. 3)
2. A major sequence of 24 to 36 credits in one of the following fields or divisions:

1. Agricultural Biochemistry	8. Forestry
2. Agricultural Economics	9. Home Economics
3. Agronomy and Plant Genetics	10. Horticulture
4. Animal Husbandry	11. Plant Pathology
5. Animal Nutrition	12. Poultry Husbandry
6. Dairy Husbandry	13. Soils
7. Entomology and Economic Zoology	14. Veterinary Medicine

3. A minor sequence of 12 credits to be chosen in some division (see major), department, or field of work outside of the major.

Subject-matter courses from one division or from departments of other colleges of the University may be applied as major or minor credits in another division if they are clearly related or fundamental to the field of the major or minor specialization.

4. Electives sufficient to make a total of 192 credit hours for the four years of work.

B. CURRICULA IN AGRICULTURE

I. TECHNICAL AGRICULTURE

The curricula possible in this group are numerous and varied. Each student in this group arranges his curriculum with the aid of his adviser and in conformity with regulations given below to fit his vocational objective. Specialization begins normally in the junior year but may also extend into the sophomore year. Every subject-matter division of the college (see pages 66 to 112) offers one or more vocational or professional fields of specialization. Some divisions offer a fairly large number of such fields. Freshman and sophomore students should therefore consult carefully with the staff of the division in which they plan to major.

The vocational opportunities are too varied to permit of complete enumeration. In general, technical agriculture includes all those vocations in which a technical knowledge of at least some fields of agriculture is required and put to immediate and practical use. Where more intense specialization is desired through graduate study or in highly specialized fields, the other curricula in agriculture (p. 17) should be considered and discussed with major divisions concerned.

The Technical Agriculture Curricula offer training for: general farming and many kinds of specialized farming; industrial and commercial enterprises dealing with agricultural products such as creamery, meat packing, milling, canning, feed products, seeds and plant nursery, and many others; industrial and commercial companies dealing with products sold chiefly to farms such as agricultural machinery, dairy and creamery supplies, feeds, etc.; business concerns that deal in many ways largely with rural people such as co-operatives, banks, insurance companies, marketing organizations, railroads, etc.; a great variety of federal, state, and other governmental agencies and bureaus such as soil conservation, agricultural adjustment, inspection services of many kinds, etc.; and, finally, a considerable variety of special technical jobs such as park and golf course supervision, technicians in manufacture and distribution of farm products, control of insect and plant pests, seed production and improvement, etc. See also Agricultural Education Curriculum, page 27.

REQUIREMENTS

All-college requirements for students in this college. See page 10.

These curricula require 204 credit hours for graduation, including:

A. Freshman-sophomore years—Required of all students registered in Technical Agriculture, pages 20-22. See also required courses in the junior year.
B. Junior-senior years—see pages 22-23.

Special attention of every student is called to faculty regulations for classification in the junior class, pages 10-11.

A. FRESHMAN-SOPHOMORE YEARS—REQUIRED COURSES

These courses are required of every student before graduation. They constitute approximately half of the curriculum and are considered fundamental and necessary to any curriculum in technical agriculture. Every student must complete these courses, if possible, before the end of the sophomore year. Modifications in the requirements may be permitted upon approval by the Students' Work Committee where students have a very definite objective in their college curriculum in which substitutions for certain of the listed freshman and sophomore required courses may profitably be made. Approval of the adviser by special letter must be presented with the petitions to the Students' Work Committee.

For some students the outline of the first two years, given below, represents more than the regular amount of work of 17 credit hours per quarter. In such cases those subjects which cannot be taken in the freshman and sophomore years must take precedence the following year. Nine credits in English are also required in the junior year. Phys. Ed. 1-2-3, Physical Education, 3 credits (credit is allowed only when the three quarters are completed) and Military Science and Tactics or Naval Science and Tactics may be taken in addition to the regular schedule if desired. Care should be taken in registration to give precedence to courses offered only one quarter.

Freshman Year

General courses.—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.

Agron. 1f,s,* General Farm Crops, 3

An. Husb. 1f,w,s,*† Livestock Production, 3

Bot. 1f,w,s, General Botany, 4, and 6 credits selected from the following: Bot. 2, 5, 7, 21, 22. Three of these credits may be selected from plant science courses given at University Farm.

Dy. Husb. 1f,s,*† Elements of Dairying, 3

Hort. 6f,* Fruit Growing, 6; or Hort. 32s, Vegetable Growing, 3 (Hort. 6 required of Agricultural Education students)

Inorg. Chem. 1f-2w-3s, General Inorganic Chemistry, 12. Students presenting a year of high school chemistry may omit this course and register for Inorg. Chem. 9-10.

Inorg. Chem. 9f,w-10w,s, General Inorganic Chemistry, 10 (one yr. of high school chem.) Those required to take Inorg. Chem. 1-2-3 may omit this course.

Math. 1f,w,s,§ Higher Algebra, 5 cred., or Agr. Eng. 11w, Applied Mathematics, 5

Orient. 1f,w,s, Freshman Orientation Lectures, 1 (see page 101)

P.M.&P.H. 3f,w,s¶ Personal Health, 2.

Rhet. 1f,w,s, Rhetoric I, 3

Rhet. 2f,w,s, Rhetoric II, 3 (Rhet. 1)

Rhet. 3f,w,s, Rhetoric III, 3 (Rhet. 2)

* Graduates of the university schools of agriculture or students presenting high school work in any of these courses may, upon approval of their adviser and the head of the division in which the course is taught, substitute elective courses.

† Students who expect to major in a special horticultural field may substitute for these courses 11 credits approved by the chief of the Division of Horticulture.

§ Students will be exempt from Math. 1 who pass the placement test given by the Department of Mathematics requiring the equivalent of Math. 1, Higher Algebra (see page 99). For any exemption the student will be required to substitute an equivalent number of credits (mathematics or electives) as approved by his adviser.

¶ Three credits of physical education are required for women in this curriculum.

Sophomore Year

1. **Freshman courses** which were not completed during the freshman year.
2. **General courses.**—The following courses may be registered for any quarter that they are offered, except that the proper sequence of continuation courses and the prerequisites must be observed.

Agr. Biochem. 4f,w§ Introduction to Organic and Biochemistry, 5 (Inorg. Chem. 10 cred.)
Agr. Biochem. 5s§ Plant Biochemistry, 5 (Agr. Biochem. 4, Soils 9, 10); or Agr. Biochem. 6f, Animal Biochemistry, 5 (Agr. Biochem. 4, Soils 9, 10)
Agr. Econ. 1f,w, Principles of Economics I, 3
Agr. Econ. 2w,s, Principles of Economics II, 5 (Agr. Econ. 1)
Agr. Eng. 3 credits selected from the following: 3w,s, Mechanical Drawing, 3; 7s, Buildings, 3; 12s, Agricultural Machinery, 3; 13f,s, Gas Engines, 3; 31w,s, Principles of Drainage, 3; 37f,w, Rural Sanitation, 3. One or more of these courses are required in the junior and senior years of several of the outlined curricula. If completed in meeting this requirement some other of the above courses must be substituted in the junior or senior year.
Agr. Eng. 23f,s,* General Physics, 5. Those presenting a year of high school physics may omit this course and substitute 5 credits elective later in their curriculum.
Bact. 53f,w,s, General Bacteriology, 5 (chem., zool.)
Ent. 5f,w,s, Economic Entomology, 5 (Zool. 14-15 or equiv.)
Forestry 10w,† Farm Forestry, 3
Soils 9w, Soils I, 4 (Agr. Biochem. 4)
Soils 10f,s, Soils II, 1 (Soils 9)
Zool. 14f-15w, General Zoology, 6

B. JUNIOR-SENIOR YEARS

Required Courses

The following courses should be taken in the junior year if not taken previously:

Rhet. 11f,s, Argumentation, 3 (Rhet. 3, Rhet. 22 advised) or Rhet. 24s, Advanced Public Speaking, 3 (Rhet. 22) or Rhet. 31f,w,s, Survey of English Literature I, 5 (Rhet. 3) or Rhet. 32f,s, Survey of English Literature II, 3 (Rhet. 3) or Rhet. 60w,s, Contemporary Literature, 3 (Rhet. 3)
Rhet. 22f,w,s, Public Speaking, 3 (Rhet. 3)
Rhet. 51f,w,s, Exposition, 3 (Rhet. 3). Cannot be taken earlier than junior year.
Social science requirement (see page 10)

Elective Courses

Every student is required to file in the registrar's office by the end of his sophomore year a statement of the major, minor, and limited electives, approved by his adviser, which he plans to take during his junior and senior years. Such statements from each student will make it possible to provide a workable program of subject courses. Students will not be given classification in the junior class until their specialization card is filed in the registrar's office. A change from one curriculum to another after the close of the sophomore year is permitted only on approval and does not exempt the student from any of the requirements of the curriculum which he finally selects. Such changes usually involve inconvenience and sometime loss of credit to the student. Special attention of the student is called to the faculty requirements for classification in the junior class. (See page 11.) All students are invited to consult with the dean of the college concerning the selection of curricula.

* Not open for credit to students offering one unit of high school physics for entrance.

† Students who expect to major in agricultural education may substitute Hort. 21 or 22.

§ Students who expect to major in agricultural education may substitute 10 credits elective for this course with the approval of the chief of the Division of Agricultural Education.

The student, with the approval of his adviser, may select any curriculum which complies with the following requirements:

1. A major of from 24 to 36 credit hours, to be selected from one of the main groups or subgroups listed below.
2. A minor of 18 credit hours, to be selected from a different main group from that of his major or in a related department in some other college of the University.

Subject-matter courses from any group or subgroup or from departments of other colleges of the University may be applied as major or minor credits in any group or subgroup if they are clearly related or fundamental to the group or subgroup of the major or minor specialization.

3. Limited electives, 18 credit hours, which must be selected outside of the groups from which the major and minor have been chosen, in order to broaden the educational base.
4. A total of not less than 18 credits in social science courses. (See page 10.)
5. Free electives sufficient to meet the number of credit hours required for graduation chosen from any of the courses offered in the University and approved by the adviser.

Elective Groups and Subgroups

II. FOOD TECHNOLOGY

This curriculum provides training in preparation for industrial fields such as meat packing; processing, storage, and distribution of fruits, vegetables, and other perishables; canning and pickling. It includes also milk products and the products of milling and related industries. Specialties in these fields may involve major subject-matter specialties in chemistry, bacteriology, and other special biological fields. Students intending to enter the Food Technology Curriculum should have a fairly definite professional or vocational program and must consult the special faculty advisory committee for this curriculum (see registrar or office of the dean of the college), with whose approval a program of subject-matter courses may be selected under the limits described. The curriculum presented is intended merely to show the wide range of available subject-matter courses, especially those basic to

* As a major in Technical Agriculture approval of division is required. A major in this group will usually be selected under the Science Specialization Curriculum, page 17.

the whole field, from which the student must select those best suited for his particular program. While this is a normal four-year curriculum certain scientific specialties may demand graduate work.

While the employment possibilities are probably chiefly in the various food industries, additional opportunities exist in research and in teaching in connection with various federal, state, and municipal government bureaus and offices as well as in colleges and in private research institutions.

REQUIREMENTS

All-college requirements for students in this college. See page 10.

The Food Technology Curriculum requires 192 credit hours for graduation and is made up of the following:

1. **Freshman-sophomore required courses.**—The same as for the Science Specialization Curriculum, except that Quantitative Methods (Agr. Biochem. 2) is substituted for Soils 9.
2. **Junior-senior years.**—
   a. Rhet. 51f,w,s, Exposition, 3.
   b. Major sequence of 24 to 36 credits in one of the following fields: Agricultural Biochemistry, Animal Husbandry, Dairy Husbandry, Animal Nutrition, Foods and Nutrition. Subject-matter courses from one division or from departments of other colleges of the University may be applied as major credits in another division if they are clearly related or fundamental to the field of the major specialization.
   c. In lieu of a minor, courses totaling at least 30 credits to be selected from the following fields: Microbiology, Chemistry, Physics. (See courses marked with an asterisk (*) in list of courses below.)
   d. Electives sufficient to make a total of 192 credit hours. May be selected from list below or from other courses and departments.

SUGGESTED COURSES FOR FOOD TECHNOLOGY

Available for major or minor sequence and electives. Courses marked with an asterisk (*) are suggested for minor requirements (2c).

College of Agriculture, Forestry, and Home Economics

Agricultural Biochemistry: 101-102, Agricultural Quantitative Analysis*; 103, Dairy Chemistry; 108, Chemistry of Wheat and Wheat Products; 110, Flour Laboratory Methods; 113-114-115, Biochemical Laboratory Methods; 116, Advanced Animal Nutrition; 118, Laboratory Problems in Biochemistry; 119, Colloids*; 120, Proteins*; 121, Carbohydrates*; 122, Lipids and Fats*; 123, Enzymes.*

Agricultural Economics: 40, Principles of Marketing Organization; 90, Agricultural Statistics.

Agricultural Engineering: 23, General Physics or 24-25, Agricultural Physics.

Agronomy and Plant Genetics: 31, Principles of Genetics.

Animal Husbandry: 51, Meat Selection; 52, Meats; 53, Advanced Meats; 54, Utilization of Meats; 107, Meat Problems.

Dairy Husbandry: 2, Dairy Bacteriology*; 110-111-112, Dairy Products; 113, Technical Control; 115, Advanced Dairy Bacteriology.*

Entomology and Economic Zoology: 5, Economic Entomology; 51, Introductory Parasitology.*

Home Economics: 40, Food Preparation; 41, Food Management and Marketing; 61, Quantity Cookery; 64, Institution Buying; 142, Experimental Cookery; 146, Special Food Problems (3 cred.) or 147, Special Food Problems (5 cred.).

Plant Pathology: 1, Plant Pathology; 105-106-107, Mycology*; 160, Plant Histochemistry; 161, Transport, Storage, Ripening of Fruits and Vegetables (may include refrigeration).

Other Colleges

Bacteriology: 114, Molds, Yeasts, and Actinomycetes*; 121-122, Physiology of Bacteria*; 123, Applied Bacteriology.*

Botany: 5, Elementary Plant Histology; 118, 119, 120, Cytology.

Chemistry: Analytical Chemistry 1-2 or 7, Quantitative Analysis; 104, Microchemistry; 140, Water Analysis. Inorganic Chemistry 11 or 12-13, Qualitative Chemical Analysis; 117, Glass Blowing. Organic Chemistry 1-2 or 51-52, Elementary Organic Chemistry.

Economics: 28, Business Law.
Mathematics: 30, Analytic Geometry; 50-51-105, Calculus.
Mechanical Engineering: 166, Refrigeration (only on approval of instructor.)
Physics: 1-2-3, Introduction to Physical Science.*
Physiology: 4, Human Physiology; 100, Physiological Chemistry.
Political Science: 1-2, American Government and Politics.
Preventive Medicine and Public Health: 53, Elements of Preventive Medicine and Public Health; 91, Environmental Sanitation; 110, Biometric Principles.
Zoology: 21, Histology.

III. WILDLIFE MANAGEMENT

(See also Game Management in Forestry Curricula, page 39)

Wildlife management has developed into an established profession, and there is an increasing demand for college training in this field. The work involves a wide range of activities including the management of upland game, big game, waterfowl, fish, and fur bearers in parks and forests, and on wildlife preserves and privately owned lands; it also includes the artificial propagation of game and fur species and the encouragement of non-game species. Within the colleges of the University many courses are available which contribute valuable information and basic principles of use to students in this field. Students desiring such specialization are advised to follow the requirements of the Wildlife Management Curriculum from the beginning of the freshman year with such substitutions as advisers may designate.

The Minnesota Agricultural Experiment Station is using every available opportunity to develop research, to collect information, and to encourage the development of this new land use industry. The following curriculum is designed to provide the student with a background of biology and farm and forest economics as well as training in the more practical phases of wildlife management. Since the specialization may vary considerably even in one field with the individual student, complete curricula are not suggested in all lines. The intention is not to offer a completely detailed curriculum to which the student must rigidly adhere. It is expected that each student will build his course by the major elective method under the guidance of an adviser and for the special vocational purpose he may have in mind. Such curricula will, in general, fall in one of the following groups: forestry, agriculture, agricultural and forestry sciences.

Students in this curriculum may prepare themselves for teaching in colleges and universities, for research and experimental work in various state and federal departments, and for management and extension work in state and federal departments concerned with utilization of our natural resources.

Wildlife management has important relations to the following government and private enterprises: United States and state forest services, national and state park services, soil erosion programs, U. S. Biological Survey, research and teaching, and commercial wildlife management. For the opportunities offered, the student is advised to consult the Division of Entomology and Economic Zoology and other divisions or departments specially concerned and the dean of the college.

REQUIREMENTS

All-college requirements for students in this college. See page 10.

This curriculum requires 192 credit hours for graduation (in addition to non-credit courses required in the freshman-sophomore years) and is made up of (1) freshman-sophomore required courses with such options as are indicated in

the freshman and sophomore years, and (2) a major and electives in the junior and senior years in accord with the schedule given below.

Special attention of every student is called to the faculty requirements for classification in the junior class, page 11, and to the English Requirement for Graduation, page 10.

All students, irrespective of the special curriculum which they may select, are required to complete certain general courses before graduation. These are considered fundamental and necessary to any curriculum. For some students the outline for the first two years, given below, represents more than the regular amount of work of 17 credit hours per quarter. In such cases those subjects which cannot be taken in the freshman and sophomore years must take precedence in the following year.

RECOMMENDATIONS

General Zoology should be completed during the freshman year. Not less than 9 credits will be accepted as fulfilling the general zoology requirement.

At least one modern language should be obtained during the undergraduate work. German is recommended and may be taken in one of the two following sequences: 1-2-3 (15 cred.) or 24a-25a-26a (12 cred.).

FRESHMAN YEAR

General courses.—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.

Bot. 1f,w,s, General Botany, 4
Bot. 7, Taxonomy of Flowering Plants, 3
Bot. 21, Elementary Ecology, 3
Inorg. Chem. 1f-2w-3s, General Inorganic Chemistry, 12. Students presenting a year of high school chemistry may elect instead Inorg. Chem. 9-10
Inorg. Chem. 9f,w-10w,s, General Inorganic Chemistry, 10 (1 yr. of high school chem.) Those required to take Inorg. Chem. 1-2-3 may omit this course.
Math. 1f,w,s,* Higher Algebra, 5
Math. 6f,w,s,* Trigonometry, 5 (Math. 1 or equiv.)
German, 15 or special sequence of 12
Orient. 1f,w,s, Freshman Orientation Lectures, 1 (see page 89)
P.M.&P.H. 3f,w,s,† Personal Health, 2
Rhet. 1f,w,s-2w,s,f-3s,f,w, Rhetoric, 9
Zool. 1f-2w-3s, General Zoology, 10

SOPHOMORE YEAR

1. Freshman courses which were not completed during the freshman year.
2. General courses
   Agr. Biochem. 4f,w, Introduction to Organic and Biochemistry, 5 (Inorg. Chem. 10)
   Agr. Biochem. 6f, Animal Biochemistry, 5 (Agr. Biochem. 4 and Soils 9)
   Agr. Econ. 1f,w, Principles of Economics I, 3
   Agr. Econ. 2w,s, Principles of Economics II, 5 (Agr. Econ. 1)
   Bact. 53f,w,s, General Bacteriology, 5 (Inorg. Chem. and Gen. Zool.)
   Pl. Path. 7w, Grasses and Sedges, 3 (7 cred. in botany)
   Pl. Path. 8s, Weeds, 3 (7 cred. in botany)
   Rhet. 11f,s, Argumentation, 3 (Rhet. 3, Rhet. 22 advised) or Rhet. 22f,w,s, Public Speaking, 3 (Rhet. 3)

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* Students will be exempt from the required mathematics courses only in accordance with the placement tests given by the Department of Mathematics (see page 99). For any exemption the student will be required to substitute an equivalent number of credits (mathematics or electives) as approved by his adviser.

† Three credits of physical education are required for women in this curriculum.

3. **Biological Station at Itasca State Park** (Summer Session). The second term of the Summer Session (Biological Station) should be attended after either the freshman or sophomore year. The course there should include Bot. 115su, Advanced Taxonomy of Flowering Plants, and electives selected according to the individual needs of the student. The first term of the Summer Session (Forestry Station) is also recommended but not required. (See page 38, Forestry Curricula, for courses.)

JUNIOR YEAR

1. **Sophomore courses** which were not completed during the sophomore year.
2. **General courses**
   Agr. Econ. 90f, Agricultural Statistics, 5
   Agr. Eng. 3w,s, Mechanical Drawing, 3
   Agr. Eng. 19f,s, Elementary Surveying, 3 (Math. 6)
   For. 126f, Silvics, 3
   For. 131w, Forest Policy and Administration, 5 or Ent. 62, Wildlife Conservation Principles and Administration, 3 (given at Itasca Park)
   Geol. 8, Introductory Geology, 5
   Rhet. 51f,w,s, Exposition, 3 (Rhet. 3)
   Soils 9w, Soils I, 4
   Soils 10f,s, Soils II, 1
3. Students may elect the spring quarter of the junior year at the Cloquet Forest Experiment Station (see page 38, Forestry Curricula, for courses) upon consultation with adviser. For such students Soils 9-10 will not be required.

JUNIOR AND SENIOR YEARS

1. A major sequence of 30 to 36 credits which must include the following courses:

   Ent. and Econ. Zool. 64w, Economic Vertebrate Zoology, 3 (Gen. Zool. 1-2-3)
   Ent. and Econ. Zool. 165w, Game Management, 3 (Gen. Zool. 1-2-3, Ent. 62, 64, 163)
   Zool. 22w, Comparative Anatomy, 5 (Gen. Zool. 1-2-3)
   Zool. 51f, Introductory Animal Parasitology, 5 (Gen. Zool. 1-2-3)
   Zool. 53s, Faunistic Zoology, 5 (Gen. Zool. 1-2-3)

2. Electives applicable to the major or selected with a view of forming a minor field may be chosen from the following departments or divisions:

   1. Agricultural Biochemistry
   2. Agricultural Economics
   3. Animal Nutrition
   4. Bacteriology
   5. Botany
   6. Farm Management
   7. Forestry
   8. Geology
   9. Horticulture
   10. Plant Pathology and Agr. Botany
   11. Poultry Husbandry
   12. Soils
   13. Veterinary Medicine
   14. Zoology

IV. PRE-VETERINARY MEDICINE

Curriculum to be arranged with the assistance and approval of the adviser. In general, subjects to be taken are inorganic chemistry, one year; General Zoology 14-15, and Botany 1; English composition, one year; and electives to be selected from German, mathematics, physics, or history. Because of the grade requirements for entrance to veterinary colleges an average grade of close to B in pre-veterinary medicine is essential.

V. AGRICULTURAL EDUCATION

Students who have completed the required work of the freshman and sophomore years of the Technical Agriculture Curriculum of the College of Agriculture, Forestry, and Home Economics, or equivalent, may prepare to teach agriculture in the public schools by completing the junior and senior years in a combined curriculum of the College of Education and the College of Agriculture, Forestry, and Home Economics.

REQUIREMENTS

All-college requirements for students in this college. See page 10.

This curriculum requires 204 credit hours for graduation, including 5 credit hours of observation and supervised teaching.

An average honor point ratio of 1.5 is required for graduation on 18 courses out of the 24 courses listed below:*

Ag. Econ. 40, 102, 103	Ent. 5
Ag. Eng. 4, 13, 40	Hort. 6
Agron. 21, 23, 31	Plant Path. 1
An. Husb. 3, 4, 56, 57, 112	Soils 9
Poultry Husb. 1	Vet. Med. 50-51-52
Dairy Husb. 1, 101	

Certification requirements for teaching vocational agriculture in Minnesota include a provision that applicants must have lived on a farm until the age of sixteen or have had two full years of farm experience after the age of sixteen.

FRESHMAN-SOPHOMORE YEARS—REQUIRED COURSES

1. Freshman-sophomore requirements in the Technical Agriculture Curriculum. See pages 20-22.

or

2. Recommended curriculum given below. This curriculum includes most of the freshman-sophomore work of Technical Agriculture but has some additions, omissions, and rearrangements in course sequences to insure possible programming of required subjects. A few freshman-sophomore subjects are postponed to the junior-senior years.

RECOMMENDED CURRICULUM—FRESHMAN-SOPHOMORE YEARS

Freshman Year

Agr. Ed. 1w, Introduction to Agricultural Education, 1
Agr. Eng. 13f,s, Gas Engines, 3
Agr. Eng. 23f,s, General Physics, 5. Not required of students who present a year of high school physics.**
Agr. Eng. 40f,s, Mechanical Training, 3
Agron. 1f,s,† General Farm Crops, 3
An. Husb. 1f,w,s, Livestock Production, 3
Bot. 1f,w,s, General Botany, 4, and 3 credits to be elected.
Dy. Husb. 1f,s, Elements of Dairying, 3
Hort. 6f, Fruit Growing, 3
Inorg. Chem. 1f-2w-3s, General Inorganic Chemistry, 12. Students presenting a year of high school chemistry may omit this course and register for Inorg. Chem. 9-10.
Inorg. Chem. 9f,w-10w,s, General Inorganic Chemistry, 10. Those required to take Inorg. Chem. 1-2-3 may omit this course.
Math. 1f,w,s,§ Higher Algebra, 5 cred., *or* Agr. Eng. 11w, Applied Mathematics, 5
Orient. 1f,w,s,¶ Freshman Orientation Lectures, 1
Rhet. 1f,w,s, Rhetoric I, 3
Rhet. 2f,w,s, Rhetoric II, 3
Rhet. 3f,w,s, Rhetoric III, 3

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* Effective beginning fall quarter, 1940-41.

† May be omitted by students who took vocational agriculture in high school, provided Agron. 132 or 133 will be taken.

§ Students will be exempt from Math. 1 who pass the placement test given by the Department of Mathematics requiring the equivalent of Math. 1, Higher Algebra (see page 99). For any exemption the student will be required to substitute an equivalent number of credits (mathematics or electives) as approved by his adviser.

¶ See page 101.

** Not open for credit to students offering one unit of high school physics for entrance.

Sophomore Year

Freshman courses which were not completed during the freshman year.

Agr. Biochem. 4f,w, Introduction to Organic and Biochemistry, 5
Agr. Econ. 1f,w, Principles of Economics I, 3
Agr. Econ. 2w,s, Principles of Economics II, 5
Agr. Eng. 4s, General Woodworking, 3
Agron. 31f,w, Principles of Genetics, 4
An. Husb. 3f, Breeds of Livestock, 3
An. Husb. 4w, Breeds of Livestock, 3 cred., *or* Dy. Husb. 104f, Dairy Stock Selection, 2
Bact. 53f,w,s, General Bacteriology, 5
Ent. 5f,w,s, Economic Entomology, 5
Pl. Path. 8s, Weeds, 3
Poul. Husb. 1w, Poultry Production, 3
P.M.&P.H. 3f,w,s, Personal Health, 2
Soils 9w, Soils I, 4
Soils 10f,s, Soils II, 1
Zool. 14f-15w, General Zoology, 6

JUNIOR-SENIOR YEARS

Students in Agricultural Education will be registered, beginning with the junior year, in both the College of Education and the College of Agriculture, Forestry, and Home Economics.

Special attention of every student is called to faculty regulations for classification in the junior class, page 11.

It is recommended that the student keep in mind the possible completion of majors or minors in some agricultural groups.

Junior Year—Required Courses

1. Freshman-sophomore courses not completed. See page 11 for requirements for classification in the junior class.
2. Rhetoric 51f,w,s, Exposition, 3
3. Social science requirement. See page 10.
4. Education courses:

   Educ. 51Af,w,s, Educational Psychology, 3
   Agr. Ed. 54f,w, Rural Education and Community Leadership, 2
   Agr. Ed. 81s, Teaching Agriculture, 3

5. Agricultural courses—From the following courses the student will be required to take those designated and approved by his adviser:

   Agr. Biochem. 6f, Animal Biochemistry, 5 cred. *or* Agr. Biochem. 5s, Plant Biochemistry, 5
   Agr. Econ. 40f,s, Principles of Marketing Organization, 3
   Agr. Econ. 102w, Farm Organization, 3
   Agr. Econ. 103s, Farm Operation, 3
   Agron. 21w, Grain Crops, 4
   An. Husb. 56f, Livestock Feeding, 3
   An. Husb. 57w, Livestock Feeding, 3 cred. *or* Dy. Husb. 103w, Dairy Stock Feeding, 3
   Pl. Path. 1f,s, Plant Pathology, 5
   Rhet. 22f,w,s, Public Speaking, 3
   Vet. Med. 50f-51w-52s, Anatomy, Physiology, and Hygiene of Domestic Animals, 9

Senior Year—Required Courses

1. Education courses:

   Agr. Ed. 82f, Methods in Teaching Agriculture, 3
   Agr. Ed. 83w, Methods in Teaching Agriculture, 2
   Agr. Ed. 90f,w,s, Observation and Participation, 2
   Agr. Ed. 91f,w,s, Supervised Teaching Experience, 3

Agr. Ed. 101f, Part-time School Instruction, 2
Agr. Ed. 102w, Evening School Instruction, 3
Agr. Ed. 103s, Facilities and Materials, 3
Agr. Ed. 104s, Planning Programs, 2

2. Agricultural courses—From the following courses the student will be required to take those designated and approved by his adviser:

Agr. Eng. 12s, Agricultural Machinery, 3 cred., *or* Agr. Eng. 3f,w,s, Mechanical Drawing, 3
Agron. 23f, Forage Crops, 4
An. Husb. 112w, Animal Breeding, 3 cred., *or* An. Husb. 113s, Livestock Management, 3
Dy. Husb. 101f, Milk Production, 5
For. 10w, Farm Forestry, 3 cred., *or* Hort. 21f, Plant Materials, Fall and Winter Aspects, 3 cred., *or* Hort. 22s, Plant Materials, Spring and Summer Aspects, 3
Soc. 14f,w,s, Rural Sociology, 3

RECOMMENDED ELECTIVES

It is suggested that electives to complete the 204 credits required for graduation be chosen from the following:

Agr. Ed. 56w, Rural Youth Leadership, 3
An. Husb. 51w, Meat Selection, 3
Dy. Husb. 3f, Testing Dairy Products, 2
Ed. 133f, Guidance in Secondary Schools, 2
Ed. Psy. 120f,w, Basic Principles of Measurements, 3
Ed. Psy. 159f,w, Personality Adjustments in Education, 3
Hort. 32s, Vegetable Growing, 3
Pub. and Rur. Jour. 53w, Publicity, 3
Rhet. 11f,w,s, Argumentation, 3

VI. AGRICULTURAL EXTENSION

Experience has shown that it is not wise or feasible, because of the wide range of possible major and minor specialization, to set up a formal curriculum for training in agricultural extension. The college does, however, offer special opportunities for an adequate training in many branches of this educational field. Any student desiring such training has the privilege as well as the responsibility of formulating his own curriculum under the general curricular requirements of Technical Agriculture or Agricultural Education.

Students planning to enter some field of agricultural extension can best prepare for this by selecting some major field and by arranging for their special extension training in the selection of their minor groups or in the selection of electives with the co-operation of advisers. The major field may be agricultural education or one of the technical divisions in the field of agriculture, such as animal husbandry, dairy husbandry, agronomy, or horticulture. Other majors are also possible. The selection of a major should be determined by the type of extension work which the student plans to follow and by the plans which the student may have as to a continuation of his study and professional development after he has become engaged in extension work.

Since agricultural extension work involves educational and other methods of presenting and promoting agricultural information and practices, it must be founded primarily on a thoro knowledge of some field of technical agriculture and a general knowledge of the whole field. The extension methods must vary with different extension jobs and must be built up on a wide range of sociological subject-matter. The methods are secondary to the subject-matter and for most types of extension work an attempt to formulate a major in extension is not advised altho a considerable proportion of the subject-matter, of course, should be selected from courses that will have a distinct bearing on extension methods. A major adviser

should be selected in the major subject-matter field of the student. It may also be advisable for such students to select a second adviser either from the extension staff or from some member of the resident teaching staff who is familiar with extension problems.

Since there is no single subject-matter course which can prepare the student for all of the intricate problems involved in extension methods and procedures, it becomes necessary for the student, with the help of his adviser, to select carefully subject-matter courses from various divisions in this college and from departments in the University which shall give him a background of knowledge which can be utilized in his extension work. Many of these courses will fall in the social science groups altho some may deal with subject-matter in technical agriculture. The number of technical agricultural and social science courses which would be useful are probably too numerous to be included in any one program so that the student will have to make careful selection with the aid of his advisers. For the benefit of such students and for the convenience of advisers a list of suggested courses is given below. Other courses may be advisable, or, in some cases, preferable. The list is merely suggestive. The student's special attention is called to a subject-matter course on extension work (Agricultural Education 80) which will be given co-operatively with members of the extension staff. This course deals particularly with the organization and established practices in the extension field.

It is generally recognized that "personality" is an important factor in the selection of extension workers and in the success of their subsequent vocational service. A judicious participation in student and community activities which give opportunities for the development of leadership is recommended. Students should also avail themselves of those numerous social and cultural opportunities of the University which contribute to a better understanding of how to meet and work with people. While the college offers no subject-matter courses in "personality," valuable criticism and advice may be secured from many faculty advisers.

REQUIREMENTS

All-college requirements for students in this college. See page 10.

SUGGESTED COURSES FOR AGRICULTURAL EXTENSION

Available as electives or required work in a curriculum especially suitable for those training for agricultural extension work:

College of Agriculture, Forestry, and Home Economics

Agricultural Economics: As many of these courses as would be feasible.

Agricultural Education: 51, Educational Psychology, or equivalent; 54, Rural Education and Community Leadership.

Agricultural Engineering: Numerous courses from which to select.

Publications and Rural Journalism: 53, Publicity. Possibly other courses from the Department of Journalism of the College of Science, Literature, and the Arts.

Rhetoric: 22, Public Speaking; 24, Advanced Public Speaking; 28, Play Production; 59, Advanced Play Production.

Subject-matter departments such as Horticulture, Agronomy, Animal Husbandry, Dairy Husbandry, Veterinary Medicine, etc. Subjects to be selected in accordance with objectives.

College of Science, Literature, and the Arts

Political Science: 1-2-3, American Government and Politics; 31, Introduction to American Government and Administration. Other possible courses for selection.

Psychology: 1-2, General Psychology; 3, Psychology Applied to Daily Life.

Sociology and Social Work: 1, Introduction to Sociology; 6, Social Interaction; 14, Rural Sociology; 110, Rural Organization; 112, Methods of Rural Social Research; 114, Rural Social Institutions.
Business Administration: 51-52-53, Business Law.

The above is not a complete list of all of the possible electives that would be useful in a major curriculum in agricultural extension but includes a wide range and is suggestive of the additional possibilities.

VII. AGRICULTURAL ENGINEERING (PROFESSIONAL)

This curriculum leads to the degree of bachelor of agricultural engineering and is offered jointly by the College of Agriculture, Forestry, and Home Economics, and the Institute of Technology. Three distinct lines of specialization are provided, namely, Farm Buildings, Farm Machinery, and Reclamation. (See also Technical Agriculture Curriculum for students in agriculture who desire to major in Agricultural Engineering, page 20.)

FRESHMAN YEAR

During the freshman year those following this curriculum will register in the Institute of Technology and follow the work of the freshman year as outlined in the bulletin of that institute.

SOPHOMORE YEAR

The following courses should be scheduled for the quarter as indicated below. For the last three years of the curriculum students are registrants both in the College of Agriculture, Forestry, and Home Economics and the Institute of Technology.

General courses
Agr. Eng. 18s, Agricultural Automotives, 4 (Phys. 7)
Agr. Eng. 21s, Elements of Surveying, 4 (Draw. 3, M.&M. 12)
Agr. Eng. 43f, Mechanical Laboratory, 3 (No prereq.)
Agron. 1, General Farm Crops, 3
Econ. 8f,w, General Economics, 3
Econ. 9w,s, General Economics, 3 (Econ. 8)
M.&M. 24f,w,s, Differential Calculus, 5 (M.&M. 13)
M.&M. 25f,w,s, Integral Calculus, 5 (M.&M. 24)
M.&M. 26f,w,s,su, Technical Mechanics: Statics, 5 (M.&M. 25)
Phys. 7f,w,s, General Engineering Physics, 5 (M.&M. 12 or equiv.)
Phys. 8f,w,s, General Engineering Physics, 5 (Phys. 7)
Phys. 9f,w,s, General Engineering Physics, 5 (Phys. 8)
Soils, 9w, Soils, 4

JUNIOR YEAR

Fall Quarter

Agr. Eng. 5f, Farm Structures Laboratory, 3
Agr. Eng. 52f, Elements of Farm Machinery, 3 (M.&M. 26)
Geol. 5f, Engineering Geology, 3
M.&M. 127f,w,s, Technical Mechanics: Dynamics, 5 (M.&M. 26)
M.&M. 129f,w,s, Hydraulics, 4 (M.&M. 26)
M.&M. 143f,w,s, Hydraulics Laboratory, 1 (M.&M. 129)

Winter Quarter

Agr. Econ. 102w, Farm Organization, 3 (Econ. 9 or equiv. or reg. in 9)
Agr. Eng. 51w, Land Reclamation, 5 (Soils 9, M.&M. 143) or Soils 108
M.&M. 128f,w,s, Strength of Materials, 5 (M.&M. 26)
M.E. 26w, Mechanism and Kinematics, 3 (M.&M. 24)
M.E. 31w, Thermodynamics, 3 (Phys. 7)

Spring Quarter

Agr. Eng. 37s, Rural Sanitation, 3 (M.&M. 129)
Agr. Eng. 53s, Farm Structures, 3 (5, Draw. 3 or equiv.)
Agr. Eng. 72s, Applied Electricity, 3 (Phys. 9 or 43 and 44) or Agr. Eng. 73s
An. Husb. 50s, Fundamentals of Livestock Production, 3 or Dy. Husb. 52s
C.E. 37s, Structural Engineering, 3 (M.&M. 26)
M.E. 27s, Machine Design, 3 (M.&M. 128)

SENIOR YEAR

Fall Quarter

Agr. Eng. 67f, Advanced Farm Structures Design, 3 (53, M.&M. 128)
Agr. Eng. 71f, Design and Economics of Agricultural Machinery, 3 (18, 52, M.E. 27)
C.E. 146f,s, Plain Concrete, 3 (M.&M. 128)
Electives to complete program

Winter Quarter

G.E. 101w, Contracts and Specifications
Rhet. 22f,w,s, Public Speaking, 3 (Rhet. 3 or Eng. Engl. 6)
Soils 108w, Physical Properties of Soils, 3 (Soils 9) or Agr. Eng. 51
Electives to complete program

Spring Quarter

Agr. Eng. 73s, Steam Boilers and Heat Engines, 3 (18, M.E. 31) or Agr. Eng. 72s
Dy. Husb. 52s, The Dairy Industry, 3 (No prereq.) or An. Husb. 50s
Electives to complete program

RECOMMENDED ELECTIVES

1. **Farm Structures**
   Agr. Eng. 44, 111-112-113; Arch. 57, 58, 59; For. 10; G.E. 81; Hort. 24.
2. **Farm Power and Machinery**
   Agr. Eng. 121-122-123, 126; E.E. 43-44-45; M.E. 18, 121, 131-132, 150; Metal. 156.
3. **Land Reclamation and Development**
   Agr. Eng. 28, 101-102-103; C.E. 161; M.&M. 130, 193.

VIII. AGRICULTURAL ENGINEERING BUSINESS ADMINISTRATION

(See statement on page 14.)

IX. AGRICULTURAL BUSINESS ADMINISTRATION

This curriculum offers an opportunity for those who wish to prepare specifically for some branch of agricultural business, such as the marketing of farm products, farm finance, farm implements, farm real estate, country merchandising, and the like. The first two years are prescribed and include introductory courses in agriculture, economics, and the fundamental sciences necessary for further work in agriculture and economics. During the freshman and sophomore years the student will register in the College of Agriculture, Forestry, and Home Economics. In the junior and senior years he will register in both the School of Business Administration and the College of Agriculture, Forestry, and Home Economics. At least 90 credits and honor points equal to the number of credits are required for admission to the junior class. For definition of "honor points" see page 9. Approximately one third of the last two years is elective and may include approved courses in any college as well as advanced courses in agriculture and economics.

The fees for the first two years are those of the College of Agriculture, Forestry, and Home Economics. For the last two years the fees are those of the School of Business Administration.

REQUIREMENTS

All-college requirements for students in this college. See page 10.

FRESHMAN YEAR

The freshman year consists of the regular freshman courses outlined on pages 20-21, except that students are advised to take Math. 8 rather than Agr. Eng. 11; or Math. 1 if they do not have the prerequisites for Math. 8. If any course of the freshman year is deferred to the sophomore year it should be An. Husb. 1. (See page 10 also.)

SOPHOMORE YEAR

The following courses should be scheduled for the quarter as indicated.

1. **Freshman courses** which were not completed during the freshman year.
2. **General courses**
   Agr. Econ. 1f,w, Principles of Economics I, 3
   Agr. Econ. 2w,s, Principles of Economics II, 5 (Agr. Econ. 1)
   Agr. Econ. 8s, Rural Economics, 3 (Agr. Econ. 2 or 3)
   Agr. Econ. 50f, Farm Finance, 5 (Agr. Econ. 2)
   Econ. 20f,w,s,* Elements of Accounting, 3
   Econ. 25f,w-26w,s, Principles of Accounting, 6
   Ent. 5f,w,s, Economic Entomology, 5 (Zool. 14-15 or equiv.)
   Psy. 1f-2w, General Psychology, 6
   Zool. 14f-15w, General Zoology, 6
3. **Electives.**—Enough elective credits should be selected to make with the required work of the freshman and sophomore years a total of 101 credit hours.

JUNIOR YEAR

1. **General requirements**
   Bus. Adm. 51f-52w-53s, Business Law, 9 (10 cred. in econ. incl. Agr. Econ. 1 and 2)
   Bus. Adm. 142f,w,s, Advanced Money and Banking, 3 (Econ. 3 and 6-7)
2. **Special requirements**
   Agr. Econ. 30f, Agricultural Prices, 3 (Agr. Econ. 2)
   Agr. Econ. 40f,s, Principles of Marketing Organization, 3 (Agr. Econ. 2)
   Agr. Econ. 90f, Agricultural Statistics, 5
   Agr. Econ. 110f-111w, Economics of Agricultural Production, 6 (Agr. Econ. 2)
   Agr. Econ. 131w, Market Prices, 3 (Agr. Econ. 30, 40)
   Agr. Econ. 141w, Marketing Organization: Dairy and Poultry Products, 3 (Agr. Econ. 40)
   Rhet. 51f,w,s, Exposition, 3 (Rhet. 3)

SENIOR YEAR

1. **General requirements**
   Bus. Adm. 58f,w,s, Elements of Public Finance, 3 (Econ. 6-7)
   Bus. Adm. 71f,w,s, Transportation: Services and Charges I, 3 (Econ. 6-7)
   Bus. Adm. 101f,w-102w,s, Advanced General Economics, 6 (Econ. 6-7)
   Bus. Adm. 139f,w,s, Advanced General Accounting, 3 (Econ. 25-26)†
   Econ. 149f,w,s, Business Cycles, 3 (Econ. 141 or Bus. Adm. 142)
2. **Special requirements**
   Agr. Econ. 135s, Methods of Price Analysis, 3 (Agr. Econ. 30, 191)
   Agr. Econ. 150s, Advanced Farm Finance, 3 (Agr. Econ. 50 or equiv.)
   Agr. Econ. 170s, Land Economics, 3 (Agr. Econ. 110)
   Agr. Econ. 191w, Advanced Agricultural Statistics, 3 (Agr. Econ. 90)

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* Students who have had a high school course or experience in bookkeeping may be exempted from this course and admitted to Econ. 25-26 by passing a placement test.

† Agr. Econ. 47s, Marketing Accounting, 4 may be substituted upon approval by adviser.

X. AGRICULTURAL JOURNALISM

This curriculum is intended for those who wish to prepare for some branch of journalism which relates to agriculture: such as staff positions on agricultural magazines, editing country newspapers, writing on agricultural questions, editing of bulletins for state and federal departments of agricultural and experiment stations, editing of special farm pages or departments for newspapers, and editing of publications for farm organizations.

MAJOR IN AGRICULTURAL JOURNALISM

Students intending to major in agricultural journalism are advised to register in journalism in the College of Science, Literature, and the Arts. Such students must have their programs of agricultural subjects approved in the office of the dean of the College of Agriculture, Forestry, and Home Economics. The agricultural subjects should include at least elementary fundamental courses in animal and plant industry, agricultural economics, and rural sociology, with electives covering special or advanced fields of agriculture. Some basic knowledge of botany, chemistry, and zoology should be obtained in the freshman and sophomore years.

Students may also register for a major in agricultural journalism in the College of Agriculture, Forestry, and Home Economics, in which case their programs in journalism must be approved by the Department of Journalism in the College of Science, Literature, and the Arts, and the agricultural program by the dean of the College of Agriculture, Forestry, and Home Economics. (See also page 15.)

MINOR IN JOURNALISM

Students majoring in some field of the Technical Agricultural Curriculum or in Agricultural Extension may select a minor in journalism. The minor program must have the approval of the Department of Journalism in the College of Science, Literature, and the Arts.

Minors in journalism in other agricultural curricula should have the approval of the dean of the College of Agriculture, Forestry, and Home Economics.

C. CURRICULA IN FORESTRY

Three professional and two technological curricula are offered students with majors in forestry. These are:

Five-year Professional Curricula*

I. General Forestry, page 38.

II. Range Management (Professional), page 39.

III. Game Management (Professional), page 39.

Four-year Technological Curricula

IV. Commercial Lumbering, page 41.

V. Wood Technology, page 42.

Each technological curriculum is made up of 204 credit hours of work.

The Professional Forestry Curricula are 5-year courses leading to the degree of master of forestry (M.F.). On completing the requirements of the first four years the student will receive the B.S. degree. The latter is not a professional degree and does not complete the training for professional work in forestry. Before beginning the fifth year of work the student must have completed all the requirements for the B.S. degree in the corresponding curriculum, totaling 210 credit hours of work and including a five-week field course at the Biological Station of the University of Minnesota at Itasca State Park and one quarter of work at the Cloquet Forest Experiment Station. The professional degree, master of forestry (M.F.), is awarded only after the satisfactory completion of the fifth year of work. This fifth year, totaling approximately 52 additional credits, mostly prescribed, includes approximately 37 credits in courses numbered 100 and above, 9 credits in courses numbered 200 and above, and comprehensive written and oral examinations.

The professional curricula are designed to meet the increasingly rigid requirements for the practice of professional work in the several technical fields of actual forestry. The wide range of information and training required in the fundamental biological and physical sciences and in social sciences, together with the increasing number of technical and professional courses in forestry call for not less than five years of college work. Keener competition in the future can be successfully met only by more adequate and better professional training.

The four-year curricula in Commercial Lumbering and Wood Technology are designed to train men for special commercial and technological positions dealing with forest products. They are not accepted for training for the professional practice of forestry. On completion of these curricula, the student receives the degree of bachelor of science (B.S.)

Students desiring to enter the Graduate School for higher degrees may do so after completion of the four-year curricula and also after completion of the first four years of any of the five-year professional curricula, provided they meet the Graduate School requirements. In such cases the student will presumably seek

* All forestry students classified by the registrar as seniors at the beginning of the fall quarter in 1940-41 will be entitled to complete their work for the degree on the basis of the four-year curriculum. Beginning with the year 1941-42, the four-year Professional Forestry Curricula will be definitely abandoned.

training for research in some special subject-matter field within or underlying the field of forestry and will register for the master of science or Doctor's degree under Plan A in the Graduate School. Altho the five-year professional courses are clearly designed as terminal professional curricula, graduates of these courses may continue in graduate study, provided they meet the requirements of the Graduate School.

Five-Year Professional Curricula

GENERAL REQUIREMENTS

All-college requirements for students in this college. See page 10.

All students, irrespective of the professional curricula which they may select, are required to complete certain general courses before graduation. These are considered fundamental and necessary to any professional curriculum in forestry. For some students the outline for the first two years, given below, represents more than the regular amount of work of 17 credits per quarter. In such cases those subjects which cannot be taken in the freshman and sophomore years must take precedence the following year. Phys. Ed. 1-2-3, Physical Education, 3 credits (credit is allowed only when the three quarters are completed) and Military Science and Tactics or Naval Science and Tactics may be taken in addition to the regular schedule if desired. Care should be taken in registration to give precedence to courses offered in only one quarter.

During the first two years the work in all the professional curricula is essentially the same, and is devoted to the study of general courses. Preferably at the beginning of the sophomore year, and not later than the junior year, each student must decide upon the professional curriculum he wishes to follow. Special attention of every student is called to the faculty requirements for classification in the junior class, page 11.

FRESHMAN YEAR

1. **General courses**

Agr. Eng. 3f,w,s, Mechanical Drawing, 3
Bot. 1f,w,s, General Botany, 4
Bot. 21f,w,s, Elementary Ecology, 3
For. 1f, General Forestry, 3
For. 3w, Dendrology, 3
For, 4s, Dendrology, 4
Inorg. Chem. 1f-2w-3s, General Inorganic Chemistry, 12. Students presenting a year of high school chemistry may omit this course and register for Inorg. Chem. 9-10.
Orient. 1f,w,s, Freshman Orientation Lectures, 1. (See page 101)
Inorg. Chem. 9f,w-10w,s, General Inorganic Chemistry, 10 (prereq. one year of high school chemistry). Those required to take Inorg. Chem. 1-2-3 are exempt.
Math. 1f,w,s, Higher Algebra, 5. Students presenting higher algebra for entrance may omit this course and substitute 5 credits elective.
Math. 6f,w,s,* Trigonometry, 5 (prereq. Math. 1 or equiv.)
P.M.&P.H. 3f,w,s, Personal Health, 2
Soc. 1f,w,s, Sociology, 5
Biological Station at Itasca State Park (Summer Session). Transfer students who enter the University as juniors may substitute electives for this requirement. All others must complete the Itasca Park work before the beginning of the sophomore year unless given permission on petition to defer it one year. A satisfactory scholastic average must be maintained during the preceding year. In no case will such students be permitted to register for junior work before completing the summer camp requirement.

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* Students will be exempt from the required mathematics courses only in accordance with the placement tests given by the Department of Mathematics (see page 99). For any exemption the student will be required to substitute an equivalent number of credits (mathematics or electives) as approved by his adviser.

Students must register for all of the following courses:
Bot. 3su, Forest Botany, 1
Ent. 13su, Field Zoology, 1
For. 2su, Field Dendrology, 1
For. 5su, Field Silviculture, 2
For. 6su, Field Mensuration, 1
For. 11su, Camp Management, 1

SOPHOMORE YEAR

1. Freshman courses which were not completed during the freshman year.
2. General courses
   Agr. Biochem. 4f,w, Introduction to Organic and Biochemistry, 5 (Inorg. Chem. 10 cred.)
   Agr. Biochem. 5s, Plant Biochemistry, 5 (Agr. Biochem. 4)
   Agr. Econ. 1f,w, Principles of Economics I, 3
   Agr. Econ. 2w,s, Principles of Economics II, 5 (Agr. Econ. 1)
   Agr. Eng. 19f-20s, Surveying, 6
   Bot. 22f,w,s, Elementary Plant Physiology, 3
   For. 7f-8w-9s, Forest Mensuration, 9 (For. 6)
   Pl. Path. 10w,s, Forest Pathology, 5 (Bot. 10 cred.)
   Rhet. 1f,w,s, Rhetoric I, 3
   Rhet. 2f,w,s, Rhetoric II, 3 (Rhet. 1)
   Rhet. 3f,w,s, Rhetoric III, 3 (Rhet. 2)

JUNIOR YEAR

1. Sophomore courses which were not completed during the sophomore year.
2. General courses
   Bot. 7f,s, Elementary Taxonomy, 3
   Rhet. 11f,w,s, Argumentation or Rhet. 22f,w,s, Public Speaking, 3
   Rhet. 51f,w,s, Exposition, 3
   Zool. 1f-2w-3s, General Zoology, 10

SENIOR YEAR

1. Junior courses which were not completed during the junior year.
2. General courses
   Ent. 56f,w, Forest Entomology, 3
   Cloquet Forest Experiment Station
      Ent. 68s, Forest Zoology, 3
      For. 128s, Silviculture Laboratory, 6
      For. 132s, Forest Regulation Laboratory, 6
      Soils 50s, Forest Soils, 2

I. GENERAL FORESTRY

Suggested for those who are preparing themselves for general technical forest work involving the growth, management, and harvesting of forest crops (such as positions in the federal or state services, or foresters for paper companies, lumber companies, or other large timber owners). In addition to the general undergraduate requirements, the course of study for the first four years must include the following courses:

Agr. Econ. 25w, Accounting, 4
Agr. Eng. 24f-25w, Agricultural Physics, 8
Agron. 31f,w, Genetics, 4
Bot. 131f, Field Ecology, 5
Bot. 140w, General Plant Physiology, 3
Econ. 28f,s, Business Law, 3
For. 20w, Grazing, 3
For. 56s, Forest Products, 3
For. 53f-54w, Wood Structure and Identification, 6
For. 136f, Forest Economics, 3

For. 137w, Seeding and Planting, 3
For. 151f,w,s, Logging, 3
For. 155w, Forest Protection, 3
Geol. 1f,w,s, General Geology (Dynamic), 3
Geol. Af,w,s, General Geology Laboratory, 2
Zool. 64w, Economic Vertebrate Zoology, 3

II. RANGE MANAGEMENT

Suggested for those who wish to prepare themselves for range management work. It is important that these men be well prepared in plant physiology, systematic botany, and plant ecology, as well as in the fundamental principles of forestry. They should have some knowledge of the feeding and breeding of livestock. In addition to the general undergraduate requirements, the course of study for the first four years must include the following courses:

Agr. Econ. 25w, Accounting, 4
Agr. Econ. 90f, Agricultural Statistics, 5
Agr. Eng. 24f-25w, Physics, 8
Agron. 31f,w, Genetics, 4
An. Husb. 50s, Fundamentals of Livestock Production, 3
Bot. 114w-115s, Advanced Taxonomy, 6
Bot. 131f, Field Ecology, 5
Bot. 140w, Plant Physiology, 3
Bot. 141f, Physicochemical Principles and Measurements in Plant Physiology, 3
For. 20w, Grazing, 3
For. 136f, Forest Economics, 3
For. 151f,w,s, Logging, 3
For. 155w, Forest Protection, 3
Geol. 1f,w,s, General Geology (Dynamic), 3
Geol. Af,w,s, General Geology Laboratory, 2
Pl. Path. 7w, Grasses and Sedges, 3

III. GAME MANAGEMENT

Suggested for those who wish to prepare themselves for a combination of forestry and game management work. It is important that these men be acquainted with general forestry practices and have a thoro knowledge of biology. In addition to the general requirements, the course of study for the first four years must include the following courses:

Agr. Econ. 90f, Agricultural Statistics, 5
Agr. Eng. 24f-25w, Physics, 8
Agron. 31f,w, Principles of Genetics, 4
Bact. 53f,w,s, General Bacteriology, 5
Bot. 114w-115s, Advanced Taxonomy, 6
Bot. 131f, Field Ecology, 5
Ent. 161f, Waterfowl and Upland Game Birds, 3
For. 20w, Grazing, 3
For. 136f, Forest Economics, 3
For. 155w, Forest Protection, 3
Geol. 1f,w,s, General Geology (Dynamic), 3
Geol. Af,w,s, General Geology Laboratory, 2
Physics 29f, Meteorology, 3
Zool, 22w, Comparative Anatomy, 5
Zool. 64w, Economic Vertebrate Zoology, 3

FIFTH YEAR

Leading to the Professional Degree, Master of Forestry

Students who are interested in preparing themselves for professional forestry work after obtaining the Bachelor's degree may become candidates for the professional degree, master of forestry. Students who have completed the requirements for the B.S. degree in the corresponding curriculum normally may expect to complete the work in one year.

The specific requirements for the degree include the completion of 52 credits, including 9 credits in seminars or in independent work under the direction of an instructor, in courses numbered 200 and above giving graduate credit. Under this plan neither a thesis nor a reading knowledge of a foreign language is required.

Each candidate will be required to pass written and oral examinations in the field of his specialization.

The course of study must include the following courses:

GENERAL REQUIREMENTS

For. 126f, Silvics, 3
For. 127w, Silviculture, 3
For, 130f, Forest Valuation, 5
For. 131w, Forest Policy and Administration, 5
For. 143w, Forest Recreation, 3
For. 147f-148w-149s, Literature Seminar, 3
For. 220f-221w-222s, Major Report, 9
Soils 103s, Erosion, 3
Soils 108w, Physical Properties of Soils, 3

SPECIAL REQUIREMENTS

In addition to the foregoing general requirements, the fifth year of study must include the following courses in the various professional forestry curricula:

I. General Forestry
- For. 111f,w, Advanced Forest Mensuration, 3
- For. 129f,w,s, American Silvicultural Practice, 3
- For. 140f, Forest Working Plans, 3
- Phys. 29f, Meteorology, 3

II. Range Management
- Bot. 134s, Research Methods in Ecology, 5
- For. 140w, Forest Working Plans, 3
- Phys. 29f, Meteorology, 3
- Pl. Path. 8s, Weeds, 3

III. Game Management
- Ent. 163f, Mammalogy, 3
- Ent. 165w, Game Management, 3
- Zool. 51f, Introductory Parasitology, 3
- Zool. 53s, Faunistic Zoology, 5

Four-Year Curricula in Commercial Lumbering and Wood Technology

Two four-year curricula, Commercial Lumbering and Wood Technology, are offered. These two curricula have nearly common freshman-year course requirements.

GENERAL REQUIREMENTS

All-college requirements for students in this college. See page 10.

FRESHMAN YEAR

General courses

Agr. Eng. 3f,w, Mechanical Drawing, 3
Bot. 1f,w,s, General Botany, 4
Bot. 22f,w,s, Elementary Plant Physiology, 3
For. 1f,* General Forestry, 3
For. 3w, Dendrology, 3
For. 4s, Dendrology, 4
Inorg. Chem. 1f-2w-3s, General Inorganic Chemistry, 12. Students presenting a year of high school chemistry may omit this course and register for Inorg. Chem. 9-10.
Inorg. Chem. 9f,w-10w,s, General Inorganic Chemistry, 10 (one year of high school chemistry). Those required to take Chem. 1-2-3 are exempt.
Math. 1f,w,s, Higher Algebra, 5. Students presenting higher algebra for entrance may omit this course and substitute 5 credits elective.
Math. 6f,w,s, Trigonometry, 5 (Math. 1 or equiv.)
Math. 7s, College Algebra, 5 (Math. 6)
Orient. 1f,w,s, Freshman Orientation Lectures, 1. (See page 101.)
P.M.&P.H. 3f,w,s, Personal Health, 2
Soc. 1s, Introduction to Sociology, 5

IV. COMMERCIAL LUMBERING

Suggested for those who wish to enter any branch of the lumber business. Includes fundamental business courses and thoro training in the structure, handling, and uses of wood. The course of study must include the following courses:

SOPHOMORE YEAR

1. **Freshman courses** which were not completed during the freshman year.
2. **Special courses.**—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.

   Agr. Eng. 24f-25w, Agricultural Physics, 8 (Math. 1 or equivalent)
   Econ. 3s, Elements of Money and Banking, 5
   Econ. 6w-7s, Principles of Economics, 10
   Econ. 20f, Elements of Accounting, 3
   Pl. Path. 10s, Forest Pathology, 5 (Bot. 9 cred.)
   Psy. 1f-2w, General Psychology, 6
   Rhet. 1f-2w-3s,† Rhetoric, 9
   Zool. 14f-15w, General Zoology, 6

JUNIOR YEAR

1. **Sophomore courses** which were not completed during the sophomore year.
2. **Special courses.**—The following courses may be registered for any quarter that they are offered, except that the proper sequence of continuation courses and the prerequisites must be observed.

   Bus. Adm. 51f-52w-53s, Business Law, 9 (Econ. 6 and 7)
   Bus. Adm. 71f,w,s, Transportation: Services and Charges, 3 (Econ. 6 and 7)
   Bus. Adm. 77f,w,s, Survey in Marketing, 3
   Bus. Adm. 89f,w,s, Production Management, 3
   Econ. 25f,w,s-26f,w,s, Principles of Accounting, 6 (Econ. 20)
   Econ. 161f,w,s, Labor Problems and Trade Unionism, 3 (Econ. 6 and 7 or 83)
   Ent. 56f,w, Forest Entomology, 3 (Zool. 14 and 15 or equiv.)
   For. 7f, Forest Mensuration, 3 (Math. 6)
   For. 53f-54w, Wood Structure and Identification, 6
   For. 56s, Forest Products, 3
   Rhet. 22f,w,s, Public Speaking, 3 (Rhet. 3)
   Rhet. 51f,w,s, Exposition, 3 (Rhet. 3)

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* Not required for Wood Technology majors.

† Special attention is called to regulations for students with insufficient preparation in English.

SENIOR YEAR

1. **Junior courses** which were not completed during the junior year.
2. **Special courses.**—The following courses may be registered for any quarter that they are offered, except that the proper sequence of continuation courses and the prerequisites must be observed.
   Agr. Econ. 90f, Agricultural Statistics, 5
   Bus. Adm. 88w,s, Advertising, 3 (Bus. Adm. 77 and Psy. 56)
   For. 57f, Wood Utilization, 3 (For. 53 and 54)
   For 58w, Lumber Merchandising and Grading, 3 (For. 53 and 54)
   For. 113f, Wood Pulp and Paper, 3 (For. 53 and 54, Chem. 3 or 10)
   For. 114f-115w-116s, Mechanical and Physical Properties of Wood, 9 (For. 53 and 54)
   For. 125s, Wood Preservation, 3 (For. 53 and 54)
   For. 151w, Logging, 3
   For. 152s, Seasoning, 3 (For. 53 and 54)
   Mech. Eng. 3f,w,s, Wood Finishing, 3
   Psy. 56w, Psychology of Advertising, 3 (Psy. 1 and 2, Econ. 6 and 7).

A sufficient number of courses to be selected in consultation with, and with the approval of, the adviser to make a total of 204 credits.

V. WOOD TECHNOLOGY

Suggested for those who wish to enter the field of pulp and paper manufacture, wood preservation, or those industries using wood as a raw material. Includes a series of courses in chemistry and mathematics and a thoro training in the structure and properties of wood. The course of study must include the following courses:

SOPHOMORE YEAR

1. **Noncredit courses** required for graduation in addition to the 204 credit hours.
2. **Freshman courses** which were not completed during the freshman year.
3. **Special courses.**—The following courses may be registered for any quarter that they are offered except that the proper sequence of continuation courses and the prerequisites must be observed.
   Agr. Biochem. 2f,w, Quantitative Methods, 5
   Agr. Econ. 90f, Agricultural Statistics, 5
   Anal. Chem. 7f,s, Quantitative Chemical Analysis, 4
   Bact. 53f,w,s, General Bacteriology, 5
   Bot. 2f,w,s, Elementary General Morphology of Plants, 3
   Inorg. Chem. 11f,s, Qualitative Chemical Analysis, 4
   Math. 30f,w,s, Analytic Geometry, 5
   Math. 50f,w, Calculus I, 5
   Math. 51w,s, Calculus II, 5
   Rhet. 1f-2w-3s, Rhetoric, 9

JUNIOR YEAR

1. **Sophomore courses** which were not completed during the sophomore year.
2. **Special courses.**—The following courses may be registered for any quarter that they are offered, except that the proper sequence of continuation courses and the prerequisites must be observed.
   Econ. 6f,w,s, Principles of Economics, 5
   For. 53f-54w, Wood Structure and Identification, 6
   For. 56s, Forest Products, 3
   For. 142s, Wood Chemistry, 3
   For. 152s, Wood Seasoning, 3
   Org. Chem. 51f-52w-153s, Organic Chemistry, 15
   Phys. 7f-8w-9s, General Physics, 15
   Rhet. 22f,w,s, Public Speaking, 3

SENIOR YEAR

1. **Junior courses** which were not completed during the junior year.
2. **Special courses.**—The following courses may be registered for any quarter that they are offered, except that the proper sequence of continuation courses and the prerequisites must be observed.

   Econ. 7f,w,s, Principles of Economics, 5
   For. 57f, Wood Utilization, 3
   For. 113f, Wood Pulp and Paper, 3
   For. 114f-115w-116s, Mechanical and Physical Properties of Wood, 9
   For. 119s, Advanced Wood Structure, 4
   For. 125s, Wood Preservation, 3
   Phys. Chem. 101f-102w-103s, Physical Chemistry, 15
   Pl. Path. 10w, Forest Pathology, 5
   Rhet. 51f,w,s, Exposition, 3

A sufficient number of courses to be selected in consultation with, and with the approval of, the adviser to make a total of 204 credits.

D. CURRICULA IN HOME ECONOMICS

Home economics students have an excellent opportunity to share in the provision which the University makes for orientation and general education. The student will sign a specialization card, not later than the third quarter of the sophomore year, for that phase of home economics in which she is most interested. Such cards are signed after conference with (a) the student's adviser, (b) the head of the section involved.

Electives of general interest, or those which seem particularly suitable for the major sequence, should be chosen to complete the student's program. These should include enough courses in the field of social science to meet the all-college requirement of 18 credits (see page 10).

All students majoring in home economics will be required to take at least 3 credits in physical education. The courses chosen must be approved by the major adviser in the Department of Physical Education for Women.

Special attention is called to the faculty requirement for classification in the junior class (see page 11).

A total of at least 185 credits is required for the B.S. degree. See also requirements for *all* students in the college, page 10.

SPECIALIZATION IN THE FIELD OF HOME ECONOMICS

Specialization in any of the fields of home economics involves two types of training for each student. Throughout the training period there is a core of courses required for homemaking purposes and, in addition, courses are required depending upon the student's vocational interest and choice. The four-year period includes a study of the physical, biological, and social sciences, English and art, with opportunities for electives in other fields. The requirements for each field of specialization will be found under appropriate headings, e.g., those interested in related art should see the curricula under Business and Teaching; those interested in foods and nutrition should see the curricula for Dietetics and for Business and Research; those interested in textiles and clothing should see the curricula for Business, Teaching and Research.

I. GENERAL HOME ECONOMICS

This curriculum is designed to satisfy the needs and interests of those persons who wish to prepare themselves for homemaking. The prescribed courses offer a broad background in home economics. Opportunity is offered also for a rather wide choice of electives.

REQUIREMENTS

All-college requirements for students in this college. See page 10.

FRESHMAN COURSES

Required Course No.	Title	Credits	Prerequisites
Orient. 1	Freshman Orientation Lectures (See p. 101)	1	None
H.E. 1	Choice and Care of Clothing	4	None
H.E. 10	Introduction to Home Economics	2	None, 1st qtr. fr. only
H.E. 15	Personal Relationships	2	None
H.E. 20	Introduction to Related Art	4	None
H.E. 31	Introduction to Nutrition	3	None
Rhet. 1	Rhetoric I	3	None
Rhet. 2	Rhetoric II	3	Rhet. 1 or exemption
Rhet. 3	Rhetoric III	3	Rhet. 2 or exemption
Rhet. 34	Books and Readings	1	None

Take Group I or II

Group I			
G.C. 101-102	Human Biology	6	None
D.H. 20 or Bact. 53	Household Microbiology (See sophomore list)	4	3rd qtr. fr.; permission of instructor
Group II			
Zool. 14-15	General Zoology	6	None
Physiol. 4	Human Physiology	4	1 qtr. zool., 1 qtr. chem.
D.H. 20 or Bact. 53	Household Microbiology (See sophomore list)	4	3rd qtr. fr.; permission of instructor

Take Group I or II

Group I			
G.C. 89	The Nature of Chemistry	5	None
G.C. 90	Sound, Astronomy, Technology	5	None
G.C. 88*	Energy and Matter	5	None
or Agr.Eng. 23*	General Physics	5	None
Group II			
Chem. 1,2	General Inorganic Chemistry	8	None
or Chem. 9,10	General Inorganic Chemistry	10	Entrance cred. in chemistry
G.C. 88*	Energy and Matter	5	None
or Agr.Eng. 23*	General Physics	5	None
Agr.Biochem. 4	(See sophomore list)		
Soc. 1	Introduction to Sociology	3	None
Phys.Ed.	Physical Education	3	May be completed any time during four years of residence

SOPHOMORE COURSES

H.E. 3	Clothing Construction A	3	H.E. 1
H.E. 4	Clothing Construction B	3	H.E. 3, 21, and home practice in clothing construction†

* Students who have had one year of high school physics may be exempt from Agr.Eng. 23 or G.C. 88. Agr.Eng. 23 not open for credit to students offering one unit of high school physics for entrance.

† Home experience in the construction of garments is required as a prerequisite for H.E. 4, following the completion of H.E. 3. The character and amount of experience will be determined by a member of the faculty of the Textiles and Clothing Section.

Required Course No.	Title	Credits	Prerequisites
H.E. 24	Problems in Home Planning and Furnishing (to be followed by H.E. 120)	5	H.E. 20
or 21	Color and Design I	3	H.E. 20
22	Color and Design II To be followed by 55, 180	3	H.E. 21
H.E. 34	Nutrition Problems (to be followed by H.E. 75)	4	3rd qtr. soph.; H.E. 31, 40, physiol. or human biol.
or 170, 171	(See junior list)		
H.E. 40	Food Preparation	5	2 qtrs. chem.
H.E. 41	Food Management and Marketing	5	H.E. 31, 40
Rhet. 11	Argumentation	3	Rhet. 3, 22 recommended
or 22	Public Speaking	3	Rhet. 3
Rhet. 31	Survey of English Literature	5	Rhet. 3
or 32	Survey of English Literature II	3	Rhet. 3
or 60	(See junior list)		
Bact. 53	General Bacteriology	5	8-10 cred. in chem. and 4 cred. in bot. or zool.
or D.H. 20	(See freshman list)		
Agr.Biochem. 4	Introduction to Organic and Biochemistry (to follow Chem. 1-2 or 9-10 sequence)	5	Inorg. Chem. 8-10 cred.
C.W. 40	Child Training	3	Psy. 1-2
or H.E.Ed. 90	(See junior list)		
Agr.Econ. 3	Principles of Economics	5	None
Soc. 6	Social Interaction	3	Soc. 1
or 14	Rural Sociology	3	Soc. 1
or 49	Social Pathology (See also other junior-senior choices)	3	3rd qtr. soph., 10 cred. in soc. or Soc. 1 and 10 cred. in soc. sci. or psy.
Psy. 1-2	General Psychology	6	None

JUNIOR-SENIOR COURSES

H.E. 50	Textiles	3	H.E. 1
H.E. 55	Related Art Problems (See sophomore sequence 21, 22)	3	H.E. 22
H.E. 75	Dietetics Laboratory	2	H.E. 34 or 170
H.E. 85	Home Management, lectures	3	H.E. 40, H.E.Ed. 90 or C.W. 40, or parallel
H.E. 86	Home Management, laboratory	4	H.E. 85 or parallel, 40, 185 parallel, H.E.Ed. 90 or C.W. 40
H.E. 120	Art History and Appreciation (See sophomore sequence 20, 24)	3	None, must be Sr. College or grad. student
H.E. 170	Nutrition of the Family	3	H.E. 31, 40, Agr.Biochem. 4, and 3 cred. in physiol.
H.E. 171	Child Nutrition	3	H.E. 170, H.E.Ed. 90 or C.W. 40
H.E. 180	Home Planning and Furnishing (See sophomore sequence 21, 22)	5	H.E. 55, 120 recommended
H.E. 185	Family Relationships	2	H.E. 86 or parallel, H.E. Ed. 90 or C.W. 40
Rhet. 51	Exposition	3	Rhet. 3
Rhet. 60	Contemporary Literature (See sophomore sequence 31, 32)	3	Rhet. 3
P.M.&P.H. 52	Health Care of the Family	3	Bact. 53 or D.H. 20; Human Physiol. 4
Soc. 119	The Family	3	4 courses in soc., or Soc. 1 and 15 cred. in soc. sci., ed., phil. or psy.
or 6	(See sophomore list)		

Required Course No.	Title	Credits	Prerequisites
H.E.Ed. 90 or C.W. 40	Child Training (See sophomore list)	3	Psy. 1, 2

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, political science, philosophy, or sociology to total 18 credits.

II. DIETETICS*

This curriculum is planned for those particularly interested in becoming hospital dietitians. Following graduation the student should plan to complete a dietetic internship in a hospital. Eventually, graduates with this training may be employed as administrative or therapeutic dietitians, as nutritionists in a public health agency, or as dietitians in a food clinic.

REQUIREMENTS

All-college requirements for students in this college. See page 10.

FRESHMAN COURSES

Required Course No.	Title	Credits	Prerequisites
Orient. 1	Freshman Orientation Lectures (See p. 101)	1	None
H.E. 1	Choice and Care of Clothing	4	None
H.E. 10	Introduction to Home Economics	2	1st qtr. fr. only
H.E. 15	Personal Relationships	2	None
H.E. 20	Introduction to Related Art	4	None
H.E. 31	Introduction to Nutrition	3	None
Rhet. 1	Rhetoric I	3	None
Rhet. 2	Rhetoric II	3	Rhet. 1 or exemption
Rhet. 3	Rhetoric III	3	Rhet. 2
Rhet. 34	Books and Reading	1	None
Zool. 14, 15	General Zoology	6	None
Chem. 1, 2	General Inorganic Chemistry	8	None
or 9, 10	General Inorganic Chemistry	10	High school chem.
or 6, 7	General Inorganic Chemistry	10	None
Physiol. 4	Human Physiology	4	1 qtr. chem., 1 qtr. zool.
Agr.Eng. 23	General Physics†	5	None
Soc. 1	Introduction to Sociology	3	None
Econ. 20 or Agr.Econ. 25	Elements of Accounting (See sophomore list)	3	3rd qtr. freshmen
Phys.Ed.	Physical Education	3	May be completed any time during four years of residence

SOPHOMORE COURSES

H.E. 24	Problems in Home Planning and Furnishing	5	H.E. 20
H.E. 33	Nutrition I	4	Agr.Biochem. 4, Physiol. 4
H.E. 40	Food Preparation	5	2 qtrs. chem.
H.E. 41	Food Management and Marketing	5	H.E. 31, 40
Rhet. 22	Public Speaking	3	Rhet. 3
or 11	Argumentation	3	Rhet. 3, 22 recommended

* For the Dietetics Specialization a grade of at least C is required for the following courses: Agr.Biochem. 4; H.E. 40, 41, 61, 170, 171; Physiol. 4. C average is required for the following group of courses: H.E. 33, 62, 75, 79, 163, 173, 175, and 178.

† Students who have had one year of high school physics may be exempt from Agr.Eng. 23. Not open for credit to students presenting one unit of high school physics for entrance.

Required Course No.	Title	Credits	Prerequisites
Rhet. 31	Survey of English Literature I	5	Rhet. 3
or 32	Survey of English Literature II	3	Rhet. 3
or 60	(See junior list)		
Bact. 53	General Bacteriology	5	10 cred. in chem. and 4 cred. in bot. or zool.
Agr.Biochem. 2	Quantitative Methods	5	10 cred. in inorg. chem.
Agr.Biochem. 4	Introduction to Organic and Biochemistry	5	10 cred. in inorg. chem.
Agr.Econ. 3	Principles of Economics	5	None
Agr.Econ. 25	Principles of Accounting	4	None
or Econ. 20	(See freshman list)		
C.W. 40	Child Training	3	Psy. 1-2
or H.E.Ed. 90	(See junior list)		
Psy. 1-2	General Psychology	6	None

JUNIOR-SENIOR COURSES

H.E. 50	Textiles	3	H.E. 1
H.E. 61	Quantity Cookery	4	H.E. 40, 41 also advised
H.E. 62	Institution Experience A	3	H.E. 40, 41 also advised
H.E. 64	Institution Buying	4	H.E. 61 or parallel 62 or parallel
H.E. 75	Dietetics Laboratory	2	H.E. 34 or 170
H.E. 79	Selected Problems for Dietitians	3	H.E. 170 or equiv.
H.E. 85	Home Management Lectures	3	H.E. 40, H.E.Ed. 90 or C.W. 40 or parallel
H.E. 86	Home Management Laboratory	4	85 or parallel, 40, 185 or parallel, H.E.Ed. 90 or C.W. 40
H.E. 142	Experimental Cookery	3	H.E. 40, Agr.Biochem. 4
H.E. 170	Nutrition of the Family	3	H.E. 31, 40, Agr.Biochem. 4, Physiol. 3 cred.
H.E. 171	Child Nutrition	3	H.E. 170, H.E.Ed. 90 or C.W. 40
H.E. 173	Nutrition in Disease	3	H.E. 170, 175 also advised
H.E. 175	Nutrition II	4	H.E. 33
H.E. 176	Advanced Nutrition	4	H.E. 175 or parallel, Agr.Biochem. 2
or 177	Digestion and Metabolism	3	H.E. 175
H.E. 178	Clinical Problems in Nutrition	2	H.E. 75 or parallel, 170, 175 or parallel
H.E. 179	Readings in Nutrition	2	H.E. 170
H.E. 185	Family Relationships	2	H.E. 86 or parallel, H.E.Ed. 90 or C.W. 40
Rhet. 51	Exposition	3	Rhet. 3
Rhet. 60	Contemporary Literature	3	Rhet. 3
or 31 or 32	(See sophomore list)		
P.M.&P.H. 52	Health Care of the Family	3	Bact. 41, Physiol. 4
H.E.Ed. 90	Child Training	3	Psy. 1-2
or C.W. 40	(See sophomore list)		

Required Course for Seniors

H.E. 163	Institution Management Problems	3	H.E. 61, 62, 64 or parallel

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, political science, philosophy, or sociology to total 18 credits.

III. HOME ECONOMICS EDUCATION

The College of Agriculture, Forestry, and Home Economics and the College of Education co-operate in the preparation of teachers of home economics. Satisfactory completion of the following curricula will lead to the B.S. degree and will provide the necessary training for qualification for the Minnesota "high school standard special certificate" for teaching home economics in secondary schools. Completion of this curriculum qualifies for teaching in federally aided home economics departments.

When the student has acquired a minimum of 90 credits and at least one honor point per credit (junior classification) and indicated her specialization as the teachers' or the extension teachers' curriculum, she becomes a registrant also in the College of Education. At the beginning of the junior year, the student is required to take the psychological examination given in the College of Education.

Prior to registration for Supervised Teaching, the student must have completed the following requirements:

1. The qualifying examination in English required of all those graduating from the College of Education.
2. Home experience in clothing, foods, and other phases of home economics.
3. Certain home economics courses with at least a grade of C.*
4. Home economics courses required in the teaching curriculum with an honor point ratio of 1.5.

In order to be recommended for graduation from the teaching specialization, the student must have (1) 1½ honor points per credit in 40 credits of home economics work required in the curriculum for General Home Economics Teaching selected from the following courses: H.E. 1, 3, 21, 31, 40, 41, 50, 53, 55, 85, 86, 180, 185; (2) an average of 1 honor point per credit in all other courses pursued during the junior and senior years.

By a proper selection of courses, students qualifying for the degree of bachelor of science may qualify for teaching in more than one field. This is desirable since most beginning teachers in public schools are often expected to teach another subject in addition to home economics.

General Home Economics Teaching

The following courses are required for those preparing for teaching general home economics:

All-college requirements for students in this college. See page 10.

FRESHMAN COURSES

Required Course No.	Title	Credits	Prerequisites
Orient. 1	Freshman Orientation Lectures (see p. 101)	1	None
H.E. 1	Choice and Care of Clothing	4	None
H.E. 10	Introduction to Home Economics	2	None; 1st qtr, fr. only
H.E. 15	Personal Relationships	2	None
H.E. 20	Introduction to Related Art	4	None
H.E. 21	Color and Design I	3	H.E. 20
H.E. 22	Color and Design II	3	H.E. 21
H.E. 31	Introduction to Nutrition	3	None
Rhet. 1	Rhetoric I	3	None

* For the General Home Economics Teaching Specialization a grade of at least C is required for the following courses: H.E. 3, 4, 21, 22, 34 (or 170), 40, 41, 55.

Required Course No.	Title	Credits	Prerequisites
Rhet. 2	Rhetoric II	3	Rhet. 1 or exemption
Rhet. 3	Rhetoric III	3	Rhet. 2
Rhet. 34	Books and Reading	1	None

Take Group I or II

Group I			
Zool. 14-15	General Zoology	6	None
Physiol. 4	Human Physioolgy	4	1 qtr. zool., 1 qtr. chem. chem.
D.H. 20 or Bact. 53	Household Microbiology (See sophomore list)	4	3rd qtr. fr., permission of instructor
Group II			
G.C. 101-102	Human Biology	6	None
D.H. 20 or Bact. 53	Household Microbiology (See sophomore list)	4	3rd qtr. fr., permission of instructor

Take Group I or II

Group I			
Chem. 1, 2	General Inorganic Chemistry	8	None
or 9, 10	General Inorganic Chemistry	10	Entrance cred. in chem.
or 6, 7	General Inorganic Chemistry	10	None
Agr.Eng. 23†	General Physics	5	None
or G.C. 88†	Energy and Matter	5	None
or Agr.Eng. 35†	Household Physics	3	Agr.Eng. 23 or G.C. 88 or equiv.
Group II			
G.C. 89	The Nature of Chemistry	5	None
G.C. 88†	Energy and Matter	5	None
or Agr.Eng.23†	General Physics	5	None
or Agr.Eng. 35†	Household Physics	3	Agr.Eng. 23 or G.C. 88 or equiv.
Soc. 1	Introduction to Sociology	3 (or 5)	None
Phys.Ed.	Physical Education	3	May be completed any time during four years in residence

SOPHOMORE COURSES

H.E. 3	Clothing Construction A	3	H.E. 1
H.E. 4	Clothing Construction B	3	H.E. 3, 21 and home practice in clothing construction§
H.E. 34 or 170, 171	Nutrition Problems (See junior-senior list)	4	3rd qtr. soph., H.E. 31, 40, physiol. or human biol.
H.E. 40	Food Preparation	5	2 qtrs. chem.
H.E. 41	Food Management and Marketing	5	H.E. 31, 40
C.W. 40 or H.E.Ed. 90	Child Training (See junior-senior list)	3	Psy. 1-2
Rhet. 22	Public Speaking	3	Rhet. 3
or 11	Argumentation	3	Rhet. 3, 22 recommended
Rhet. 31	Survey of English Literature I	5	Rhet. 3 or permission of instructor
or 32 or 60	Survey of English Literature II (See junior-senior list)	3	Rhet. 3

† Students who have had one year of high school physics may be exempt from Agr.Eng. 23 or G.C. 88 and substitute Agr.Eng. 35. Agr.Eng. 23 not open for credit to students presenting one unit of high school physics for entrance.

§ Home experience in the construction of garments is required as a prerequisite for H.E. 4, following the completion of H.E. 3. The character and amount of experience will be determined by a member of the faculty of the Textiles and Clothing Section.

Required Course No.	Title	Credits	Prerequisites
Bact. 53 or D.H. 20	General Bacteriology (See freshman list)	5	10 cred. in chem. and 4 cred. in bot. or zool.
Agr.Biochem. 4	Introduction to Organic and Biochemistry	5	Inorg. Chem. 10 cred.
Agr.Econ. 3 or Econ. 6-7	Principles of Economics	5	None
	Principles of Economics	10	None
Psy. 1-2	General Psychology	6	None
	JUNIOR-SENIOR COURSES		
H.E. 50	Textiles	3	H.E. 1
H.E. 53	Advanced Clothing	3	H.E. 4, 22, 50
H.E. 55	Related Art Problems	3	H.E. 22 or 56
H.E. 85	Home Management Lectures	3	H.E. 40, H.E.Ed. 90 or C.W. 40 or parallel
H.E. 86	Home Management Laboratory	4	H.E. 85 or parallel, 40, 185 parallel, H.E.Ed. 90 or C.W. 40
H.E. 170	Nutrition of the Family	3	H.E. 31, 40, Agr. Biochem. 4, Physiol. 3 cred.
and 171 or 34	Child Nutrition (See sophomore list)	3	H.E. 170, H.E.Ed. 90 or C.W. 40
H.E. 180	Home Planning and Furnishing	5	H.E. 55, 120 recommended
H.E. 185	Family Relationships	2	H.E. 86 or parallel, H.E. Ed. 90 or C.W. 40
P.M.&P.H. 52	Health Care of the Family	3	Bact. 41 or D.H. 20; Physiol. 4, or permission of instructor
Rhet. 51*	Exposition	3	Rhet. 3
Rhet. 60 or 31 or 32	Contemporary Literature (See sophomore list)	3	Rhet. 3
Ed. 51A-51C	Introduction to Secondary School Teaching	6	6 cred. in psy. and a C average
Agr.Econ. 126	Economics of Consumption	3	Agr.Econ. 3
H.E.Ed. 90 or C.W. 40	Child Training (See sophomore list)	3	Psy. 1-2
H.E.Ed. 91	Observation, Materials, Teaching in Home Economics	5	H.E. 4, 34 (or 170), 41, 50, 55; Psy. 1-2, Ed. 51A, 51C, parallel H.E.Ed. 93
H.E.Ed. 92	Teaching Problems in Home Economics	2	H.E.Ed. 91, 93, parallel 94 and 192
H.E.Ed. 93	Supervised Teaching in Home Economics	3	H.E. 4, 34 (or 170), 41, 50. 55, Psy. 1-2, Ed. 51A, 51C, parallel H.E.Ed. 91
H.E.Ed. 94	Supervised Teaching in Home Economics	3	H.E.Ed. 91, 93, parallel H.E.Ed. 92 and 192
H.E.Ed. 192	Educational Measurement in Home Economics	2	Ed. 51A or equiv., parallel H.E.Ed. 92 and 94

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, political science, philosophy, or sociology to total 18 credits.

* Unless exempt.

Those whose interests lead them into further specialization in the teaching field may choose one of the following groups. The student should plan her program early in her college course to be certain that she has the necessary prerequisites.

Teaching Textiles and Clothing

To the requirements in general teaching add:

Required Course No.	Title	Credits	Prerequisites
H.E. 54	Problems in Clothing Construction	3	Jr., sr.; H.E. 53 or permission of instructor
H.E. 102	Advanced Textiles	3	Jr., sr.; H.E. 50, Agr. Biochem. 4, Agr.Econ. 3 or parallel
H.E. 115	Clothing Economics	2	Jr., sr.; H.E. 50, Agr. Econ. 3
H.E. 120	Art History and Appreciation	3	Senior College and grad. students only
Bot. 1	General Botany	4	None

Teaching Foods

To the requirements in general teaching add:

H.E. 61	Quantity Cookery	4	Jr., sr.; H.E. 40
H.E. 142	Experimental Cookery	3	Jr., sr.; H.E. 40, Agr. Biochem. 4
H.E. 146	Special Food Problems	3	Sr.; H.E. 142
or 147	Special Food Problems	5	Sr.; H.E. 142
Agr.Biochem. 2	Quantitative Methods	5	Soph., jr., sr.; Inorg. Chem. 10 cred.

Teaching Nutrition

Omit from the requirements in general teaching the following courses: H.E. 3, 4, 21, 22, 53, 55, 180, G.C. 88-89, 101-102 and Agr. Econ. 126.

To the requirements in general teaching add:

H.E. 24	Problems in Home Planning and Furnishing	5	Soph.; H.E. 20
H.E. 75	Dietetics Laboratory	2	Jr., sr.; H.E. 34 or 170
H.E. 173	Nutrition in Disease	3	Jr., sr.; H.E. 170, 175 also advised
H.E. 179	Readings in Nutrition	2	Jr., sr.; H.E. 170
H.E. 142	Experimental Cookery	3	Jr., sr.; H.E. 40, Agr. Biochem. 4

Home Economics Extension

Those who wish to go into home economics extension teaching should fulfill the requirements of the general teachers' curriculum and add:

H.E. 98	Home Economics Extension	3	H.E.Ed. 91 or parallel

Teaching Related Art

Those interested in Related Art teaching should:

a. Select the minimum credit requirement in science when there is an option.
b. Omit Agr.Econ. 126.

c. Add the following:

Required Course No.	Title	Credits	Prerequisites
H.E. 23	Advanced Design	3	Soph., jr.; H.E. 22
H.E. 25	Design Applied to Crafts	3	Soph.; H.E. 22
or 26	Decorative Needlework and Other Crafts	3	Soph.; H.E. 22
H.E. 120	Art History and Appreciation	3	Open to Senior College and grad. students only
H.E. 122	Advanced Interior Design	3	Jr., sr.; H.E. 180, 120 or permission of instructor
or 125	Advanced Costume Design	3	Jr., sr.; H.E. 4 or permission of instructor, H.E. 22 and 26 recommended
H.E.Ed. 197	Organization and Methods for Related Art Teaching	1-3	Sr.; H.E.Ed. 91, H.E. 180 or parallel

Six credits from the following in Art Education or Architectural Drawing:

ArtEd. 4, 6, 8	Drawing from Still Life and Pose	2 a qtr.	None
or 29-30	Rhythmic Sketch	1 a qtr.	None
or Arch.D.P.I	Drawing and Painting	2 a qtr.	None

IV. HOME ECONOMICS IN BUSINESS

Students planning to use home economics training in business may choose one of the following fields in which to specialize.

Foods and Nutrition*

While the Division of Home Economics has no organized plan for practical experience in foods in business, such experience is valuable to students majoring in this field. This experience might take the form of a summer or part-time position in a public utility company, experimental kitchen, food industry, department store demonstration, or similar enterprise. The student's ability to get this experience will depend on her own initiative and success in the work she undertakes. The ability to use a typewriter is important.

An organized plan for home experience is a requirement for this curriculum. The project is to be chosen in consultation with a member of the faculty of the foods section after the completion of H.E. 41.

All-college requirements for students in this college. See page 10.

FRESHMAN COURSES

Orient. 1	Freshman Orientation Lectures (See p. 101)	1	None
H.E. 1	Choice and Care of Clothing	4	None
H.E. 10	Introduction to Home Economics	2	1st qtr. fr. only
H.E. 15	Personal Relationships	2	None
H.E. 20	Introduction to Related Art	4	None
H.E. 31	Introduction to Nutrition	3	None
Rhet. 1	Rhetoric I	3	None
Rhet. 2	Rhetoric II	3	Rhet. 1 or exemption
Rhet. 3	Rhetoric III	3	Rhet. 2
Rhet. 34	Books and Reading	1	None

* For the Foods and Nutrition in Business Specialization a grade of at least C is required for the following courses: H.E. 40, 41, 142, 170; Rhet. 22; Jour. 69 or 70.

Required Course No.	Title	Credits	Prerequisites
Zool. 14-15	General Zoology	6	None
Physiol. 4	Human Physiology	4	1 qtr. zool., 1 qtr. chem.
Chem. 1-2	General Inorganic Chemistry	8	None
or 6-7	General Inorganic Chemistry	10	None
or 9-10	General Inorganic Chemistry	10	Entrance credit in chem.
Agr.Eng. 23†	General Physics	5	None; for students not having high school physics
or 35	Household Physics	3	Agr.Eng. 23 or equiv. or G.C. 88. Students having had high school physics may be exempt from Agr.Eng. 23 but must take Agr.Eng. 35
Soc. 1	Introduction to Sociology	3 (or 5)	None
D.H. 20	Household Microbiology	4	3rd qtr. fr., permission of instructor
or Bact. 53	(See sophomore list)		
Phys. Ed.	Physical Education	3	May be completed at any time during four years' residence

SOPHOMORE COURSES

See courses listed for freshmen.

H.E. 24	Problems in Home Planning and Furnishing	5	H.E. 20
H.E. 40	Food Preparation	5	2 qtrs. chem.
H.E. 41*	Food Management and Marketing	5	H.E. 31, 40
Rhet. 22	Public Speaking	3	Rhet. 3
or 23	Public Speaking	5	Rhet. 3
or 11	Argumentation	3	Rhet. 3, 22 recommended
Rhet. 24	Advanced Public Speaking	3	Rhet. 22 or 23
Rhet. 31	Survey of English Literature I	5	Rhet. 3
or 32	Survey of English Literature II	3	Rhet. 3
or 60	(See junior-senior list)		
C.W. 40	Child Training	3	Psy. 1-2
or H.E.Ed. 90	(See junior-senior list)		
Agr.Biochem. 4	Introduction to Organic and Biochemistry	5	Inorg. Chem. 10 credits
Agr. Econ. 3	Principles of Economics	5	None
Bact. 53	General Bacteriology	5	10 cred. in chem.; 4 cred. in bot. or zool.
or D.H. 20	(See freshman list)		
Jour. 13	Introduction to Reporting	3	Soph. with C average; jr., sr.; Eng. A-B-C or Comp. 4-5-6 or exemption from English requirements
Psy. 1-2	General Psychology	6	None
Soc. 6 or G.C. 26 or 27 or 29 or 30 or 34 or 35 or 38 or 39 or Hist. 1-2	Social Interactions	3	Soc. 1; not open to students who have had Soc. 100 or Psy. 140
	(See General College Bulletin)		
	European Civilization	8	None

* Home experience is required in some phase or phases of food work. The project to fulfill this requirement is to be chosen in consultation with a member of the faculty of the Foods Section after completion of H.E. 41 and before entering the senior year.

† Not open for credit to students presenting one unit of high school physics for entrance.

JUNIOR-SENIOR COURSES*

Required Course No.	Title	Credits	Prerequisites
H.E. 50	Textiles	3	H.E. 1
H.E. 61	Quantity Cookery	4	H.E. 40
H.E. 62	Institution Experience A	3	H.E. 40
H.E. 71	Demonstrations	1	Open only to 3rd qtr. jr., sr.
H.E. 85	Home Management Lectures	3	H.E. 40, H.E.Ed. 90, or C.W. 40 or parallel
H.E. 86	Home Management Laboratory	4	H.E. 85 or parallel, 40, 185 or parallel, H.E. Ed. 90 or C.W. 40
H.E. 120	Art History and Appreciation	3	None; Senior College and grad. only
H.E. 142	Experimental Cookery	3	H.E. 40, Agr. Biochem. 4
H.E. 146	Special Food Problems	3	H.E. 142, open to sr. only
or 147	Special Food Problems	5	H.E. 142, open to sr. only
H.E. 170	Nutrition of the Family	3	H.E. 31, 40, Agr. Biochem. 4, Physiol. 3 cred.
H.E. 171	Child Nutrition	3	H.E. 170, H.E.Ed. 90 or C.W. 40
H.E. 179	Readings in Nutrition	2	H.E. 170
H.E. 180	Home Planning and Furnishing	5	H.E. 21, 22, 55, 120 recommended
or 24	(See sophomore list)		
H.E. 185	Family Relationships	2	H.E. 86 or parallel, H.E. Ed. 90 or C.W. 40
H.E.Ed. 90	Child Training	3	Psy. 1-2
Psy. 56	Psychology of Advertising	3	Psy. 1-2, Agr. Econ. 3
P.M.&P.H. 52	Health Care of the Family	3	Bact. 53 or D.H. 20, Physiol. 4
Bus.Adm. 88	Advertising	3	Agr.Econ. 126 or B.A. 77, and Psy. 56
Agr.Econ. 126	Economics of Consumption	3	Agr.Econ. 2 or 3
or Econ. 185	Economics of Marketing	3	Econ. 6-7 or 83
or Bus.Adm. 167	Personnel Administration	3	Econ. 161
or Econ. 161	Labor Problems and Trade Unions	3	Econ. 6-7 or 83
Rhet. 51	Exposition	3	Rhet. 3
Rhet. 60	Contemporary Literature	3	Rhet. 3
or 31 or 32	(See sophomore list)		
Jour. 41	Editing for Nonmajors	3	Jour. 12 or 13
Jour. 69	Newspaper and Magazine Articles	3	Jour. 15 or 41
or 70	Business and Specialized Journalism	3	Jour. 15 or 69 or permission of instructor

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, political science, philosophy, or sociology to total 18 credits.

Related Art†

For those who wish to specialize in the general fields of Related Art and Business the following courses are required.

All-college requirements for students in this college. See page 10.

* Home experience is required in some phase or phases of food work. The project to fulfill this requirement is to be chosen in consultation with a member of the faculty of the Foods Section after completion of H.E. 41 and before entering the senior year.

† For Related Art in Business Specialization a grade of at least C is required for the following courses: H.E. 21, 22, 55, 122, 125, 180. It is recommended that each home economics student interested in business learn to use a typewriter.

FRESHMAN COURSES

Required Course No.	Title	Credits	Prerequisites
Orient. 1	Freshman Orientation Lectures (See p. 101)	1	None
H.E. 1	Choice and Care of Clothing	4	None
H.E. 10	Introduction to Home Economics	2	1st qtr. fr. only
H.E. 15	Personal Relationships	2	None
H.E. 20	Introduction to Related Art	4	None
H.E. 21	Color and Design I	3	H.E. 20
H.E. 22	Color and Design II	3	H.E. 21
H.E. 31	Introduction to Nutrition	3	None
Rhet. 1	Rhetoric I	3	None
Rhet. 2	Rhetoric II	3	Rhet. I or exemption
Rhet. 3	Rhetoric III	3	Rhet. II
Rhet. 34	Books and Reading	1	None
G.C. 101	Human Biology I	3	None
G.C. 102	Human Biology II	3	None
P.M.&P.H. 3	Personal Health	2	None
P.M.&P.H. 4	Health Problems of Adult Life	2	P.M.&P.H. 3
G.C. 88	Energy and Matter	5	None
G.C. 89	The Nature of Chemistry	5	None
or Agr.Eng. 23	General Physics	5	None
or Agr.Eng. 35	Household Physics†	3	Agr.Eng. 23 or equiv.
Soc. 1	Introduction to Sociology	3	None
Hist. 1-2	European Civilization	8	None
or 17	Social and Economic History of Modern Europe	5	3rd qtr. fr.
Phys.Ed.	Physical Education	3	May be completed at any time during four years of residence
ArtEd. 4, 6, 8	Drawing from Still Life and Pose	2 a qtr.	None
or 29-30	Rhythmic Sketch	1 a qtr.	None
or Arch.DP-I	Drawing and Painting	2 a qtr.	None
	(6 credits to be selected from any of the preceding courses.)		
Fine Arts	Any course	3	

SOPHOMORE COURSES

H.E. 23	Advanced Design	3	H.E. 22
or 25	Design Applied to Crafts	3	H.E. 22
or 26	Decorative Needlework and Other Crafts	3	H.E. 22
H.E. 34	Nutrition Problems	4	3rd qtr. soph.; H.E. 31, 40
H.E. 40	Food Preparation	5	2 qtrs. chem., physiol. or human biol.
Comp. 27-28	Advanced Writing	6	Eng. A-B-C or exemption
Rhet. 22	Public Speaking	3	Rhet. 3
or 11	Argumentation	3	Rhet. 3
Rhet. 31	Survey of English Literature I	5	Rhet. 3
or 32	Survey of English Literature II	3	Rhet. 3
or 60	(See junior list)		
C.W. 40	Child Training	3	Psy. 1-2
or H.E.Ed. 90	(See junior list)		
Psy. 1-2	General Psychology	6	None
Jour. 12	Newspaper Reporting	5	None; Comp. 27-28 advised
or 13	Introduction to Reporting	3	Eng. A-B-C or exemption
Agr.Econ. 3	Principles of Economics	5	None
or Econ. 6-7	Principles of Economics	10	None

† Students who have had one year of high school physics may be exempted from Agr.Eng. 23 or G.C. 88 or physics courses. Agr.Eng. 23 not open for credit to students presenting one unit of high school physics for entrance.

JUNIOR-SENIOR COURSES

Required Course No.	Title	Credits	Prerequisites
H.E. 50	Textiles	3	H.E. 1
H.E. 55	Related Art Problems	3	H.E. 22 or 56A
H.E. 85	Home Management Lectures	3	H.E. 40, H.E.Ed. 90 or C.W. 40 or parallel
H.E. 86	Home Management Laboratory	4	H.E. 85, 40, H.E.Ed. 90 or C.W. 40 or parallel
H.E. 120	Art History and Appreciation	3	Senior College and grad. students only
H.E. 121	Textile Design	3	H.E. 50, 55, 120
H.E. 122	Advanced Interior Design	3	H.E. 180, 120 or permission of instructor
H.E. 125	Advanced Costume Design	3	H.E. 4 or permission of instructor, H.E. 22, 26 recommended
H.E. 180	Home Planning and Furnishing	5	H.E. 55, 120 recommended
H.E. 185	Family Relationships	2	H.E. 86 or parallel; H.E.Ed. 90 or C.W. 40
Rhet. 51	Exposition	3	Rhet. 3
Rhet. 60	Contemporary Literature	3	Rhet. 3
or 31	(See sophomore list)		Rhet. 3
Agr.Econ. 126	Economics of Consumption	3	Agr.Econ. 2 or 3
Psy. 56	Psychology of Advertising	3	Psy. 1-2 and Agr.Econ. 3
or Bus.Adm. 88	Advertising	3	Permission of instructor
Jour. 41	Editing for Nonmajors	3	Jour. 12 or 13
Jour. 69	Newspaper and Magazine Articles	3	Jour. 15 or 41
or 73	Magazine Writing and Editing	3	Jour. 15
Jour. 74	Magazine Writing and Editing	3	Jour. 73 and permission of instructor
H.E.Ed. 90	Child Training	3	Psy. 1-2
or C.W. 40	Child Training	3	Psy. 1-2
Bus.Adm. 69	Retail Store Management	3	Agr.Econ. 3

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, political science, philosophy, or sociology to total 18 credits.

For those who are interested in special aspects of Related Art in the fields of Business and Journalism the following courses are listed:

Interior Furnishing: To the general courses listed under Related Art add:

Arch.DP-I	Drawing and Painting (2 qtrs.)	2 a qtr.	Jr.; none
ArtEd. 4	Drawing from Still Life	2	Jr.; none
OMIT			
H.E. 125	Advanced Costume Design	3	H.E. 4 or permission of instructor
ArtEd. 6, 8	Drawing from Still Life and Pose	4	None
ArtEd. 29-30	Rhythmic Sketch	1 a qtr.	None

Costume Design: To the general courses listed under Related Art add:

H.E. 3	Clothing Construction A	3	Soph.; H.E. 1
H.E. 4	Clothing Construction B	3	Soph.; H.E. 3, 21 and home practice in clothing construction
H.E. 115	Clothing Economics	2	Jr.; H.E. 50, Agr.Econ. 3
OMIT			
H.E. 122	Advanced Interior Design	3	H.E. 180, 120, or permission of instructor
Arch.DP-I	Drawing and Painting	2 a qtr.	None

Journalism:* To the general courses listed under Related Art add:

Required Course No.	Title	Credits	Prerequisites
Bus.Adm. 88	Advertising	3	Jr., permission of instructor
Jour. 13	Introduction to Reporting	3	Soph.; Eng. A-B-C or Comp. 4-5-6 or English exemption
or 12	Newspaper Reporting	5	Soph., permission of chairman of department
or 14-15	Newspaper Reporting	5	Soph.; Comp. 27-39, Jour. 13 or 12 or permission of instructor
Jour. 41	Editing for Nonmajors	3	Jr.; Jour. 12 or 13
Jour. 69	Newspaper and Magazine Articles	3	Jr.; Jour. 15 or 41
or 73-74	Newspaper and Magazine Articles	6	Jr.; Jour. 15
Jour. 70	Business and Specialized Journalism	3	Jr.; Jour. 15 or 69, or permission of instructor
Psy. 56	Psychology of Advertising	3	Jr.; Psy. 1-2, Agr.Econ. 2
OMIT			
ArtEd. 6, 8	Drawing from Still Life and Pose	2 a qtr.	None
Arch.DP-I	Drawing and Painting	2 a qtr.	None
Agr.Econ. 25	Principles of Accounting	4	None
or Econ. 20	Elements of Accounting	3	None

TEXTILES AND CLOTHING†

For those who wish to specialize in the general field of Textiles and Clothing in Business the following courses are required.

All-college requirements for students in this college. See page 10.

FRESHMAN COURSES

Orient. 1	Freshman Orientation Lectures (See p. 101)	1	None
H.E. 1	Choice and Care of Clothing	4	None
H.E. 10	Introduction to Home Economics	2	None; 1st qtr. fr. only
H.E. 15	Personal Relationships	2	None
H.E. 20	Introduction to Related Art	4	None
H.E. 21	Color and Design I	3	H.E. 20
H.E. 22	Color and Design II	3	H.E. 21
H.E. 31	Introduction to Nutrition	3	None
Rhet. 1	Rhetoric I	3	None
Rhet. 2	Rhetoric II	3	Rhet. 1 or exemption
Rhet. 3	Rhetoric III	3	Rhet. 2
Rhet. 34	Books and Reading	1	None

Take Group I or II

Group I			
Zool. 14-15	General Zoology	6	None
Physiol. 4	Human Physiology	4	1 qtr. zool., 1 qtr. chem.
D.H. 20 or Bact. 53	Household Microbiology (See sophomore list)	4	3rd qtr. fr., permission of instructor
Group II			
G.C. 101-102	Human Biology	6	None
D.H. 20 or Bact. 53	Household Microbiology (See sophomore list)	4	3rd qtr. fr., permission of instructor

* For the specialization in Related Art and Journalism a grade of C is required in courses in English and Journalism in addition to the C grade requirements in Related Art.

† For Textiles and Clothing in Business a grade of at least C is required in the following courses: H.E. 3, 4, 21, 22, 50, 102, 107, 115. It is recommended that the home economics student interested in business learn to use a tyepwriter.

Required Course No.	Title	Credits	Prerequisites
Chem. 1-2	General Inorganic Chemistry	8	None
or 6-7	General Inorganic Chemistry	10	None
or 9-10	General Inorganic Chemistry	10	Entrance cred. in chem.
or G.C. 89	Nature of Chemistry (omit for textile testing)	5	None
Agr.Eng. 23†	General Physics	5	None
or G.C. 88	Energy and Matter	5	None
Phys.Ed.	Physical Education	3	May be taken at any time during four years of residence
Soc. 1	Introduction to Sociology	3	None
	SOPHOMORE COURSES		
H.E. 3	Clothing Construction A	3	H.E. 1
H.E. 4	Clothing Construction B	3	H.E. 3, 2 and home practice in clothing construction§
H.E. 34 or 170, 171	Nutrition Problems (See junior list)	4	3rd qtr. soph., 31, 40, physiol., human biol.
H.E. 40	Food Preparation	5	2 qtrs. chem.
Rhet. 11	Argumentation	3	Rhet. 3, 22 recommended
or 22	Public Speaking	3	Rhet. 3
Rhet. 31	Survey of English Literature I	5	Rhet. 3
or 32	Survey of English Literature II	3	Rhet. 3
or 60	(See junior courses)		
Bact. 53	General Bacteriology	5	Chem. 10 cred., Zool. or Bot. 4 cred.
or D.H. 20	(See freshman list)		
Agr.Econ. 3	Principles of Economics	5	None
or Econ. 6-7	Principles of Economics	10	None
Agr.Econ. 25	Principles of Accounting	4	None
or Econ. 20	Elements of Accounting	3	None
C.W. 40	Child Training	3	Psy. 1-2
or H.E.Ed. 90	(See junior list)		
Psy. 1-2	General Psychology	6	None
	JUNIOR-SENIOR COURSES		
H.E. 50	Textiles	3	H.E. 1
H.E. 55	Related Art Problems	3	H.E. 22 or 56
H.E. 85	Home Management Lectures	3	H.E.Ed. 90 or C.W. 40 or parallel, H.E. 40
H.E. 86	Home Management Laboratory	4	H.E. 85 or parallel, 40, 185 parallel, H.E.Ed. 90 or C.W. 40
H.E. 102	Advanced Textiles	3	H.E. 50, Agr.Biochem. 4, Agr.Econ. 3 or Econ. 6-7 or parallel
H.E. 115	Clothing Economics	2	H.E. 50, Agr.Econ. 3
H.E. 120	Art History and Appreciation	3	Jr., sr., and grad. only
H.E. 170	Nutrition of the Family	3	H.E. 31, 40; Agr.Biochem. 4, Physiol. 3
H.E. 171	Child Nutrition	3	H.E. 170, H.E.Ed. 90
or 34	(See sophomore list)		or C.W. 40
H.E. 180	Home Planning and Furnishing	5	H.E. 55, 120 recommended

† Students who have had high school physics may be exempt from Agr.Eng. 23 or G.C. 88. Agr.Eng. 23 not open for credit to students presenting one unit of high school physics for entrance.

§ Home experience in the construction of garments is required as a prerequisite for H.E. 4, following the completion of H.E. 3. The character and amount of experience will be determined by a member of the faculty of the Textiles and Clothing Section.

Required Course No.	Title	Credits	Prerequisites
H.E. 185	Family Relationships	2	H.E. 86 or parallel, H.E.Ed. 90 or C.W. 40
Rhet. 51	Exposition	3	Rhet. 3
Rhet. 60 or 31 or 32	Contemporary Literature (See sophomore list)	3	Rhet. 3
P.M.&P.H. 52	Health Care of the Family	3	Bact. 53 or D.H. 20, Physiol. 4
Agr.Econ. 126	Economics of Consumption	3	Agr.Econ. 2 or 3, or Econ. 6-7
Bus.Adm. 69	Retail Store Management	3	B.A. 77
Bus.Adm. 77	Survey of Marketing	3	Econ. 6-7 or Agr.Econ. 3
Bus.Adm. 88	Advertising	3	Econ. 2 or B.A. 77 and Psy. 56
H.E.Ed. 90 or C.W. 40	Child Training (See sophomore list)	3	Psy. 1-2
Psy. 56	Psychology of Advertising	3	Psy. 1-2 and Principles of Economics

In addition, the student will choose the phase of Textiles and Clothing in Business in which she is interested and for which special requirements are listed.

Store or Other Commercial Enterprises

H.E. 53	Advanced Clothing	3	Jr.; H.E. 4, 22, 50
French	2 years high school French		
or 1-2	Beginning French	10	Fr.; none

Journalism

H.E. 53	Advanced Clothing	3	Jr.; H.E. 4, 22, 50
Jour. 13	Introduction to Reporting	3	Soph. with C average; Eng. A-B-C or Comp. 4-5-6 or exemption
Jour. 41	Editing for Nonmajors	3	Jr.; Jour. 12 or 13
Jour. 69	Newspaper and Magazine Articles	3	Jr.; Jour. 15 or 41
Fine Arts 1, 2, 3	History of Architecture, Sculpture, and Painting	9	Fr.; none

Textile Testing

H.E. 107	Textile Analysis	3	Jr.; H.E. 102, Agr.Biochem. 2
Bot. 1	General Botany	4	Fr.; none
P.M.&P.H. 110	Biometric Principles	5	18 cred. biol. sci. or math. through anal. geom.
Agr.Biochem. 2	Quantitative Methods	5	Soph.; 8-10 cred. in inorg. chem.
Agr.Biochem. 4	Introduction to Organic and Biochemistry	5	Soph.; 8-10 cred. in inorg. chem.

V. INSTITUTION MANAGEMENT*

The curriculum in Institution Management is planned to provide background and initial experience for those students who are interested in food service of a commercial nature, such as that in restaurants, cafeterias, school lunchrooms, and tearooms. Those persons considering this field of training must bear in mind that practical experience before graduation is very important. This experience may be gained in vacation periods by securing minor positions at camps, hotels, restaurants, or tearooms where food is prepared and served in large quantities.

* For the Institution Management Specialization a grade of at least C is required for the following courses: H.E. 40, 41, 61, 62, 63, 64, 163, 170.

If well-rounded practical experience is not gained before graduation it will be necessary to build up an experience record before one can hope to accept work carrying a large amount of responsibility. We recommend that each student who wishes to secure a position of responsibility (1) use vacation periods to get a well-rounded work experience, (2) plan on a fifth year in an apprentice training course, and (3) learn how to use a typewriter.

All-college requirements for students in this college. See page 10.

FRESHMAN COURSES

Required Course No.	Title	Credits	Prerequisites
Orient. 1	Freshman Orientation Lectures (See p. 101)	1	None
H.E. 1	Choice and Care of Clothing	4	None
H.E. 10	Introduction to Home Economics	2	None; 1st qtr. fr. only
H.E. 15	Personal Relationships	2	None
H.E. 20	Introduction to Related Art	4	None
H.E. 31	Introduction to Nutrition	3	None
Rhet. 1	Rhetoric I	3	None
Rhet. 2	Rhetoric II	3	Rhet. 1 or exemption
Rhet. 3	Rhetoric III	3	Rhet. 2
Rhet. 34	Books and Reading	1	None
Zool. 14-15	General Zoology	6	None
Chem. 1, 2	General Inorganic Chemistry	8	None
or 9, 10	General Inorganic Chemistry	10	High school chem.
or 6, 7	General Inorganic Chemistry	10	None
Physiol. 4	Human Physiology	4	1 qtr. chem. and 1 qtr. zool.
D.H. 20 or Bact. 53	Household Microbiology (See sophomore list)	4	3rd qtr. fr.; permission of instructor
Agr.Eng. 23 or G.C. 88	General Physics†	5	None
	Energy and Matter	5	None
Soc. 1	Introduction to Sociology	3	None
Econ. 20 or Agr.Econ. 25	Elements of Accounting (See sophomore list)	3	3rd qtr. fr.
Phys.Ed.	Physical Education	3	May be taken at any time during four years in residence

SOPHOMORE COURSES

H.E. 24	Problems in Home Planning and Furnishing	5	H.E. 20
H.E. 40	Food Preparation	5	2 qtrs. chem.
H.E. 41	Food Management and Marketing	5	H.E. 31, 40
Rhet. 22	Public Speaking	3	Rhet. 3
or 11	Argumentation	3	Rhet. 3, 22 recommended
Rhet. 31	Survey of English Literature I	5	Rhet. 3
or 32	Survey of English Literature II	3	Rhet. 3
or 60	(See junior list)		
Bact. 53 or D.H. 20	General Bacteriology (See freshman list)	5	10 cred. in chem., 4 cred. in bot. or zool.
Agr.Biochem. 4	Introduction to Organic and Biochemistry	5	10 cred. in inorg. chem.
Agr.Econ. 3	Principles of Economics	5	None
or Econ. 6, 7	Principles of Economics	10	None
Agr.Econ. 25 or Econ. 20	Principles of Accounting (See freshman list)	4	None

† Students having had one year of high school physics are exempted from Agr.Eng. 23 or G.C. 88. Agr.Eng. 23 not open for credit to students presenting one unit of high school physics for entrance.

Required Course No.	Title	Credits	Prerequisites
Soc. 6	Social Interactions	3	Soc. 1
or 14	Rural Sociology	3	Soc. 1
or 49, 55 or 119	(See Combined Class Schedule)		
Psy. 1-2	General Psychology	6	None
C.W. 40	Child Training	3	Psy. 1, 2
or H.E.Ed. 90	(See junior list)		

JUNIOR-SENIOR COURSES

H.E. 50	Textiles	3	H.E. 1
H.E. 61	Quantity Cookery	4	H.E. 40, 41 advised
H.E. 62	Institution Experience A	3	H.E. 40, 41 advised
H.E. 63	Institution Experience B	3	H.E. 61 and 62
H.E. 64	Institution Buying	4	H.E. 61 or parallel, 62 or parallel
H.E. 75	Dietetics Laboratory	2	H.E. 34 or 170
or 173	Nutrition in Disease	3	H.E. 170, 175 also advised
H.E. 85	Home Management Lectures	3	H.E. 40, H.E.Ed. 90 or C.W. 40 or parallel
H.E. 86	Home Management Laboratory	4	H.E. 85 or parallel, 40, 185 or parallel, H.E. Ed. 90 or C.W. 40
H.E. 142	Experimental Cookery	3	H.E. 40, Agr.Biochem. 4
H.E. 170	Nutrition of the Family	3	H.E. 31, 40, Agr.Biochem. 4, Physiol. 3 cred.
H.E. 171	Child Nutrition	3	H.E. 170, H.E.Ed. 90 or C.W. 40
H.E. 185	Family Relationships	2	H.E. 86 or parallel, H.E.Ed. 90 or C.W. 40
Rhet. 51	Exposition	3	Rhet. 3
Rhet. 60	Contemporary Literature	3	Rhet. 3
or 31 or 32	(See sophomore list)		
P.M.&P.H. 52	Health Care of the Family	3	Bact. 53 or D.H. 20, Physiol. 4
H.E.Ed. 90	Child Training	3	Psy. 1-2
or C.W. 40	(See sophomore list)		
Agr.Econ. 126	Economics of Consumption	3	Agr.Econ. 2 or 3
Bus.Adm. 77	Survey in Marketing	3	None; Agr.Econ. 3 desirable
or Econ. 185	Economics of Marketing	3	Econ. 6-7 or 83
Bus.Adm. 167	Personnel Administration	3	Permission of department
or Econ. 161	Labor Problems	3	Econ. 6-7
or Psy. 160	Psychology in Personnel Work	3	Psy. 1-2, Econ. 6-7
An.Husb. 54	Utilization of Meats	3	None; H.E. 40, 41 desirable

Required Course for Seniors

H.E. 163	Institution Management Problems	3	H.E. 61, 62, 64

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, political science, philosophy, or sociology to total 18 credits.

VI. HOME ECONOMICS AND NURSERY SCHOOL EDUCATION

All-college requirements for students in this college. See page 10.

A few promising students can be encouraged to pursue this combination. The student and her program must be approved by the director of the Nursery School and the chief of the Division of Home Economics. In addition to the General

Home Economics program the following courses, offered by the Institute of Child Welfare, will be required. These courses are open to juniors and are offered by the Institute of Child Welfare. They are listed under Methods and Directed Teaching in the program of the College of Education.

JUNIOR-SENIOR COURSES

Required Course No.	Title	Credits	Prerequisites
Ed.T. 55	Principles of Early Childhood Education	3	C.W. 80 or parallel
Ed.T. 56	Permanent Play Materials	2	Psy. 1-2
Ed.T. 57	Plastic Materials	3	C.W. 80
Ed.T. 58	Rhythmic Games and Music for the Young Child	2	Ed.T. 55
Ed.T. 59	Story Telling for Young Children	2	Ed.T. 55
Ed.T. 75	Methods and Observation in Nursery School	3	Ed.T. 55, C.W. 40, Ed.T. 56, 57, 58, 59

Additional social science credits beyond those required above should be chosen from anthropology, economics, geography, history, political science, philosophy, or sociology to total 18 credits.

VII. PREPARATION FOR RESEARCH

These curricula are planned for superior students who wish to be prepared to pursue graduate work, with the expectation of filling a research position after receiving an advanced degree. The options and electives offered should be selected in consultation with a major adviser of the Graduate School faculty. An average honor point ratio of 1.5 must be maintained for the major and minor sequences. The following courses are required for all students taking these curricula.

All-college requirements for students in this college. See page 10.

FRESHMAN COURSES

Required Course No.	Title	Credits	Prerequisites
Orient. 1	Freshman Orientation Lectures (See p. 101)	1	None
H.E. 1	Choice and Care of Clothing	4	None
H.E. 10	Introduction to Home Economics	2	None; 1st qtr. fr. only
H.E. 15	Personal Relationships	2	None
H.E. 20	Introduction to Related Art	4	None
H.E. 31	Introduction to Nutrition	3	None
Rhet. 1	Rhetoric—Composition	3	None
Rhet. 2	Rhetoric—Exposition	3	Rhet. 1 or exemption
Rhet. 3	Rhetoric—Description and Narration	3	Rhet. 2
Rhet. 34	Books and Reading	1	None
Zool. 14, 15	General Zoology	6	None
Bot. 1	General Botany	4	None
D.H. 20 or Bact. 53	Household Microbiology (See sophomore list)	4	3rd qtr. fr.; permission of instructor
Physiol. 4	Human Physiology	4	1 qtr. chem., 1 qtr. zool.
Chem. 1-2	General Inorganic Chemistry	8	None
or 6-7	General Inorganic Chemistry	10	None
or 9-10	General Inorganic Chemistry	10	High school chem.

* Students who have had high school physics may be exempt from Agr.Eng. 23 but take Agr.Eng. 35 (or the following groups: Physics 1, 2, and 3, or 1a, 2a, and 3a, or 7, 8, and 9). Students who have not had high school physics will take Agr.Eng. 23 or any of the above groups. Agr.Eng. 23 not open for credit to students who present one unit of high school physics for entrance.

Required Course No.	Title	Credits	Prerequisites
Agr.Eng. 23*	General Physics	5	None
or 35	Household Physics	3	Agr.Eng. 23 or G.C. 88 or equiv.
or Phys. 1, 2, 3	Introduction to Physical Science	9	H.S. alg. and plane geom.
or 1a, 2a, 3a	Introduction to Physical Science	12	H.S. alg. and plane geom.
or 7, 8, 9	General Physics	15	Trig. or equiv.
Soc. 1	Introduction to Sociology	3	None
Phys.Ed.	Physical Education	3	May be taken at any time during four years in residence
Math.	Mathematics	10	
Language	Modern Languages	10	

SOPHOMORE COURSES

H.E. 24	Problems in Home Planning and Furnishing	5	H.E. 20
or 180	(See junior list)		
H.E. 34	Nutrition Problems	4	3rd qtr. soph.; 30 or 31, 40, physiol., human biol.
or 170 & 171	(See junior list)		
H.E. 40	Food Preparation	5	2 qtrs. of chem.
Rhet. 22	Public Speaking	3	Rhet. 3
or 11	Argumentation	3	Rhet. 3, 22 recommended
Rhet. 31	Survey of English Literature I	5	Rhet. 3 or permission of instructor
or 32	Survey of English Literature II	3	Rhet. 3
or 60	(See junior list)		
or Bact. 53	General Bacteriology	5	10 cred. in chem.; 4 cred. in bot. or zool.
or D.H. 20	(See freshman list)		
Agr.Biochem. 2	Quantitative Methods	5	10 cred. in inorg. chem.
Agr.Biochem. 4	Introduction to Organic Chemistry	5	10 cred. in inorg. chem.
or Org.Chem. 51-52	Elementary Organic Chemistry	10	15 cred. in chem.
Agr.Econ. 3	Principles of Economics	5	None
or Econ. 6-7	Principles of Economics	10	None
Psy. 1-2	General Psychology	6	None
C.W. 40	Child Training	3	Psy. 1-2
or H.E.Ed. 90	(See junior list)		

JUNIOR-SENIOR COURSES

H.E. 50	Textiles	3	H.E. 1
H.E. 85	Home Management Lectures	3	H.E. 40, H.E.Ed. 90 or C.W. 40 or parallel
H.E. 86	Home Management Laboratory	4	H.E. 40, 85 or parallel, 185 parallel, H.E.Ed. 90 or C.W. 40
H.E. 170	Nutrition of the Family	3	H.E. 31, 40; Agr.Biochem. 4; Phys. 3 cred.
and 171	Child Nutrition	3	H.E. 170; H.E.Ed. 90 or C.W. 40
or 34	(See sophomore list)		
H.E. 180	Home Planning and Furnishing	5	H.E. 55 and 120
or 24	(See sophomore list)		
H.E. 185	Family Relationships	2	H.E. 86 or parallel, H.E. Ed.90 or C.W. 40
Rhet. 51	Exposition	3	Rhet. 3
Rhet. 60	Contemporary Literature	3	Rhet. 3
or 31	(See sophomore list)		
or 32	(See sophomore list)		
P.M.&P.H. 52	Health Care of the Family	3	Bact. 53 or D.H. 20, Physiol. 4
H.E.Ed. 90	Child Training	3	Psy. 1-2
or C.W. 40	(See sophomore list)		

MAJOR IN TEXTILES AND CLOTHING

A major sequence in the field of textiles and clothing to make a total of 24 to 36 credits which must include H.E. 3, Clothing Construction A (3 cred.; soph.; prereq. H.E. 1) and H.E. 102, Advanced Textiles (3 cred.; jr.; prereq. 50, Agr. Biochem. 4, Agr. Econ. 3 or parallel) in addition to H.E. 1, 24 (or 180), and 50 which are listed above.

A minor sequence of 12 credits to be chosen outside the field of textiles and clothing, e.g., biochemistry, botany, economics, physics, and not to include any of the courses required for all.

Additional social science courses beyond those required above should be chosen from anthropology, economics, geography, history, political science, philosophy, or sociology to total 18 credits.

MAJOR IN FOODS AND NUTRITION

A major sequence in foods and nutrition to make a total of 24 to 36 credits which must include H.E. 41, Food Management and Marketing (5 cred.; soph.; prereq. H.E. 31, 40), H.E. 75, Dietetics Laboratory (2 cred.; jr.; prereq. H.E. 34 or 170) and H.E. 142, Experimental Cookery (3 cred.; jr.; prereq. H.E. 40, Agr. Biochem. 4) in addition to H.E. 31, 34 (or 170 and 171) and 40, which are listed above.

A minor sequence of 12 credits to be chosen outside the field of foods and nutrition, e.g., biochemistry, physiology, physics, bacteriology, and not to include any of the courses required for all.

Additional social science courses beyond those required above should be chosen from anthropology, economics, geography, history, political science, philosophy, or sociology to total 18 credits.

VIII. HOME ECONOMICS RELATED SCIENCE

Opportunity is offered for emphasis on the sciences basic to certain fields in home economics. It is assumed that the student will take graduate work at least to the Master's degree. This curriculum should be chosen only by those who have an excellent high school record and an aptitude for science.

All-college requirements for students in this college. See page 10.

English: Composition and public speaking, 15 credits (including Rhet. 51).

Biological Science: 20 to 25 credits from three or more of the following fields: bacteriology, botany, physiology, preventive medicine and public health, and zoology.

Physical Science: 20 to 25 credits from two or more of the following fields: chemistry, biochemistry, and physics.

Social Science: 18 to 20 credits from one or more of the following fields: anthropology, economics, geography, history, political science, philosophy, or sociology.

Psychology and Child Welfare: 9 credits.

Mathematics, Statistics or combination: 9 to 15 credits.

A major sequence of 24-36 credits in a field such as foods and nutrition, home management, or textiles and clothing.

A minor sequence of 12 credits to be chosen in some field of work outside of the major and not to include any of the courses specifically used to meet the above requirements. (Subject-matter courses from any department or college in the University may be applied as major or minor credits if they are clearly related or fundamental to the field of the major or minor specialization.)

Electives sufficient to make a total of 185 credits of which at least 25 shall be in courses outside the major which will contribute to the recognition and solution of the problems of personal and family living.

Total 185 credits required.

Additional social science courses beyond those required above should be chosen from anthropology, economics, geography, history, political science, philosophy, or sociology to total 18 credits.

DESCRIPTION OF COURSES

AGRICULTURAL BIOCHEMISTRY

Freshman and Sophomore Courses

This division offers two types of work, namely courses in those phases of chemistry which have special application in agriculture or home economics for students whose major work is in their divisions; and courses designed to train chemists for research or instruction in the special field of agricultural biochemistry.

Students planning to specialize in agricultural biochemistry in the Science Specialization Curriculum should secure in their junior-senior years a broad fundamental foundation of courses in chemistry, biology, physics, and mathematics.

The following courses are suggested as providing the essential basic training for the junior-senior years and for the first year of postgraduate work:

Organic Chemistry 51-52-153 (15 credits); Physics 4-5-6 or 7-8-9 (15 credits); Mathematics through Integral Calculus; Physical Chemistry 101-102-103 (9 to 15 credits); Agronomy and Plant Genetics 31 (4 credits); Agricultural Biochemistry 2, 101-102, 113-114-115, 119, 120, 121, 122, and 123 and either 116 and 103 or 108-110, depending on whether the student's interest lies in animal or plant biochemistry.

For those students who plan to later specialize in the animal phases of biochemistry certain courses in animal husbandry, dairy husbandry, zoology, bacteriology or physiology should be included in the junior-senior years. Similarly for those desiring to specialize in the plant phases of biochemistry, courses in botany, plant genetics, plant pathology, forestry, plant physiology and bacteriology are desirable adjuncts. These supporting subjects should insofar as possible be selected in consultation with the student's major adviser.

2. Quantitative Methods. Principles of quantitative analysis, including stoichiometric problems, practice in the use of the balance and in typical gravimetric and volumetric manipulations. (5 cred.; soph., jr., sr.; prereq. Inorg. Chem. 10 cred.)
4. Introduction to Organic and Biochemistry. An introduction to the chemistry of carbon compounds directed toward an understanding of the principles underlying the classification, structure, and general properties of those which are of biological importance. (5 cred.; soph., jr., sr.; prereq. Inorg. Chem. 10 cred.*)
5. Plant Biochemistry. An introduction to the chemistry, metabolism, and nutrition of plants based on the organic and inorganic compounds which are characteristic of plants and plant products, and their reactions and interactions. (5 cred.; soph., jr., sr.; prereq. 4, Soils 9 advised)
6. Animal Biochemistry. An introduction to the chemistry, metabolism, and nutrition of animals based on the organic and inorganic compounds which are characteristic of animals and animal products, and their reactions and interactions. (5 cred.; soph., jr., sr.; prereq. 4, Soils 9 advised)

* By special permission of the student's adviser, General College Courses 88 and 89 or Inorg. Chem. 1-2 will be acceptable as prerequisites for home economics students.

Junior and Senior Courses

101-102. Agricultural Quantitative Analysis. The estimation of inorganic and organic constituents of biological products, the proximate analysis of foods and feeding stuffs, the use of the polariscope, immersion, refractometer, colorimeter and nephelometer, viscosimeter, and other special apparatus. (6 cred.; jr., sr.; prereq. 2)

103. Dairy Chemistry. Lectures and laboratory work on the physical, colloidal, and chemical properties of milk and dairy products, the chemistry of the various constituents of milk and of the processes involved by the manufacture of dairy products. (5 cred.; jr., sr.; prereq. 2, 6)

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. (3 cred.; jr., sr.; prereq. 5)

110. Flour Laboratory Methods. A laboratory course in methods of analysis of wheat and its products; milling tests of wheat, baking, and special tests of flour. Designed to train students for research and control work in the cereal industry. (3 to 5 cred.; jr., sr.; prereq. 101-102 or equiv.)

113-114-115. Biochemical Laboratory Methods. A laboratory course paralleling the lectures in 119-123, using recent methods for the investigation of biologically important compounds. (6 cred.; jr., sr.; prereq. quant. anal., parallel 119-123)

116. Advanced Animal Nutrition. Recent developments in animal nutrition, covering the field of proteins, mineral metabolism, and vitamins. (3 cred.; jr., sr.; prereq. 6 or Physiol. Chem. 120 advised)

117. Laboratory Problems in Animal Nutrition. A laboratory course on methods used in nutrition studies. (3 cred.; jr., sr.; prereq. 116, instructor's permission)

118. Laboratory Problems in Biochemistry. Special laboratory work in the preparation and isolation of pure compounds which occur in living cells, the study of biochemical reactions, and special methods of identification or determination of biochemical products. (3 or 5 cred.; sr.; prereq. 113-114, 119; or 103 or 110)

119. Colloids. Lectures and assigned readings dealing with the colloidal state of matter, the preparation and properties of colloidal systems, and the relation of these to biochemical processes. (3 cred.; sr.; prereq. Zool. or Bot. 9 cred., and 5 cred. in Org. Chem. 51-52-153)

120. Proteins. Lectures and assigned readings on composition, structure, chemical and physical properties, and the functions of proteins and amino acids. (3 cred.; sr.; prereq. 119)

121. Carbohydrates. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the carbohydrates. (3 cred.; sr.; prereq. 119)

122. The Lipids and Fats. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the fats and fatlike compounds. (3 cred.; sr.; prereq. 119)

123. Enzymes. Lectures and assigned readings on enzyme action, including the methods of preparation and investigation of enzymes and their function in biological and industrial processes. (3 cred.; sr.; prereq. 119)

AGRICULTURAL ECONOMICS

Students desiring to major in agricultural economics will work out a program suited to their needs in consultation with an adviser in the division. Opportunities for specialization in various fields such as farm management, marketing, agricultural prices, farm finance, and the like are available. Among the courses recommended for majors are Agr.Econ. 8, 25, 30, 40, 50, 80, and 90.

Freshman and Sophomore Courses

1. Principles of Economics I. For students in agriculture and forestry. (3 cred.; soph., jr., sr.; no prereq.)
2. Principles of Economics II. For students in agriculture and forestry. (5 cred.; soph., jr., sr.; prereq. 1)
3. Principles of Economics. For students in home economics. (5 cred.; soph., jr., sr.; no prereq.)
7. Natural Resources. A study of the natural resources of the United States and other countries in their relation to agriculture. Attention is given to the importance of these resources and to their wise utilization. Lectures, reference work, and discussions. (3 cred.; soph., jr., sr.; no prereq.)
8. Rural Economics. An analysis of a number of the important economic problems of agriculture, including organization of the agricultural industry, tenancy, farm incomes, rural population and standards of living, tariff, taxation, and agricultural policy. (3 cred.; soph., jr., sr.; prereq. 2 or 3)
25. Principles of Accounting. (4 cred.; soph., jr., sr. in agr., for., and home econ. only)
30. Agricultural Prices. Factors determining prices and trends in prices of agricultural commodities. Adjustment of production to price changes. Foreign competition. Price stabilization. Price policies. (3 cred.; soph., jr., sr.; prereq. 2)
40. Principles of Marketing Organization. The principles of the organization of the market and of marketing enterprises, both proprietary and co-operative. (3 cred.; soph., jr., sr.; prereq. 2)
47. Marketing Accounting. Interpretation of accounts, statement preparation, and analysis. Accounting methods and statements of agricultural marketing organizations including co-operative associations. Utilization of accounting data and statements by the management. (4 cred.; soph., jr., sr.; prereq. 25)

Junior and Senior Courses

50.* Farm Finance. The mechanism of exchange with special reference to the financing of the production and marketing of farm products. (5 cred.; jr., sr. in agr. or for. only; prereq. 2)

80.* Farm Management: Records and Accounts. Kinds and uses of farm records; calculation of measures of farm earnings; accounting analysis of farm business. Discussion and practice. (3 cred.; jr., sr.)

90.* Agricultural Statistics. Statistical method applied to the analysis of agricultural data; collection, tabulation, and graphical presentation; averages; measures of dispersion; index numbers; sampling; time series. (5 cred.; jr., sr.)

* Open to sophomores on petition.

102. Farm Management: Organization. Characteristics of farming as a business; factors determining type of farming; farm tenure and farm selection; farm layout and farm improvements; factors affecting the selection of crops and livestock for a particular farm. (3 cred.; jr., sr.; prereq. 2)
103. Farm Management: Operation. Farm budgeting; personal and business factors affecting farm financial success; utilization of labor, power, and equipment; farm management research methods and farm management services. Special problem in farm planning. Field visit to well-managed farms. (3 cred.; jr., sr.; prereq. 102)
104. Types of Farming. A study of factors affecting the geographic distribution of agricultural production by type-of-farming areas and of crop and livestock systems and practices within these areas. (3 cred.; jr., sr.; prereq. 2)

110-111. Economics of Agricultural Production I and II. The principles of production economics applied to agriculture, special emphasis being placed upon profitable combinations of factors of production, comparative advantage, and localization of production. (6 cred.; jr., sr.; prereq. 2)

126. Economics of Consumption. Nature of human wants; standards of living; costs of living; income, administration of income; nature of demand; demand and price; relation of consumption to the population problem. (3 cred.; jr., sr.; prereq. 2 or 3)
131. Market Prices. Manner in which prices are determined in the market place. Local, wholesale, and retail prices. Price fluctuation and speculation. Prices and market grades. Market quotations. (3 cred.; jr., sr.; prereq. 30, 40)
135. Methods of Price Analysis. Statistical methods for the study of the forces determining prices, forecasting price changes, and determining "established prices." Survey of research work in the field. (3 cred.; sr.; prereq. 30, 191)
140. Marketing Organization: Staples. Principles of production economics applied to the organization of markets and marketing organization for the grains, tobacco, cotton, and wool. Special attention to grain marketing. (3 cred.; jr., sr.; prereq. 40)
141. Marketing Organization: Dairy and Poultry Products. (3 cred.; jr., sr.; prereq. 40)
142. Marketing Organization: Fruits and Vegetables. (2 cred.; jr., sr.; prereq. 40)
143. Marketing Organization: Livestock and Meats. (3 cred.; jr., sr.; prereq. 40)
144. Co-operative Organization. Development of co-operation in agriculture in the United States and foreign countries. Analysis of economic problems peculiar to co-operative organization, especially of marketing agencies. (3 cred.; jr., sr.; prereq. 40)
150. Advanced Farm Finance. A consideration of credit problems of farmers with special attention to institutions financing farmers. (3 cred.; jr., sr.; prereq. 50 or equiv.)
170. Land Economics. Land as a factor of production; rural and urban utilization; rents and land values; land classification; land exchange. (3 cred.; jr., sr.; prereq. 110)
191. Advanced Agricultural Statistics. Analysis of agricultural data by methods of correlation, partial and multiple correlation. (3 cred.; jr., sr.; prereq. 90)

See also courses in Economics and Business Administration.

AGRICULTURAL EDUCATION

Courses for Undergraduate Students

1. Introduction to Agricultural Education. An orientation course for students who are interested in exploring the opportunities for employment and service as teachers of agriculture. Qualifications of teachers and a survey of preparatory offerings. (1 cred.; fr.)

51. Educational Psychology. The main facts and principles of educational psychology and the fundamental principles upon which education is based. Emphasis is placed on those phases which are most closely related to vocational education. (3 cred.; jr., sr.; no prereq. Not offered, see Ed. 51A)

54. Rural Education and Community Leadership. The rural school as a community center, and ways and means of organizing education and recreational activities, such as clubs, festivals, fairs, and other desirable features of rural community life. (2 cred.; jr., sr.; prereq. 51)

56. Rural Youth Leadership. A lecture, demonstration, and laboratory course in co-operation with leaders and specialists in the various fields and problems of rural youth leadership with emphasis on 4-H clubs, Future Farmers of America, and extension activities. (3 cred.; jr., sr.; no prereq.)

81. Teaching Agriculture. Organization and administration of the program for teaching agriculture in the secondary school. Relationships to other rural programs; planning farm practice activities, guidance for rural youth, and the use of the home farm and community in teaching agriculture. (3 cred.; jr., sr.; prereq. 51)

82.‡ Methods in Teaching Agriculture. Fundamentals of method in teaching as related to teaching agriculture in high school. Organizing subject-matter of daily work; selection and manipulation of devices. Classroom and laboratory method. Specific plans for teaching secondary school agriculture. (3 cred.; sr.; prereq. 81)

83. Advanced Methods in Teaching Agriculture. (Continuation of 82) (2 cred.; sr.; prereq. 82)

90.‡ Observation and Participation. Observation of agriculture departments in operation, including facilities, classes, and supervised practice. Individual reports and class discussions of observations. (2 cred.; jr., sr.; prereq. 81)

91.‡ Supervised Teaching Experience. Preparation of lesson plans and actual teaching of classes under careful supervision in recitation and laboratory; criticism and discussion of plans, methods and results of student teaching. (3 cred.; sr.; prereq. 82 and a C+ average in major)

Courses for Undergraduate and Graduate Students

101. Part-Time School Instruction. Instructional programs for rural young men not regularly enrolled in school. Analysis of rural youth situations and placement problems. (2 cred.; sr.; prereq. 81)

102. Evening School Instruction. Instructional programs for adult farmer groups. Organization of courses, teaching procedures, follow-up work, community programs of adult education. (3 cred.; sr.; prereq. 81)

103. Facilities and Materials. A study of the physical arrangement for departments of vocational agriculture. Building facilities, room fixtures, references, equipment, visual aids, illustrative materials. (3 cred.; sr.; prereq. 82)

‡ A fee of $1 per credit is charged for this course.

104. Planning Programs. Long-time and annual plans for departments of vocational agriculture. Schedule of activities, analyzing results. (2 cred.; sr.; prereq. 82)
137. Course of Study Construction in Agriculture. A lecture and clinical laboratory course designed to aid teachers in constructing courses of study appropriate to the needs of local communities. Consideration of principles for the selection, distribution, and organization of the subject-matter for the integrated course of study in agriculture. (3 cred.; sr.; prereq. 10 cred. in ed.)
141.‡ Supervised Practice in Vocational Agriculture. A special methods course dealing with the selection, planning, supervising and summarizing of the practical work in agriculture. Special emphasis on the problem method of teaching and the use of the farm and community for teaching purposes. (3 cred.; sr.; prereq. 10 cred. in ed.)
145. The Integrated Course of Study in Agriculture. A presentation of the problems of organization, administration, and teaching in departments of agriculture in the secondary schools. Special emphasis on planning programs for individual students. (3 cred.; sr.; prereq. 10 cred. in ed.)

AGRICULTURAL ENGINEERING

Students in Technical Agriculture may take their major or minor in the field of agricultural engineering. The field embraces the practical and applied phases of technology as applied to agriculture, including farm machinery and power, farm structures, drainage and irrigation, soil erosion control, farm home conveniences, and rural electrification. Because of the broad scope of the field, those majoring therein are advised to consult with the division for assistance in outlining a program of study.

A Professional Course in Agricultural Engineering is offered jointly with the Institute of Technology. This is a technical course designed to train engineers in the various phases of technology as applied to agricultural practices and industries. Details concerning the professional curriculum are given on page 32.

Freshman and Sophomore Courses

3. Mechanical Drawing. Materials, instruments, and their uses. Lettering, scale reading, conventional symbols, and blue printing. Orthographic projection, pictorial drawing, and farm buildings (Agriculture); or records and plats of surveys, contour, profile, and map tracing. (Forestry). (3 cred.; no prereq.)
4. General Woodworking. Instruction and practice in bench and machine woodworking, sharpening edge tools, saws, etc. Painting, wood finishing, and glazing. Projects selected to meet the ability of the student. (3 cred.; no prereq.)
5. Farm Structures Laboratory. Laboratory practice and study of farm building construction with different types of materials. (3 cred.; prof. agr. eng. only; no prereq.)
7. Buildings. The arrangement, planning, and designing of farm buildings with special attention to their convenience, economy, and durability. (3 cred.; no prereq.)

‡ A fee of $1 per credit is charged for this course.

11. Applied Mathematics. Rules of practical mathematics with special attention to formulas and problems directly related to agricultural and forestry work; e.g., areas, volumes, progressions, statistics, averages, proportions, variations, investments, cost problems. (5 cred.; prereq. high school elementary algebra and plane geometry or their qualitative equivalent)
12. Agricultural Machinery. Machinery as a factor in agricultural production; development, construction, and operation. (3 cred.; no prereq.)
13. Gas Engines. Theory, operation, care and repair of gasoline engines. (3 cred.; no prereq.)
14. Tractors. Lecture and laboratory course dealing with the construction, operation, care, adjustment, testing, and use of the tractor. (3 cred.; prereq. 13)
18. Agricultural Automotives. Principles of internal combustion engines and tractors including ignition, lubrication, carburetion, cooling, real gas cycles, transmission systems, and drive members. 4 cred.; prof. agr. eng. only; prereq. Phys. 7)
19. Elementary Surveying. Use of tape, level, transit, and traverse board in agricultural and forestry field problems, e.g., mensuration surveys, traverses, differential and profile leveling; plotting and mapping. Care and adjustment of instruments. (3 cred.; prereq. 3, 11 or trigonometry)
20. Advanced Surveying. Topographic surveys by stadia and other methods, running simple curves, cross sectioning, plotting the survey, profile building, grade determination, and figuring of quantities in earthwork. (3 cred.; prereq. 19)
21. Elements of Surveying. Use of tape, level, transit, traverse board in differential and profile leveling, cross sectioning, running tangents, and simple curves, topographic and agricultural surveys. Mapping, calculation of earthwork, and adjustments of instruments. (4 cred.; prof. agr. eng. only; prereq. Draw. 3, M.&M. 12)
22. Agricultural Machinery Laboratory. Construction and adjustment of machines; measurement of drawbar horse-power; hitches. (1 cred.; prereq. 12 or parallel)
23. General Physics. The elements of physics for those who have not had physics in high school. Mechanics, heat, light, and electricity with laboratory work. (5 cred.; no prereq.)
24. Agricultural Physics I. An applied course involving lectures and laboratory work in mechanics and heat. (4 cred.; prereq. Math. 6 or equiv.)
25. Agricultural Physics II. A practical lecture, recitation, and laboratory course on electricity and light, including electric generating plants, batteries, motors, lighting systems, and light and radiant energy as applied to farm problems. (4 cred.; prereq. 24)
28. Land Clearing. Land clearing methods, machinery, and care and use of explosives. (2 cred.; no prereq.) (Offered only in even numbered years)
31. Principles of Drainage. Elementary principles and practice of soil erosion control and of drainage in relation to plant growth, crop and land values, and farm operation and development. (3 cred.; no prereq.)
32. Elements of Supplemental Irrigation. A study of the place and purpose of supplemental irrigation in humid regions. Systems and methods, plans of layouts, costs and return therefrom. (2 cred.; no prereq.) (Offered only in odd numbered years)
35. Household Physics. Lectures and laboratory work on the physical principles underlying the operation of the common household devices and appliances. Home heating, air conditioning and ventilation, artificial lighting, illumination. (3 cred.; prereq. 23 or equiv. or G.C. 88)

37. Rural Sanitation and Water Supply. Wells, pumps, and water supply. Methods of securing sanitary water systems for farmsteads and rural institutions. Sanitary sewage disposal methods for homes, creameries, etc. (3 cred.; no prereq. for agr. section; M.&M. 129 for eng. section)
40. Mechanical Training. Instruction and laboratory practice in mechanical trades embracing rope work, belt lacing and pulleys, cement work, soldering, electric wiring, harness repair, etc. (3 cred.; no prereq.)
41. Metal Work. Instruction and laboratory practice in mechanical trades embracing cold metal work, pipe fitting, forge work, oxyacetylene welding, brazing and cutting, and electric arc welding. Students may select any of the above and concentrate on those of special interest. Special attention given to practical applications and features of special interest to teachers. (3 cred.; no prereq.)
43. Mechanical Laboratory. Instruction and laboratory practice in mechanical work embracing rope work, belt lacing and pulleys, cement work, soldering, welding, pipe fitting, electric wiring, etc. (3 cred.; prof. agr. eng. only; no prereq.)
44. Advanced Drawing. Plans and pictorial drawings, including perspective, charts, graphs, and co-ordinate plotting on various scales. Mapping. Illustrations for publication. (2 cred.; prereq. Draw. 2 or equiv.)

Junior and Senior Courses

51. Land Reclamation. Principles and practices of soil erosion control, land drainage, and irrigation in relation to plant growth, farm operation, land development, and community interest. (5 cred.; jr. and sr. prof. agr. eng only; prereq. 21 or parallel, Soils 9, M.&M. 129) (Offered only in even numbered years)
52. Elements of Farm Machinery. Principles of development, construction, and use of agricultural machines. Drawbar power. (3 cred.; prof. agr. eng only; prereq. M.&M. 26)
53. Farm Structures. Planning and economics of farm structures. (3 cred.; prof. agr. eng. only; prereq. 5, Draw. 3 or equiv.)
67. Advanced Farm Structures Design. Planning, estimating, and designing of farm structures. Study of materials, and equipment commonly used. (3 cred.; jr., sr., prof. agr. eng. only; prereq. 5, 53, M.&M. 128)
70. Dairy Engineering. Construction and principles of operation of refrigerating equipment, steam boilers, and steam equipment and their application to the dairy plant. (3 cred.; jr., sr.; prereq. 24)
71. Design and Economics of Agricultural Machinery. Machine and power costs of farm operations; operating principles and design problems. (3 cred.; jr., sr., prof. agr. eng. only; prereq. 18, 52, M.E. 27)
72. Applied Electricity. Laboratory work in direct and alternating current machines as used on farms, including generators, motors, storage batteries, transformers, and complete isolated electric and hydroelectric plants. (3 cred.; jr., sr., prof. agr. eng. only; prereq. Phys. 9 or 43, 44) (Offered only in even numbered years)
73. Steam Boilers and Heat Engines. Steam boilers and heat engines in their applications to agriculture. (3 cred.; prof. agr. eng. only; prereq. 18 and M.E. 31) (Offered only in even numbered years)

101,102,103. Advanced Drainage Problems. Special drainage problems including surface run-off, soil permeability, relation of soil and crop type to drainage, shape and regulation of water table in relation to root growth, etc. (2 to 6 cred. per qtr.; sr.; prereq. 51)

104. The Soil Moisture Relation in Agriculture. The scientific basis of soil moisture regulation and conservation in such phases as irrigation, drainage, and soil erosion. Lectures and special problems. (3 cred.; prereq. 9 cred. in agr. eng. including phys.) (Not open to engineers)

111,112,113. Farm Building Problems. Investigations in the utility and durability of building materials. Methods of construction, costs, and efficiency of farm buildings. (2 to 6 cred. per qtr.; sr.; prereq. 67)

114. Buildings, Equipment, Materials, and Methods of Construction. The relation of structures and building equipment to agriculture. Lectures and special problems. (3 cred.; prereq. 9 cred. in agr. eng. including 3 and 4 or equiv.) (Not open to engineers)

121,122,123. Farm Power and Machinery Problems. Special studies of farm machinery and mechanical power for the farm. Tests, design, and adaptability to various farm conditions. (2 to 6 cred. per qtr.; jr., sr.; prereq. 126)

124. Agricultural Machinery and Mechanical Power Management. Machinery and power management and use and its cost as a factor of agricultural production. Lectures and special problems. (3 cred.; prereq. 9 cred. in agr. eng. including phys. and Agr. Eng. 12) (Not open to engineers)

126. Selection and Management of Agricultural Machinery. Special problems in economical power and machine combinations and their application to the farm. (3 cred.; jr., sr.; prereq. 18, 71, Agr. Econ. 102)

AGRONOMY AND PLANT GENETICS

Students may major in either agronomy or plant genetics. Students in Technical Agriculture may prepare for returning to the farm, farm operators, county agents, seedsmen, or grain dealers. Students in Science Specialization may enter (usually after one or more year's graduate work) the fields of research in agronomy or plant genetics in experiment stations, enter federal service, go into teaching in colleges and universities or may engage in agronomic or plant breeding research with seed companies.

Recommended courses for major in:

1. **Technical Agriculture:** Agron. 21, 22, 23, 31, 132, 133, 134; Pl. Path. 7, 8; from 3 to 6 credits in other plant science courses may be added with the approval of the adviser.
2. **Science Specialization:** A major sequence in either agronomy or plant genetics may be arranged in consultation with the major adviser. The courses will be selected in relation to the major interest of the student and may include any courses fundamental to basic training in plant science.

Minor sequence:

Minors should be chosen in consultation with the major adviser. Those in Technical Agriculture usually should choose a minor in another field of technical agriculture most likely to prepare for the vocational objective.

Students in Science Specialization should choose a minor in a science field related to the interests of the student.

Freshman and Sophomore Courses

1. General Farm Crops. A study of the important field crops of the United States. (3 cred.; no prereq.)
21. Grain Crops. Structure, function, culture, improvement, and uses of corn, wheat, oats, barley, rye, flax, and buckwheat. (4 cred.; soph., jr., sr.; prereq. 1)
22. Grain and Hay Grading. Development of grades, study of grading methods, and actual practice in grading grain and hay samples according to federal standards. Training in judging grain and hay on quality basis. (3 cred.; soph., jr., sr.; prereq. 1)
23. Forage Crops. Methods of obtaining stands, stage of maturity of cutting or grazing in relation to continued productivity, yields and quality of product. Hay and silage makings and storage. (4 cred.; soph., jr., sr.; prereq. 1)
31. Principles of Genetics. Fundamental principles of breeding, heredity, variation, biometry, and evolution. (4 cred.; soph., jr., sr.)

Junior and Senior Courses

124. Problems in Farm Crops. Through the use of the problem method, the student is given opportunity to deal with important phases of agronomy. (3 cred.; jr., sr.; prereq. 1, 31, and at least two courses from 21, 23, 132, 134. Seniors and special students may register in the course with approval of instructor.)
126. Crop Judging. Identification of crops, weeds, and diseases in relation to judging and grading farm crops. (4 cred.; jr., sr.; prereq. 22)
132. Farm Crops Plant Breeding. Applied genetics. Methods of breeding each of the important agricultural crops. (4 cred.; jr., sr.; prereq. 31)
133. Pasture Crops and Management. Characteristics, economic value, and distribution of pasture plants. Methods of obtaining stands. Management of temporary and permanent pastures to maintain and improve production. (4 cred.; jr., sr.; prereq. 23)
134. Seminar in Agronomy. Critical studies of problems in agronomy. (2 cred.; sr.; prereq. Agron. 9 cred.)

ANALYTICAL CHEMISTRY

INSTITUTE OF TECHNOLOGY

SCHOOL OF CHEMISTRY

Freshman and Sophomore Courses

1-2. Quantitative Analysis. (10 cred.; soph., jr., sr.; prereq. Inorg. Chem. 13)

For additional courses and course descriptions see the Bulletin of the Institute of Technology.

ANIMAL AND POULTRY HUSBANDRY

Major specialization in this division is elected by students who are chiefly interested in the production, sale, processing, or distribution of livestock and its products. Vocational opportunities cover a wide range from the raising of livestock on farms to the distribution of meat products through retail channels; educational positions, as county agricultural agents, preparation for graduate study in order to qualify for positions in agricultural colleges, and research work in experi-

ment stations. Majors are offered in either animal husbandry or poultry husbandry. In the animal husbandry major special attention is given to problems of livestock breeding, feeding, or meat selection and distribution. The poultry husbandry major covers similar fields as applied to the poultry industry.

Recommended courses for majors in:

A. Animal Husbandry

1. **Technical Agriculture:** Agr. Biochem. 6; Agr. Econ. 40, 143; Agron. 23, 31; An. Husb. 3, 4, 5, 51, 52, 53, 56-57, 58, 101, 112, 113; Vet. 50, 51, 52.
2. **Science Specialization:** Consult adviser.

B. Poultry Husbandry

1. **Technical Agriculture:** Agr. Biochem. 6; Agr. Econ. 25, 40, 141; Agron. 31; Poul. Husb. 1, 2, 50, 51, 52, 103, 104; Vet. 50, 51, 52; 12 credits from the following: Agricultural Economics, Zoology, Agricultural Biochemistry, Animal Husbandry.
2. **Science Specialization:** Consult adviser.

ANIMAL HUSBANDRY

Freshman and Sophomore Courses

1. Livestock Production. Opportunities and problems in livestock production. A survey of practices followed in the production of beef cattle, sheep, swine, and horses. Lectures and laboratory practice in classifying and appraising livestock. (3 cred.; no prereq.)

3-4. Breeds of Livestock. The origin, history, characteristics, and economic importance of the breeds of livestock. Factors for consideration in the selection of breeding animals and practice in judging purebred livestock. (6 cred.; soph., jr., sr.; prereq. 1)

5. Livestock Judging. Practice in judging horses, cattle, sheep, and hogs from the market and breed standpoint. (3 cred.; soph., jr., sr.; prereq. 3-4)

Junior and Senior Courses

50. Fundamentals of Livestock Production. Basic principles involved in the breeding, feeding, and management of livestock. (3 cred.; jr., sr. in forestry or prof. agr. eng. only; no prereq.)

51. Meat Selection. Lectures on the characteristics and peculiarities of meats from different animals. Meat classification, grading, and utilization; the physical and chemical composition of meat. (3 cred.; jr., sr.; prereq. 1)

52. Meats. Slaughter of animals and the cutting of carcasses. Lectures, demonstrations, and laboratory; meat judging practice. (3 cred.; jr., sr.; prereq. 1, 51)

53. Advanced Meats. The relation of animal form to carcass yield. The commercial wholesale and retail meat cuts. Factors affecting the quality of meat. (3 cred.; jr., sr.; prereq. 52)

54. Utilization of Meats. A study of the different cuts of pork, beef, veal, mutton, and lamb with reference to prices, relative economy, uses, nutritive value, chemical composition, ripening, curing, palatability. (3 cred.; jr., sr. home econ. students; no prereq.)

56-57. Livestock Feeding. A study of the nutritional requirements of farm animals and the composition and characteristics of livestock feeds. The values of separate feeds and of combinations of feeds for beef cattle, sheep, horses, and swine. (6 cred.; jr., sr.; prereq. 1)

58. Market Classes and Marketing of Livestock. The market classes and grades of livestock. A study of marketing methods; transportation problems; sanitary regulations; meat processing and distribution; visits to the South St. Paul market; selling purebred livestock. (4 cred.; jr.; prereq. 3-4)

101. Advanced Stock Judging. Competitive judging of all types, breeds, and classes of livestock supplemented by visits to nearby stock farms. (3 cred.; jr., sr.; prereq. 5)

107. Meat Problems. The wholesale cuts and grades of meat; the packing industry and the utilization of by-products. Special problems and trips to packing establishments. (3 cred.; jr., sr.; prereq. 53)

108. Seminar. Special problems and research assignments on investigations pertaining to the livestock industry. (3 cred.; jr., sr.; prereq. 3-4)

112. Animal Breeding. The application of the principles of physiology of reproduction and genetics to the breeding of farm animals. (3 cred.; jr., sr.; prereq. Agron. 31)

113. Livestock Management. Management problems in market stock and in purebred livestock production. A study of the essential management principles involved in each of the several types of specialization in livestock production. A general course covering horses, beef cattle, sheep, and hogs. (3 cred.; jr., sr.; prereq. 3-4)

POULTRY HUSBANDRY

Freshman and Sophomore Courses

1. Poultry Production. An introduction to the poultry industry and the principles underlying farm flock management. (3 cred.; soph.; no prereq.)

2. Poultry Breeds, Varieties, and Culling. Practice in judging breed, varietal and production characteristics of poultry. (3 cred.; prereq. 1 or parallel)

Junior and Senior Courses

50. Poultry Problems. Special problems and research in the field of poultry husbandry. (2 to 6 cred.; jr., sr.; prereq. 6 cred. in poultry husb.)

51. Incubation, Brooding, and Breeding. Principles and commercial aspects of incubation, brooding, and breeding. Some specialized practices, such as sexing, caponizing, artificial insemination, etc., will be considered. (4 cred.; jr., sr.; prereq. 1, Agron. 31)

52.* Poultry Judging and Marketing. Practice in selection for standard and production qualities and the grading of live and dressed market poultry and eggs. (3 cred.; jr., sr.; prereq. 2)

103. Poultry Feeding and Management. A study of principles of poultry nutrition and systems of feeding and management. (3 cred.; jr., sr.; prereq. 1, Agr. Biochem. 4)

104. Seminar. Investigations and reports on selected topics in poultry husbandry. (2 cred.; sr.; prereq. 9 cred. in poultry husb. including 51, 103 or equiv.)

* The judging team will be selected from members of this class.

ANTHROPOLOGY

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman and Sophomore Courses

41. Introduction to Anthropology. (5 cred.; soph., jr., sr.; prereq. 10 cred. in sci. or soc. sci.)

Junior and Senior Courses

54. Social Organization. (3 cred.; jr., sr.; prereq. 41)
56. Primitive Science. (3 cred.; jr., sr.; prereq. 41)
80. The American Indian. (3 cred.; jr., sr., grad.; prereq. 41)
105. Elements of Language. (3 cred.; jr., sr., grad.; prereq. 41 or 10 credits of any language)
106. European Prehistory. (3 cred.; jr., sr., grad.; prereq. 41)
110. Physical Anthropology. (3 cred.; jr., sr., grad.; prereq. 41 or one course in human anatomy or zoology)
117. Culture and Culture Areas. (3 cred.; jr., sr., grad.; prereq. 41)
118. Races and Cultures of Middle and South America. (3 cred.; jr., sr., grad.; prereq. 41)
119. The Contact of Cultures. (3 cred.; jr., sr., grad.; prereq. 41)
120. Indians of the Plains. (3 cred.; jr., sr., grad.; prereq. 41) (Not offered in 1940-41)
131-132. Races and Cultures of Arabia, Egypt, and North Africa. (6 cred.; jr., sr., grad.; prereq. 41)
133-134. Races and Cultures of the Far East. (6 cred.; jr., sr., grad.; prereq. 41)
161. Primitive Religion. (3 cred.; jr., sr., grad.; prereq. 41)
162. Races and Cultures of Negro Africa. (3 cred.; jr., sr., grad.; prereq. 41)
163. Ethnology of India. (3 cred.; jr., sr., grad.; prereq. 41)
165. Psychological Phases of Culture. (3 cred.; jr., sr., grad.; prereq. 41)
166. History of Anthropological Theory and Method. (3 cred.; jr., sr., grad.; prereq. 41)
167. Primitive Mythology. (3 cred.; jr., sr., grad.; prereq. 41)
170. Primitive Art. (3 cred.; jr., sr., grad.; prereq. 41)

ARCHITECTURE

INSTITUTE OF TECHNOLOGY

COLLEGE OF ENGINEERING AND ARCHITECTURE

Junior and Senior Courses

51-52-53. History of Architecture. (9 cred.; jr., sr.; prereq. consent of instructor)
54-55-56. Tutorial Work in History of Architecture. (9 cred.; prereq. 53)
57-58-59. Building Materials and Methods. (6 cred.; no prereq.)
DP-I.‡ Drawing and Painting, Grade I. (6 cred.; no prereq.)
DP-II.‡ Drawing and Painting, Grade II. (6 cred.; prereq. DP-I)
DP-III.‡ Drawing and Painting, Grade III. (6 cred.; prereq. DP-II)
AD-I.‡‡ Architectural Design, Grade I. (15 cred.; no prereq.)
AD-II.‡‡ Architectural Design, Grade II. (18 cred.; prereq. AD-I)

‡ A fee of $1 per quarter is charged for this course.
‡‡ A fee of $2 per quarter in charged for this cousre.

SD-I. Stage Design. (4 cred.; no prereq.)
4-5-6. Graphic Representation. Projections, shades and shadows, perspective, etc. (6 cred.; no prereq.)

For additional courses and course descriptions see the Bulletin of the Institute of Technology.

ART EDUCATION

COLLEGE OF EDUCATION

Freshman and Sophomore Courses

1-2-3. Fundamental Experiences in Design. (9 cred.; all; prereq. high school art or 14-15-16)
4-6-8. Drawing from Still Life and Pose. Pose emphasized for H.E. students. (2 cred. each.; all; no prereq.)
24-26-28. Drawing and Painting from Still Life and Pose. (2 cred. each; prereq. ArtEd. 8 or equiv.)
29-30. Rhythmic Sketch. Simple action and blackboard drawing of figure. (1 cred. each.; no prereq.)

Senior College Courses

70-71-72. Fundamental Experiences in Design—Continued—Color Emphasis. (3 cred. each.; prereq. 9 cred. in design)
154. Art in Society—Costume. (3 cred.; sr., grad.)

For additional courses and course descriptions see the Bulletin of the College of Education.

BACTERIOLOGY AND IMMUNOLOGY

MEDICAL SCHOOL

Freshman and Sophomore Courses

53.‡ (Formerly Course 41.) General Bacteriology. (5 cred.; with C average in the prerequisite courses, jr., sr.; prereq. 10 cred. in chem. and 4 cred. in bot. and zool.)

Junior and Senior Courses

103. Soil Microbiology. Studies of the microscopic inhabitants of the soil, their interrelationships and rôle in the transformations of soil constituents with particular emphasis on the cycles of carbon, nitrogen, and sulphur in nature. (5 cred.; jr., sr., grad.; prereq. 53, and 15 cred. in chem.)
104. Sanitary Bacteriology. (4 cred.; jr., sr., grad.; prereq. 53, and 15 cred. in chem.)
114. Molds, Yeasts, and Actinomycetes. (4 cred.; jr., sr., grad.; prereq. 53 or 101)
121-122.† Physiology of Bacteria. (6 cred.; jr., sr., grad.; prereq. 53 and 8 cred. in org. chem. or biochem.)

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ Microscope required. Use of microscope may be obtained by purchasing $1.50 microscope card from bursar, Main campus.

BOTANY

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman and Sophomore Courses

1. General Botany. (4 cred.; all; no prereq.)
2.‡ Elementary General Morphology of Plants. (3 cred.; all; prereq. 1)
3. Forest Botany. (1 cred.; students in agr. and for.; no prereq. Given at Itasca Park)
5.‡ Elementary Plant Histology. (3 cred.; all; prereq. 1)
7.‡ Taxonomy of Flowering Plants. (3 cred.; all; prereq. 1)
21.‡ Elementary Ecology. (3 cred.; all; prereq. 1)
22.‡ Elementary Plant Physiology. (3 cred.; all; prereq. 1 and high school or college chem. or registration in college chem.)

Junior and Senior Courses

61.‡ Thallophytes. (3 cred.; jr., sr.; prereq. 10 cred. incl. 2)
62.‡ Bryophytes and Pteridophytes. (3 cred.; jr., sr.; prereq. 10 cred. incl. 2)
63.‡ Gymnosperms and Angiosperms. (3 cred.; jr., sr.; prereq. 7 and either 2 or 62)
108. Pteridophytes. (5 cred.; sr., grad.; prereq. 18 cred. incl. 7 and 62) (Not offered in 1940-41)
110. Gymnosperms. (5 cred.; sr., grad.; prereq. 18 cred. incl. 7 and 63)
113-114-115.* Advanced Taxonomy of Flowering Plants. (9 cred.; jr., sr., grad.; prereq. 10 cred. incl. 7)
118.‡ Cytology I—Cytoplasmic Phenomena. (3 cred.; jr., sr., grad.; prereq. 15 cred. in biol. incl. Bot. 5 and an elem. course in chem.)
119.‡ Cytology II—Nuclear Phenomena. (3 cred.; jr., sr., grad.; prereq. same as for 118)
120.‡‡ Research Methods in Histology and Cytology. (3 or 5 cred.; jr., sr., grad.; prereq. 118 and 119)
127. Anatomy of Vascular Plants. (5 cred.; jr., sr., grad.; prereq. 18 cred. incl. 5)
131. Field Ecology. (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 21)
132.‡ Ecological Anatomy. (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 5 and 21)
133. Plant Geography of North America. (5 cred.; jr., sr., grad.; prereq. 10 cred. incl. 21)
134.‡ Research Methods in Ecology. (5 cred.; jr., sr., grad.; prereq. 18 cred. incl. 21)
136. Physiology of the Cell. (3 cred.; jr., sr., grad.; prereq. 20 cred. in phys., chem., biochem., or permission of instructor)
140. General Plant Physiology. (3 cred.; jr., sr., grad.; prereq. 22, elem. inorg. chem.)
146.‡‡ Physicochemical Principles and Measurements in Plant Physiology. (3 or 5 cred.; jr., sr., grad.; prereq. 20 cred. in chem. or biochem.)
147.‡‡ Photosynthesis and Other Effects of Radiation. (3 or 5 cred.; jr., sr., grad.; prereq. same as for 146)
148.‡‡ Plant Metabolism. (3 to 5 cred.; jr., sr., grad.; prereq. same as for 146)

* Any quarter may be taken separately, except 115, which requires either 113 or 114 as a prerequisite.

‡ A fee of $1 is charged for this course.

‡‡ A fee of $3 is charged for this course.

154.‡ Applied Spectroscopy in Biology. (3 to 5 cred.; jr., sr., grad.; prereq. 20 cred. in chem. or biochem.)

155.‡ Advanced Spectroscopy in Biology. (3 cred.; jr., sr., grad.; prereq. 154)

197-198-199.‡ Problems. (3 to 5 cred.; jr., sr., grad.; prereq. 20 cred. and consent of instructor)

CHILD WELFARE

Freshman and Sophomore Courses

10. Introduction to Child Study. To orient student with reference to modern movement for nursery schools, parent education, and the study of child development. Some consideration of the kindergarten, Montessori, and mental hygiene movements. (2 cred.; 3rd qtr. fr., soph.; no prereq.)

40. Child Training. Survey of child development followed by a discussion of the practical aspects of the training of young children. Observations in the Nursery School, lectures, and reports. Students cannot receive credit for both 40 and H.E.Ed. 90. (3 cred.; soph., jr., sr.; prereq. Psy. 1-2)

Junior and Senior Courses

80. Child Psychology. A survey of child development with special reference to nursery school and kindergarten education. (3 cred.; jr., sr.; prereq. Psy. 1-2)

82. Later Childhood and Adolescence. Growth, social adjustment, emotional, mental, and personality development. Training and guidance, leisure time activities. (3 cred.; prereq. 40 or 80 or equiv.)

130. Motor, Linguistic, and Intellectual Development of the Child. Lectures, readings, and reports. (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)

131. Personality, Emotional, and Social Development of the Child. Lectures, readings, and reports. (3 cred.; sr., grad.; prereq. 12 cred. in psy. or equiv.)

133-134.† Measurement of Child Personality. The various methods and techniques such as growth records, mental tests, ratings, controlled observations, experiments, etc., used in the study of the young child. Practical exercises on institute records and data. (4 cred.; sr., grad.; prereq. 10 cred. in psy. or ed. psy., and Ed. Psy. 60, or Biom. 101, and permission of instructor)

140. Behavior Problems. Nature and origin of behavior difficulties. Emphasis upon young children and the relation between early behavior trends and later maladjustment. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)

141-142. Practicum in Behavior Problems. Clinic and field work in the study and treatment of behavior problems. (Cred. ar.; sr., grad.; prereq. 140 and permission of instructor)

170. Parent Education. History and survey of present programs in parent education and adult education. Analysis of child development and training literature in relation to the preparation of materials for study groups. Lectures, discussions, and reports. (2 cred.; sr., grad.; prereq. 15 cred. in child welfare or home econ., or ed., or psy., or soc., or prev. med.)

190. Principles of Mental Measurement of Young Children. Mental test methods and their interpretation. Lectures, demonstrations, readings, and reports. (2 cred.; sr., grad.; prereq. 12 cred. in psy., ed. psy., or soc.)

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 is charged for this course.

DAIRY HUSBANDRY

The Dairy Production Curriculum is suggested for those students interested in dairy cattle in preparation for (1) dairy farming, (2) technical and extension work pertaining to dairy cattle or dairy farming, and (3) additional graduate study in this field.

The Dairy Products Curriculum is suggested for students interested in the manufacture or distribution of dairy products, either (1) as a plant operator, (2) in technical or extension work in this field, or (3) for graduate study in some phase relating to the dairy industry.

1. **Technical Agriculture:** Recommended courses for majors in:
   Dairy Production: Agr. Biochem. 6; Agr. Econ. 40, 80, 102, 103, 104; Agr. Eng. 40; Agron. 21, 23, 31; An. Husb. 3-4, 112, 113; Dy. Husb. 2, 51, 101, 103, 104, 105, 106, 116, 117; Geol. 8; Pl. Path. 1; Poult. Husb. 1; Soc. 1; Vet. 50-51-52.
   Dairy Products: Agr. Biochem. 6, 101, 102, 103; Agr. Econ. 25, 40, 50, 131, 140, 141; Agr. Eng. 24, 25, 40, 41, 70; Dy. Husb. 2, 3, 4, 10, 51, 101, 105, 106, 110, 111, 112, 113, 114, 115; Econ. 28.
2. **Science Specialization:** Consult adviser.

Freshman and Sophomore Courses

1. Elements of Dairying. Lectures and demonstrations with opportunity for laboratory practice. The history and development of the dairy industry. The origin and classification of domesticated cattle. History and characteristics of the dairy breeds of cattle. Milk, its composition, food value, chemical and physical properties with relation to the handling of milk and the manufacture of milk products. Dairy arithmetic. Two trips to dairy plants are required. (3 cred.; prereq. entrance cred. in chem. or Inorg. Chem. 1 or 9)
2. Dairy Bacteriology. Lectures and laboratory exercises. Types of milk organisms; the contamination of milk and how prevented; relation of milk to the public health; the bacteriology of dairy products. (3 or 5 cred.; 3 cred. for lect., 2 cred. for lab.; soph., jr., sr.; prereq. Bact. 53) (Lecture taken separately only on permission of instructor)
3. Testing Dairy Products. The use of the Babcock test and other tests common to dairy products plants. (2 cred.; prereq. 1)
4. Dairy Products Practice. A study of factory methods. Includes a minimum of one month's practical experience in a plant handling dairy products in a factory way. Reports and records of work done required. (3 cred.; soph., jr., sr.; prereq. 1)
9. Dairy Cattle Judging. A study of the type and breed characteristics of dairy animals and the relation of form to function in the dairy cow. (1 cred.; soph., jr., sr.; no prereq.)
10. Dairy Products Judging. Laboratory practice in the grading of milk and milk products including cream, ice cream, cheese, butter, and concentrated milks. (1 cred.; soph., jr., sr.; prereq. 1)

Junior and Senior Courses

51. Market Milk. Lectures and laboratory work. Classes of market milk; transportation and distribution; sanitary inspection; equipment and operation of plants; problems of public control. (3 cred.; jr., sr.; prereq. 1, 2)

52. The Dairy Industry. Composition of milk; milk constituents and their uses in dairy manufacturing and as food; Babcock test; sanitary handling of milk and dairy products on the farm and in the plant; breeds of dairy cattle, housing and management. (Offered in alternate years, spring quarter 1940, etc. Alternate with Fundamentals of Livestock Production.) (3 cred.; agr. eng. only; no prereq.; I TThS; 100HH(UF).)

101. Milk Production. Problems of the dairy farmer, such as characteristics and adaptation of dairy breeds; selection and management of dairy herd and size; calf raising, dairy barns. (5 cred.; jr., sr.; prereq. 1)

103. Dairy Stock Feeding. Application of principles of nutrition to feeding the dairy cow and growing young animals. Feeding standards; characteristics of various feeding stuffs; formulation of rations. (3 cred.; sr.; prereq. 101, An. Husb. 56)

104. Dairy Stock Selection. Selection by type, pedigree, and production records. (2 cred.; jr., sr.; prereq. 9, 101 or parallel)

105. Seminar I. Special investigation and study of selected topics. Study of dairy literature. Preparation of bibliographies. Each student presents papers and reports on assigned subjects and reviews recent scientific investigations in dairy husbandry. (1 cred.; sr.; prereq. 3 courses in dairy husb.)

106. Seminar II. Continuation of 105. (1 cred.; sr.; prereq. 105)

110. Dairy Products: Ice Cream and Frozen Desserts. The manufacture of ice cream with special reference to the chemical and physical processes involved. Organization, construction, equipment, and operation of such factories. Laboratory exercises and lectures. (3 cred.; jr., sr.; prereq. 1, 3)

111. Dairy Products: Butter. The manufacture of butter with special reference to the chemical and bacteriological processes involved. Organization, construction, equipment, and operation in such factories. Laboratory exercises to illustrate these processes. (3 cred.; jr., sr.; prereq. 1, 2, 3)

112. Dairy Products: Cheese. The manufacture of cheese, with special reference to the chemical, bacteriological, and physical processes involved. Organization, construction, equipment, operation of such factories. Laboratory exercises and lectures. (3 cred.; jr., sr.; prereq. 1, 2, 3)

113. Technical Control. Lectures and laboratory. Chemical and bacteriological laboratory methods used in technical control of milk and its products. Use of Monjonnier tester, cryoscope, and bacteriological control methods. (3 cred.; sr.; prereq. 2, 111 or 112)

114. Milk By-Products. The manufacture of condensed milk, dry milk, casein, and other milk by-products with special reference to the physical processes involved. Laboratory exercises and lectures. (3 cred.; jr., sr.; prereq. 1, 3)

115. Advanced Dairy Bacteriology. Investigations of specific problems on the bacteriology and mycology of milk and dairy products. (3 cred.; sr.; prereq. 2, 111 or 112)

116. Milk Secretion. Lecture assignments covering the anatomy and physiology of milk secretion and factors influencing the quality and quantity of milk. (3 cred.; sr.; prereq. Physiol. 9 cred. and Agr. Biochem. 103)

117. Dairy Cattle Breeding. Application of the principles of genetics to the improvement of dairy cattle. Evaluation of breeding animals and formulation of breeding plans. (3 cred.; jr., sr.; prereq. 101, 104, Agron. 31)

(For courses in Dairy Chemistry see Agricultural Biochemistry 103, page 67.)

ECONOMICS

SCHOOL OF BUSINESS ADMINISTRATION

For courses and course descriptions see the Bulletin of the School of Business Administration.

See also courses in Agricultural Economics.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

COLLEGE OF EDUCATION

For courses and course descriptions see the Bulletin of the College of Education.

EDUCATIONAL PSYCHOLOGY

COLLEGE OF EDUCATION

For courses and course descriptions see the Bulletin of the College of Education.

ENGLISH

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman and Sophomore Courses

21-22-23. Introduction to Literature. (15 cred.; all; prereq. Rhet. 1, 2, 3)

37-38-39.§ Twentieth-Century Literature. Readings in British and American literature since the 1890's, arranged by types of discourse. 37f: The literature of opinion, biography, travel, etc., with some reading in the short story; 38w: poetry and drama; 39s: the novel since Thomas Hardy. This course is intended, as a general introduction to the intelligent reading of literature, for students in all colleges, and not particularly for those meaning to specialize in English. (9 cred.; soph., jr., sr.; prereq. Rhet. 1, 2, 3)

For additional courses and course descriptions see the Bulletin of the College of Science, Literature, and the Arts.

ENTOMOLOGY AND ECONOMIC ZOOLOGY

Courses in this department are closely correlated with those offered in the Department of Zoology of the College of Science, Literature, and the Arts.

Recommended for majors in entomology: Ent. 5, 14, 51, 52, 55, 64; Pl. Path. 1; Zool. 21, 53, 83.

Recommended minors: agronomy, biochemistry, horticulture, plant pathology.

Whether the chosen curriculum is that of Technical Agriculture or of Science Specialization, major students in entomology are required to take 15 credits in either German or French prior to graduation.

Students wishing to major in economic zoology should consult the special curricula in Wildlife Management (p. 25), and in Game Management (p. 39).

§ Students may enter any quarter.

Freshman and Sophomore Courses

5. Economic Entomology. The life histories, habits, and methods of control of the insect pests of orchard, field, and garden. Laboratory work in the determination of the more important forms. (5 cred.; soph., jr., sr.; prereq. Zool. 14-15 or equiv.)

13. Field Zoology. For forestry freshmen at Itasca Park. (1 cred.; no prereq.)

14-15-16. Principles of Beekeeping. History of beekeeping industry. Life history, morphology, physiology, and reproduction of the honey bee. Colony development. Races of bees. Bee equipment. Apiary and shop management. Wintering, disease control. Grading and marketing bee products. (2 to 6 cred.; no prereq.)

17-18-19. Beekeeping Practice. Laboratory, shop, and apiary work. External and internal anatomy of honey bee. Assembling equipment. Installing package bees, requeening, making increase. Preparation of combs and extracted honey for market. (1 to 3 cred.; prereq. 14-15 or parallel)

20. Advanced Beekeeping. Special work for students specializing in beekeeping, adapted to the needs of the individual student. (2 to 6 cred.; prereq. 14 to 19 and 5 cred. in ent.)

Junior and Senior Courses

51.*† Introductory Parasitology. An elementary course dealing with parasitic Protozoa, worms, and arthropods and their relation to diseases of man and animals. (5 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.)

52.*† Introductory Entomology. General morphology, life histories, habits, and classification of insects. (5 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.)

55. Entomological Techniques. Practical laboratory instruction in mounting, preservation of insect larvae; preparation of microscopic mounts of minute insects; labeling, classifying, and cataloging specimens of insects for scientific study. (9 hrs. lab., 3 cred.; jr., sr.)

56. Forest Entomology. Lectures and laboratory work dealing with the principles of controlling insects that attack trees and forest products, together with a consideration of the life history and habits of important representative species. (3 cred.; jr., sr.; prereq. Zool. 14-15 or equiv.)

61. Forest Zoology. Lectures, laboratory, and field work. Habits and life histories of forest vertebrates. Relations of vertebrates to forest environments and their effects on these environments. Collection and care of specimens. (3 cred.; jr., sr.; prereq. Zool. 1-2-3. Given at Cloquet)

62. Wildlife Conservation Principles and Administration. A general course dealing with principles and practical problems met in administering the wildlfe resources, and with the state and federal agencies which are involved. Public attitudes toward this resource, and legislation are considered. (3 cred.; jr., sr.; prereq. Zool. 1-2-3 or equiv. Given at Itasca Park.)

64. Economic Vertebrate Zoology. Lectures and library work. Deals with the various vertebrates of Minnesota, their habits and economic status, and means by which their numbers may be controlled. (3 cred.; jr., sr.; prereq. Zool. 1-2-3 or equiv.)

114. Apiculture. Problems of bee management, disease control, wintering, bee breeding, processing, and marketing bee products. Given in the form of

* Offered on the Minneapolis campus.
† Open to sophomores on petition.

seminar discussion and laboratory and field practice. (3 cred.; jr., sr.; prereq. 9 cred. in ent.)

117-118-119.* Animal Ecology. General ecology with special reference to the insects of Minnesota. Frequent field trips. Lectures, laboratory, and field work. (9 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)

120. General Ecology of Insects. Ecology with special reference to insects, their distribution, natural control, and related problems. Lectures, laboratory, and field work. (3 cred.; jr., sr.; alternative to 119, or both may be taken; prereq. 117-118)

125-126-127.* Advanced General Entomology. Advanced work in the lines of morphology and classification of insects with lectures on the history of entomology. Lectures and laboratory. (9 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)

139-140. Histology and Development of Insects. Lectures and laboratory work on the histology, embryonic and postembryonic development of insects. Individual work along these lines is available to properly qualified students in Course 197. (9 cred.; jr., sr.; prereq. 125-126-127 or equiv.)

141-142. Insects in Relation to Plant Diseases. A study of the principal insect vectors and their habits, types of insect injuries affecting health of plants, modes of insect transmission and dissemination of plant diseases, the methods of rearing and handling the carriers. Of interest to students in entomology, plant pathology, horticulture, forestry, and agronomy. (6 cred.; jr., sr.; prereq. 8 cred. in ent. or plant path.)

144-145-146.* Animal Parasites and Parasitism. Lectures and laboratory work. Origin and biological significance of parasitism; structure, life history, and economic relations of representative parasites. Second term devoted primarily to the relation of insects to diseases of man and animals. (3 to 9 cred.; jr., sr.; prereq. Zool. 9 cred.)

150. Introduction to Aphidology. The biology and taxonomy of Aphididae. (3 cred.) (Given in alternate years. Offered in 1940-41).

161. Waterfowl and Upland Game Birds. Life histories, habits, environmental requirements, and management of the North American species of game birds. Lectures, laboratory and field work. (3 cred.; jr., sr.; prereq. Zool. 46-47 or equiv.)

163. Mammalogy. Distinguishing characters and life histories of the various mammal groups, particularly those represented in the state. Consideration is given to the possibilities of fur farming in case of certain species. (3 cred.; jr., sr.; prereq. Zool. 22)

165. Game Management. Theory and practice of game management, including a consideration of its history and mechanism; the properties of game populations; the factors that make up game environments; methods of recognizing and measuring these properties and factors; and management measures for the various species. (3 cred.; jr., sr.; prereq. 62, 64, 163)

166. Methods in Field Zoology. Lectures and laboratory work. Frequent field trips. Use of field data, range mapping, censuses, surveys, preparation of indices and life equation tables, field investigation techniques. (3 cred.; jr., sr.; prereq. 163, 165)

* Offered on the Minneapolis campus.

175. Insecticides and Their Action. A study of the chemical composition, the physical properties, and the physiological action of standard, of little known, and of new insecticides. (4 cred.; sr.; prereq. inorg. and org. chem.)
176. Advanced Economic Entomology. A critical consideration of the principles of insect control and the history of their development. (3 cred.; sr.; prereq. 5 or 56, Zool. 117-118-119 or equiv.)
197. Introduction to Research. Preparation for investigational work in lines of entomology, parasitology, ecology, economic zoology, or beekeeping. Advanced laboratory, field, and library work; training in preparation of bibliographies and manuscripts; special problems. Summer work should be planned when possible. (5 or more cred.; sr.; prereq. work as prescribed by the division)

FORESTRY

Freshman and Sophomore 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. (3 cred.; no prereq.)
2. Field Dendrology. Trees and shrubs found in Itasca Park, with special reference to identification by means of gross characters. (1 cred.; no prereq.)
3,4. Dendrology. The forest trees of the United States; their classification, characteristics, and range, with special attention to prominent and constant characteristics. Lectures, assigned reading, laboratory. (3 cred. for Course 3 and 4 cred. for Course 4; no prereq.)
5. Field Silviculture. Largely field work designed to give the student a working knowledge of the forest. Includes silvicultural study of the types found in the north woods and the general principles underlying silvicultural reconnaissance. (2 cred.; no prereq. Given at Itasca Park)
6. Field Mensuration. Largely field work. Includes elementary work in tree measurements, timber cruising, stem analysis, and the study of the measurements of stand, volume, and yield; use of compass, pacing and mapping. (1 cred.; no prereq. Given at Itasca Park)
7-8-9. Forest Mensuration. The basic principles underlying the determination of the volume of forest products, and trees, stands, and forests; the growth and yield of trees, stands, and forests; and the elementary methods of compiling and analyzing numerical data. (9 cred.; all; prereq. 6, Math. 1 and 6)
10. Farm Forestry. The place of forestry in land-use planning. The economic status of the farm woodlot. The establishment and care of woodlots and windbreaks. Forest influences with special reference to soil erosion control. The use of wood on the farm. (3 cred.; not open to students majoring in forestry; no prereq.)
11. Camp Management. Instruction and experience in camp management. Each student shall be placed in charge of the summer camp under faculty supervision for a short period of time. (1 cred.; no prereq. Given at Itasca Park)
20. Grazing. History of grazing in the West. Kind of stock used. Forage plants. Regulations and methods of handling stock on the national forests. Range management and protection. Lectures and reading. (3 cred.; soph., jr., sr.; no prereq.)

49. House and Furniture Woods. The woods used in house construction and finish, furniture, etc. Their identification and properties. Lectures and laboratory. (2 cred.; soph., jr., sr.; not open to students majoring in forestry; no prereq.)

Junior and Senior Courses

53-54. Wood Structure and Identification. Structure, classification, and identification of the domestic commercial woods. Lectures, reading, laboratory. (6 cred.; jr., sr.; prereq. 3, 4)

56. Forest Products. An introductory survey of the products of forests other than lumber, such as naval stores, tannins, wood pulp, paper, etc. Lectures, reading, reports. (3 cred.; jr., sr.; no prereq.)

57. Wood Utilization. Production, distribution, qualities, amounts, and prices of both foreign and domestic hardwoods and softwoods. Lectures, reading, reports. (3 cred.; sr.; prereq. 53-54)

58. Lumber Merchandising and Grading. A study of the lumber industry, lumber associations, lumber grades, lumber prices, and lumber distribution. (3 cred.; sr.; prereq. 53-54, 152)

62-63. Forest Problems. Elementary methods of analyzing quantitative data and the preparation of a technical report on some phase of forestry work. This report may include the results of some original investigation, or it may consist in collecting and arranging facts and the drawing of proper conclusions from these facts. (4 cred.; sr. classification)

101. Advanced Dendrology. A continuation of Course 3, 4 with special studies in classification and distribution of the timber species of the world. (3 cred.; jr., sr.; prereq. 3, 4)

111-112. Advanced Forest Mensuration. Continuation of Course 11 with special emphasis on the construction of alignment charts, and statistical methods as applied to problems in forest mensuration. (6 cred.; sr.; prereq. 7-8-9)

113. Wood Pulp and Paper. Cellulose and its properties. Methods of production of wood pulp and paper products. Lectures, reading, reports. (3 cred.; jr., sr.; prereq. 53-54, Chem. 3 or 10)

114. Mechanical and Physical Properties of Wood. Derivation and application of the formulas used in determining stresses in wood. Laboratory methods in timber physics. Lectures and outside reading. (3 cred.; jr., sr.; prereq. 53-54, Math. 7)

115-116. Mechanical and Physical Properties of Wood. Study of the mechanical and physical properties of wood. Laboratory, reading, and reports. (6 cred.; sr.; prereq. 114)

119. Advanced Wood Structure I. The microtechnique of woody tissues. Lectures, reading, and laboratory work. (4 cred.; sr.; prereq. 53-54)

125. Wood Preservation. Lectures and collateral reading upon the history, development, and methods of wood preservation. Different systems now in use and preservatives used. (3 cred.; jr., sr.; prereq. 53-54)

126. Silvics. The fundamentals forming the basis of silviculture with special attention to the silvics of the important tree species. Lectures, readings, and required papers. (3 cred.; jr., sr.; no prereq.)

127. Silviculture. A study of the general principles underlying the art of silviculture, and a brief study of European methods as applied to American conditions. (3 cred.; jr., sr.)

128. Silviculture Laboratory. Nursery practice and field planting. Preparation of a silvicultural plan for a small tract of timber and the application of that plan. (6 cred.; jr., sr.; prereq. 127)
129. American Silvicultural Practice. A study of the silvicultural methods now being employed in the United States and the probable results of the application of European methods. Reading course. (3 cred.; jr., sr.; prereq. 126 and 127)
130. Forest Valuation. The business of forest management. A study of the different factors entering into the valuation of forest property. (5 cred.; jr., sr.)
131. Forest Policy and Administration. Policy of the United States and the states toward the utilization of the public forest resources. Policy of other owners toward forest resources controlled by them. Administration of the national and state forests. (5 cred.; jr., sr.)
132. Forest Regulation Laboratory. Field work. The collection of the data necessary for a forest working plan. Includes the making of the timber estimates, growth studies, and maps necessary to a forest working plan. (6 cred.; jr., sr. Given at Cloquet)
136. Forest Economics. The place of the forest in the productive utilization of land; past and present markets and source of supply of timber and timber products, particularly with reference to the present situation in North America. (3 cred.; jr., sr.; prereq. Agr. Econ. 2)
137. Seeding and Planting. A study of the principles of seeding and planting and the various methods used in the different regions of the United States. (3 cred.; jr., sr.; prereq. 126 or 127)
140. Forest Working Plans. A study of methods of regulating and allotting the cut from a forest under management. Preparation of a working plan. Lectures and reports. (3 cred.; sr.; prereq. 128, 132)
141. Principles of Silvics. A study of the principles underlying the silvical characteristics of trees and the reactions of trees to their environments. (3 cred.; jr., sr.; prereq. 126)
142. Wood Chemistry. Wood composition, the constitution of wood components, the reactions of wood components and derivatives, and the analysis and chemical technology of wood and wood products. (3 cred.; jr., sr.; prereq. Org. Chem. 52, For. 53-54)
143. Forest Recreation. The recreational use of the forest from an economic, sociological, and technical point of view. Administrative and technical problems arising from recreational use. (3 cred.; jr., sr.)
144. Forage and Browse Plants. A study of the more important forage and browse plants of the United States; their identification, nutritive value, palatability, growth habits, and distribution. Includes a general study of forage types, the classes of forage, carrying capacities, and methods of ecological investigation. (3 cred.; jr., sr., grad.; prereq. Bot. 113 and Pl. Path. 7)
151. Logging. The principles and general methods of logging in the different forest regions of the United States, and the modifications required by forest management. Outside reading, motion pictures, and reports. (3 cred.; jr., sr.)
152. Wood Seasoning. The theory and practice of air seasoning and kiln drying of wood. (3 cred.; jr., sr.; prereq. 53-54)
155. Forest Protection. The protection of forests from fire—fire prevention and fire suppression. The causes of forest fires and their elimination, climate and fires, fire fighting and fire legislation. (3 cred.; jr., sr.; prereq. 127)

220-221-222. Major Report. Independent study and the preparation of a comprehensive report on some phase of general forestry, range management, or game management. (2 cred. per qtr.; grad.) (Not offered in 1940-41)

223-224-225. Literature Seminar. Assigned topics with special reference to current forestry problems. Critical and historical review of current forestry literature. (1 cred. per qtr.; grad.)

GENERAL COLLEGE

2-3. Practical Applications of Psychology.

26-27-28. United States in World Civilization.

29. The Functions and Problems of Government. Class meets three times a week.

30. The American Citizen and His Government. Class meets three times a week.

31. International Relations. Class meets three times a week.

34-35. Contemporary Society.

49-50-51. Social Trends and Problems. Class meets three times a week.

55-56-57. Literature Today.

73-74-75. Current Affairs I. Class meets twice a week.

88,89,90. Physical Science Studies. Class meets five times a week each quarter.
88—Part A. Energy and Matter.
89—Part B. The Nature of Chemistry.
90—Part C. Technology, Astronomy, and Sound.

101-102-103. Human Biology. Class meets three times a week each quarter.

GEOLOGY AND MINERALOGY

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman and Sophomore Courses

1-2.† General Geology (Dynamic and Historical). (6 cred.; all; no prereq.)
A-B.‡ General Geology Laboratory (Dynamic and Historical). (4 cred.; all; with or after 1-2)

1-3.† General Geology (Dynamic and Economic). (6 cred.; all; no prereq.)
A-C.‡ General Geology Laboratory (Dynamic and Economic). (4 cred.; all; with or after 1-3)

8.§ Introductory Geology. (5 cred.; all; no prereq.)

23-24.†‡ Elements of Mineralogy. (8 cred.; soph., jr., sr.; prereq. a course in chem.)

For additional courses and course descriptions see the Bulletin of the College of Science, Literature, and the Arts.

GERMAN

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman and Sophomore Courses

1. Beginning German A. (5 cred.; all; no prereq.)

2. Beginning German B. (5 cred.; all; prereq. 1 or one year of high school German)

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

§ Not open to students who have had Course 1. Does not satisfy the Junior College requirement for science. Cannot be followed by Course 1 for credit. May be followed by Course 2 with instructor's permission.

3. Beginning German C. (5 cred.; all; prereq. 2 or two years of high school German)
4. Intermediate German. (5 cred.; all; prereq. 3 or three years of high school German)

24a-25a-26a.† Chemical German. (12 cred.; no prereq.)

30-31-32. Medical German. (9 cred.; prereq. 3)

Two options are permitted for requirements in Science Specialization Curriculum: 1-2 (15 cred.) or 24a-25a-26a (12 cred.)

For additional courses and course descriptions see the Bulletin of the College of Science, Literature, and the Arts.

HISTORY AND PHILOSOPHY OF EDUCATION

COLLEGE OF EDUCATION

For courses and course descriptions see the Bulletin of the College of Education.

HOME ECONOMICS

Freshman and Sophomore Courses

1. Choice and Care of Clothing. A consideration of the problems involved in the selection and buying of clothing. A study will be made of the characteristics of certain textile materials, and their suitability for various uses. (4 cred.; fr.; no prereq.)
2. Introduction to Textiles. A study of textile fibers and their properties as related to fabric properties; yarn and fabric structure and design; problems in the selection of textile materials for clothing and household furnishings. Laboratory work with representative fabrics. (3 cred.; for S.L.A., Bus. Adm., and Art Ed.; no prereq.)
3. Clothing Construction A. Laboratory practice in designing and planning, cutting, fitting, and applying the suitable techniques in making garments of cotton and silk or rayon fabrics; care and use of sewing machines; interpretation and adaptation of commercial patterns. Construction problems will include a child's garment. (3 cred.; soph.; prereq. 1)
4. Clothing Construction B. Laboratory practice in costume modeling; preparation of dress form; application of tailored technique to silk, rayon, or wool fabrics; garments constructed will include a remodeling problem. (3 cred.; soph., jr.; prereq. 3, 21, and home practice in clothing construction)

10. Introduction to Home Economics. A study of the environment of the new student, emphasizing the educational and vocational problems involved. (2 cred.; 1st qtr. fr. only; no prereq.)

15. Personal Relationships. This course is concerned with a study of human relationships. Practical situations involved in everyday living will be discussed. (2 cred.; fr.; no prereq.)

20. Introduction to Related Art. A study of the art problems which are involved in the everyday life of the student. (4 cred.; fr.; no prereq.)

21,22. Color and Design I, II. The principles of color and design related to such problems as selecting and designing costumes and selecting, arranging, and designing house furnishings. (3 cred. for each course; prereq. 20 for 21, 21 for 22)

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

23. Advanced Design. An intensive study of design and its applications. The aim is facility in designing. (3 cred.; soph., jr.; prereq. 22)
24. Problems in Home Planning and Furnishing. Exteriors and interiors studied for their design and suitability. An analysis of typical floor plans. Problems in selecting and arranging household furnishings. (5 cred.; soph.; prereq. 20)
25. Design Applied to Crafts. Principles of design and color harmony applied in various crafts. Articles are planned to relate to definite dress and home furnishing problems. (3 cred.; prereq. 22)
26. Decorative Needlework and Other Crafts. Applied design in needlework the major interest. Other crafts are given consideration. (3 cred.; prereq. 22)
30.* Introduction to Nutrition. A course designed for students wishing a discussion of the application of the principles of nutrition to the selection of food. (2 cred.; no prereq.) (Not open to home econ. students)
31. Introduction to Nutrition. The application of nutrition principles to food selection of college students. Includes typical student problems such as buying meals, and the relation of food to the promotion and maintenance of health. (3 cred.; fr.; no prereq.)
33. Nutrition I. (1) The nature and properties of groups of compounds occurring in the cell and in food, (2) digestion, and (3) absorption. (4 cred.; soph., jr., sr.; prereq. Agr. Biochem. 4, Physiol. 4)
34. Nutrition Problems. A consideration of the nutrition problems most commonly met by adults and children in typical families. (4 cred.; 3rd qtr. soph., jr., sr.; prereq. 31, 40, physiol. or human biol.)
40. Food Preparation. The development of technique and the application of fundamental science principles to cookery processes. The establishment of good standards for food products. (5 cred.; not open to fr.; prereq. 2 qtrs. chem.)
41. Food Management and Marketing. Determination and study of the management factors involved in the food problems of the homemaker and consumer. A study of the quality and cost of foods on the market. Laboratory. (5 cred.; soph., jr., sr.; prereq. 31, 40)

Junior and Senior Courses

50. Textiles. A lecture and laboratory course dealing intensively with textile materials—fibers and fabrics, with special emphasis upon the selection of household fabrics; textile problems of the consumer-buyer. (3 cred.; jr., sr.; prereq. 1)
53. Advanced Clothing. Laboratory course in the designing, modeling, and construction of silk or wool costume, including millinery; one problem to test acquired speed. (3 cred.; jr., sr.; prereq. 4, 22, 50)
54. Problems in Clothing Construction. Laboratory work will deal with alteration of ready-made garments, fitting, pattern modification, and other construction processes. (3 cred.; jr., sr.; prereq. 53 or permission of instructor)
55. Related Art Problems. Problems worked out relating to costume and house furnishing design. (3 cred; jr., sr.; prereq. 22 or 56)

56A-56B. Applications of Color and Design. The principles of design and color applied to the selection, cost, and arrangement in the fields of costume, dress, and household fabrics and household furnishings. (3 cred. each; not open to home econ. students; no prereq.; courses must be taken in the sequence indi-

* Offered on the Minneapolis campus.

cated. Written permission must be obtained from the Junior College office, 106 Folwell Hall)

61. Quantity Cookery. Application of the principles of cookery to large quantity preparation; planning of meals for dining hall, cafeteria, and tearoom; a study of standardized formulae and production costs. (4 cred.; jr., sr.; prereq. 40)
62. Institution Experience A. Experience in the minor problems of cafeteria, dining hall, and tearoom administration. (3 cred.; jr., sr.; prereq. 40)
63. Institution Experience B. Additional experience in preparation of food for large groups, and individual problems in organization and administration. (3 cred.; jr., sr.; for institution management majors only; prereq. 61, 62)
64. Institution Buying. Problems involved in the purchasing and use of foods and equipment for the institution. (4 cred.; jr., sr.; prereq. 61 or parallel, 62 or parallel)
70. Advanced Food Preparation. This course involves an intensive study (with laboratory work) of one of the following problems: cooking meat or fish and poultry; preservation of fruits and vegetables or meats and poultry; cakes; bread. (3 cred.; prereq. Agr. Biochem. 4, H.E. 40)
71. Demonstrations. The aim shall be to familiarize the student with the purposes and techniques of demonstrations in the various fields of home economics with special reference to their application in the field of business. (1 cred.; open to 3rd qtr. jr. and sr.) (Not offered in 1940-41)
75. Dietetics Laboratory. (1) Food values, (2) problems relating to the selection of food under conditions of health and under such pathological conditions as are treated by diet. (2 cred.; jr., sr.; prereq. 34 or 170)
76.* Nutrition. The application of the principles of nutrition as applied to special groups. (3 cred.; not open to home econ. students; prereq. permission of instructor)
79. Selected Problems of Dietitians. A selected group of problems related to the work of the dietitian involving discussions, assigned readings, and field trips. (3 cred.; jr., sr.; prereq. 170 or equiv.)
84. Junior-Senior Problems. Independent work will be required on a problem selected under guidance. Open only to those persons who are taking Home Management Laboratory *in the same quarter*. (2 cred.; prereq. permission of instructor under whom the student wishes to work)
85. Home Management: Operation and Maintenance, Lectures. Discussion of the managerial aspects of homemaking with special emphasis upon problems involved in the use of time, energy, and money. (3 cred.; jr., sr.; prereq. 40, H.E. Ed. 90 or C.W. 40 or parallel)
86. Home Management: Operation and Maintenance, Laboratory. Actual experience in a home management house with various household management problems including the care and development of a child of pre-school age. (4 cred.; jr., sr.; prereq. 85 or parallel, 40, 185 parallel, H.E. Ed. 90 or C.W. 40)
98. Home Economics Extension. Study of the objectives, organization, and functioning of home economics extension service in Minnesota and elsewhere. Observation of work in the Twin Cities. Discussion and conferences. (3 cred.; sr.; prereq. H.E. Ed. 91 or parallel)
102. Advanced Textiles. An intensive study of textile materials with special refer-

* Offered on the Minneapolis campus.

ence to the following: nature of the raw materials; economic, chemical, and physical applications involved in their manufacture and use; methods and significance of physical testing. (3 cred.; jr., sr.; prereq. 50, Agr. Biochem. 4, Agr. Econ. 3 or parallel)

107. Textile Analysis. Problems and application of quantitative methods in textile analysis with special reference to establishing standards for fabrics. (3 cred.; jr., sr.; prereq. 102, Agr. Biochem. 2)

115. Clothing Economics. A study of the economic aspects of clothing which directly or indirectly affect the consumer. (2 cred.; jr., sr.; prereq. 50, Agr. Econ. 3)

120. Art History and Appreciation. The historical development of painting, sculpture, architecture, decoration, furniture, and costumes, studied with special emphasis on design and influence upon modern styles. (3 cred.; Senior College and grad. only)

121. Textile Design. A study of historic and modern textile designs with special reference to the technique and materials employed in their production and to their adaptations for present-day use in the home and in dress. (3 cred.; jr., sr.; prereq. 50, 55, 120)

122. Advanced Interior Design. Special problems of small house interiors involving execution of elevation drawings. Studies and reports on topics of practical and historical interest. Actual materials will be used as far as possible. (3 cred.; jr., sr.; prereq. 180, 120 or permission of instructor)

125. Advanced Costume Design. Relation of color and texture to dress design. Study of figure construction. Studies and reports on assigned topics. Laboratory work with fabrics. Designs in pencil and water colors. (3 cred.; jr., sr.; prereq. 4, or permission of instructor, 22; 26 recommended)

142. Experimental Cookery. An intensive study of problems in foods and food preparation with individual laboratory problems. (3 cred.; jr., sr.; prereq. 40, Agr. Biochem. 4)

146. Special Food Problems. Individual problems in foods and food preparation. (3 cred.; sr.; prereq. 142)

147. Special Food Problems. The same as Course 146 with additional problems. (5 cred.; sr.; prereq. 142)

163. Institution Management Problems. Problems affecting the efficient administration of the institution; departmental organization, operation, maintenance; employment problems; business policies. Field trips to various types of institutions. (3 cred.; sr.; prereq. 61, 62, 64 or parallel)

170. Nutrition of the Family. The fundamental principles of human nutrition and their application in the promotion and maintenance of optimal health of the family. (3 cred.; jr., sr.; prereq. 31, 40, Agr. Biochem. 4, Physiol. 3 cred.)

171. Child Nutrition. Lectures, discussions, and field work dealing with the principles of child nutrition and with the formation of desirable food habits. (3 cred.; jr., sr.; prereq. 170, H.E. Ed. 90 or C.W. 40)

173. Nutrition in Disease. A study of the fundamental principles involved in using diet in the treatment of certain diseases. (3 cred.; jr., sr.; prereq. 170, 175 also advised)

175. Nutrition II. A study of tissues and tissue metabolism as well as work on blood, milk, and urine. (4 cred.; jr., sr.; prereq. 33)

176. Advanced Nutrition. Selected quantitative methods applicable to investigations relating to digestion and metabolism. (4 cred.; jr., sr.; prereq. 175 or parallel, Agr. Biochem. 2)

177. Digestion and Metabolism. An intensive study of problems relating to digestion and metabolism involving lectures, readings, and laboratory work. (3 cred.; jr., sr.; prereq. 175)
178. Clinical Problems in Nutrition. The application of nutrition information to problems in health and disease involving assigned readings, discussions, and experience in a clinic. (2 cred.; jr., sr.; prereq. 75 or parallel, 170, 175 or parallel)
179. Readings in Nutrition. A course designed to give intensive experience in the use of nutrition books and periodicals, involving assigned readings, oral and written reports. (2 cred.; jr., sr.; prereq. 170)
180. Home Planning and Furnishing. A study for the homemaker who aims at more intelligent planning and furnishing of the home. House plans and the selection and arrangement of equipment and furnishings from the point of view of beauty and good home management. (5 cred.; jr., sr.; prereq. 55; 120 recommended)
185. Family Relationships. A consideration of the factors that promote security, stability, and satisfaction in the immediate family group; and the responsibilities of the family in its relationship to community life. (2 cred.; jr., sr.; prereq. 86 or parallel, H.E. Ed. 90, or C.W. 40)
186. Problems in Income Management. An intensive study of problems relating to individual and family budgets. Readings, discussions, and field work. (3 cred.; prereq. 85 or parallel, 86, 170 or equiv., Agr. Econ. 126 or parallel)
195. Development of Home Economics. A discussion of the development of home economics with special emphasis upon current problems. (2 cred.; sr.; permission of instructor)

HOME ECONOMICS EDUCATION

COLLEGE OF EDUCATION

Junior and Senior Courses

90. Child Training. A brief study of the physical and mental development of the child is followed by a discussion of the problems of training small children. Emphasis is placed on the preschool child. Lectures, observations in the Nursery School, and reports. (3 cred.; jr., sr.; prereq. Psy. 1-2)
91.‡ Observation, Materials, Teaching in Home Economics. The psychological bases for teaching; investigation and collection of facts on teaching situations through observation and participation in school activities; study of teaching materials and method. (5 cred.; jr., sr.; prereq. H.E. 4, 34 (or 170), 41, 50, 55; Psy 1-2; Ed. 51A, 51C; parallel H.E. Ed. 93)
92. Teaching Problems in Home Economics. Reports, discussion, conferences on the planning of units, teaching procedures, illustrative materials, and equipment. (2 cred.; sr.; prereq. H.E. Ed. 91, 93 parallel; H.E. Ed. 94 and 192)
93.‡ Supervised Teaching in Home Economics. Observation, participation, and actual teaching experience under supervision in different home economics situations and on different age levels. (3 cred.; jr., sr.; prereq. H.E. 4, 34 (or 170), 41, 50, 55; Psy. 1-2; Ed. 51A, 51C; parallel H.E. Ed. 91. Students must have received a grade of C or higher in H.E. 3, 4, 21, 22, 34 (or 170), 40, 41, 55, and must have completed home experience in foods, clothing, and other phases of home economics and must have passed the qualifying examination in English)

‡ A fee of $1 per credit is charged for this course.

94.‡ Supervised Teaching in Home Economics. A continuation of H.E. Ed. 93. (3 cred.; sr.; prereq. H.E. Ed. 91, 93; parallel H.E. Ed. 92 and 192). To receive credit for this course student must have completed H.E. Ed. 93.

192. Educational Measurement in Home Economics. Study of the techniques of measurement applicable in home economics, construction and evaluation, objective devices; review of published tests and scales. (2 cred.; sr., grad.; prereq. Ed. 51A or equiv., parallel H.E. Ed. 92 and 94)

193. Home Economics Curriculum. A study of the contribution of home economics at various educational levels; evaluation of curriculum practices and techniques employed in curriculum planning and reconstruction. (2 or 3 cred.; sr., grad.; prereq. or parallel 94 or permission of instructor)

194a. Adult Education Problems. Objectives of adult education; planning an adult program; teaching procedures; discussion of special problems. This course is planned for high school and extension teachers and supervisors of home economics classes. (3 cred.; sr., grad.; prereq. 91, 93, or equiv.)

194b. Adult Education Problems. Development of unit outlines, illustrative material, and bibliography for use in adult classes. Course is planned for teachers and supervisors of local leader groups or adult classes. (3 cred.; sr.; prereq. 91, 93, or equiv.)

197.‡ Organization and Methods for Related Art Teaching. Organization of a related art course and methods of teaching art as applied to familiar objects and processes. The course is planned on an individual problem basis. (1 to 3 cred.; sr.; prereq. 91, H.E. 180 or parallel)

HORTICULTURE

There are four distinct fields in horticulture: vegetable growing, fruit growing, landscape gardening, and floriculture. In some cases students may find it advisable to include more than one field in their major. Those who contemplate entering into some horticultural industry such as fruit growing, market gardening, truck growing, nursery business, greenhouse business, florist work, or landscape gardening, should follow the Curriculum in Technical Agriculture. Students who plan on taking postgraduate work in preparation for research or college teaching are advised to follow the Science Specialization Curriculum.

1. **Technical Agriculture.**—The courses listed below are recommended for students majoring in horticulture in the indicated fields:
   a. Vegetable Growing: Hort. 32, 110, 135, 137; Agron. 31.
   b. Fruit Growing: Hort. 6, 56, 107, 110, 111, 121; Agron. 31.
   c. Landscape Gardening: Hort. 6, 11, 21, 22, 24, 56, 176; Agr. Eng. 3, Draw. and Des. Geom. 41, 42, 43.
   d. Floriculture: Hort. 11, 12, 14, 56, 110, 153; Agron. 31.

   Additional courses in such supporting fields as botany, plant pathology, entomology, soils, etc. may be added to fit the needs of individual students. Minor sequences should be arranged in consultation with the adviser.
2. **Science Specialization.**—For subjects recommended for major in some field of horticulture, consult adviser.

‡ A fee of $1 per credit is charged for this course.

Freshman and Sophomore Courses

6. Fruit Growing. The fundamental principles of fruit growing. Sites, soils, nursery stock, planting and planting plans, tillage, fertilization, cover crops, pollination, frost avoidance, pruning, and thinning. Lectures and references. (3 cred.; no prereq.)
10. Home Floriculture. Designed for the student who does not take any other courses in floriculture. Gives the student a working knowledge of the propagation, culture, and uses of common garden flowers and house plants. Lectures, reference reading, and laboratory. (3 cred.; not open to students who have credit in Hort. 11 or 56; no prereq.)
11. Garden Flowers. A study of the common annuals, biennials, and perennial flowers, with special emphasis on their uses in landscape planting. Lectures, reference reading, laboratory, and field trips. (3 cred. [2 cred. if Course 10 has been taken]; prereq. Bot. 10 cred. or equiv.) (Offered only in odd numbered years.)
12. Commercial Floriculture, Fall Crops. A study of the culture of the principal florists' crops with major emphasis on chrysanthemums, carnations, and cut flowers and potted plants especially adapted to Christmas sales. Lectures, reference reading, laboratory, and field trips to greenhouses and flower stores. (3 cred.; prereq. Bot. 1 or equiv.)
14. Commercial Floriculture, Spring Crops. A study of the culture of the principal florists' crops with major emphasis on roses, bulbous plants, the minor cut flower crops, and bedding plants. Lectures, reference reading, laboratory, and field trips to greenhouses and flower stores. (3 cred.; prereq. Bot. 1 or equiv.) (Offered only in even numbered years.)
21. Plant Materials, Fall and Winter Aspects. A study of the trees, shrubs, and evergreens used in landscape planting, with special emphasis on their fall and winter characters, their identification and uses in landscape design. Lectures, outdoor and indoor laboratories, field trips. (3 cred.; prereq. Bot. 10 cred. or equiv.)
22. Plant Materials, Spring and Summer Aspects. A study of trees, shrubs, and evergreens used in landscape planting, with special emphasis on their spring and summer characters, particularly that of blooming habit. Lectures, outdoor and indoor laboratories, field trips. (3 cred.; prereq. Bot. 10 cred. or equiv.)
24. Principles of Landscape Design. The composition of the various elements used in landscape gardening, methods of presentation. Lectures and problems. (3 cred.; prereq. 21 or 22, Draw. and Des. Geom. 41 or Agr. Eng. 3)
32. Vegetable Growing. The fundamental principles of vegetable growing. Scope of the industry and its place in agriculture. Varieties, seed production, regional adaptation, soils, fertilizers, equipment, storage, systems of production and marketing. (3 cred.; no prereq.)
41. Judging Horticultural Crops. The principles and practice of judging and exhibiting fruits, vegetables, and flowers. (2 cred.; soph., jr., sr.; prereq. 6 or 32) (Offered only in even numbered years)

Junior and Senior Courses

56. Plant Propagation. Methods of propagating plants by seed, cuttings, layers, and grafting. Practical work in management of nursery stock, bulbs, and plants. Lectures, reference reading, and field trips. (3 cred. [2 cred. if Course 10 has been taken]; jr., sr.; prereq. Bot. 7 cred. or equiv.) (Offered only in even numbered years)

107. Orchard Management. A detailed study of the various operations in orchards and berry fields. Operating costs and profits. Lectures, laboratory, and individual problems. (3 cred.; jr., sr.; prereq. 6) (Offered only in even numbered years)
110. Horticultural Crop Breeding. The principles of plant improvement, their special application to horticultural plants, and the breeding methods used with each of the important horticultural crops. (3 cred.; jr., sr.; prereq. Agron. 31)
111. Systematic Pomology. Fruit varieties. Classification, description, identification, and elements of judging. Lectures, laboratory, and a survey of the literature. (3 cred.; jr., sr.; prereq. 6, Bot. 10 cred. or equiv.) (Offered only in odd numbered years)
121. Small Fruit Culture. Cultural practices for each of the small fruits. Brief consideration is given to their botanical relationships and the history of their commercial development. Lectures, problems, and survey of literature. (3 cred.; jr., sr.; prereq. 6 or 32, Bot. 10 cred. or equiv.)
135. Potatoes. Culture, handling, storage, seed maintenance, varieties, improvement, and physiology of the potato plant. (3 cred.; jr., sr.; prereq. 32, Bot. 10 cred. or equiv.)
137. Vegetable Crops. Lectures and survey of literature relating to vegetable crop production. Assigned readings include the classification, culture, improvement, and physiology of leading vegetable crops. (3 cred.; jr., sr.; prereq. 32, Bot. 10 cred. or equiv.)
153. Conservatory Plants and Florists' Flowers. A systematic study of the plants adapted to growing in conservatories and homes, and also of florists' cut flowers and potted plants. Lectures, laboratory, and field trips to greenhouses. (3 cred.; jr., sr.; prereq. Bot. 10 cred. or equiv.) (Offered only in odd numbered years)
176. Landscape Construction. Construction and maintenance of turf for lawns, golf courses, and other play areas; garden architecture, grading, planting and care, costs of construction. Lectures, field trips, and reports. (3 cred.; sr.; prereq. 24) (Offered only in odd numbered years)

190-191-192. Special Problems. Problems based upon the work given in the preceding courses. (2 to 4 cred. per qtr.; jr., sr.; prereq. instructor's permission)

193-194. Horticultural Seminar. Reports and discussions of problems and investigational work. (1 cred. per qtr.; jr., sr.; prereq. Hort. 9 cred.)

INORGANIC CHEMISTRY

Institute of Technology

SCHOOL OF CHEMISTRY

Freshman and Sophomore Courses

1-2-3.‡ General Inorganic and Qualitative Chemistry. (12 cred.; all; no prereq.)

9-10.‡ General Inorganic Chemistry. (10 cred.; all; prereq. entrance cred. in chem.)

11.‡ Qualitative Chemical Analysis. (4 cred.; prereq. 2 or 5)

For additional courses and course descriptions see the Bulletin of the Institute of Technology.

‡ A fee of $2 per quarter is charged for this course.

MATHEMATICS

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Placement tests.—In each of Courses 1 and 6, a placement test will be given during the first two weeks of the quarter. Students who fail in this test will be advised to take a more elementary course. In particular, any student who offers less than one year of high school advanced algebra as a substitute for Course 1 and who fails to pass the placement test in Course 6, will be required to take Course 1 before taking more advanced mathematics. A student who has had a complete year of elementary algebra and a corresponding course in advanced high school algebra for one-half year, should be able to pass the placement test in Course 6. The first class meeting in each course is of particular importance.

Freshman and Sophomore Courses

1. Higher Algebra. (5 cred.; all; prereq. one yr. elementary algebra; open for credit to any student offering less than one year of high school higher algebra for entrance)
6. Trigonometry. (5 cred.; all; prereq. plane geometry and Course 1 or high school higher algebra; open for credit to students offering high school trigonometry for entrance)
7. College Algebra. (5 cred.; all; prereq. 6 or high school trigonometry if approved by department chairman)

For additional courses and course descriptions see the Bulletin of the College of Science, Literature, and the Arts.

MILITARY SCIENCE AND TACTICS

Students who have completed the Basic Course, R.O.T.C., may be selected for advanced work by the professor of military science and tactics. Those who pursue the Advanced Course are required to sign an agreement with the government to continue the two years' course to completion. This includes attendance at a training camp, held normally during the summer following the first year's advanced work. The camp is conducted free of cost to the student, and in addition, while actually in camp, the student receives the pay prescribed for the seventh grade in the army. Students pursuing the Advanced Course are also furnished a special uniform and receive a fixed allowance per day. The total government compensation for the two years' advanced work amounts to about $150. Students who satisfactorily complete the Advanced Course will be commissioned in the Officers' Reserve Corps of the United States Army. The University allows 18 credits for the two years' advanced R.O.T.C. work.

1,2,3. First Year Basic Course R.O.T.C. Coast Artillery Corps. Leadership, rifle marksmanship, ammunition, weapons and materiel, hygiene and sanitation, military courtesy and discipline, national defense, military history and policy, army organization, obligations of citizenship, map reading. (1 cred. each qtr.; prereq. higher algebra, geometry, and trigonometry.) Students who do not possess these prerequisites at the time of registration may be accepted by the commandant if they agree to complete these studies prior to the gunnery courses.

4,5,6. Second Year Basic Course R.O.T.C. Coast Artillery Corps. Leadership, weapons and materiel, fire control and position finding for seacoast and anti-aircraft artillery, identification of aircraft, characteristics of naval targets, motor transportation. (1 cred. each qtr.; prereq. 1, 2, 3, higher algebra and trigonometry)

151-152,153. First Year Advanced Course R.O.T.C. Coast Artillery Corps. Leadership, position finding, conduct of fire, gunnery for heavy artillery, gunnery for anti-aircraft artillery, administration, aerial photograph reading, defense against chemical warfare, signal communications, orientation. (3 cred. each qtr.; prereq. 4, 5, 6)

154,155,156. Second Year Advanced Course R.O.T.C. Coast Artillery Corps. Military law, military history, supply, field engineering, leadership, combat orders, artillery tactics, and technique, orientation. (3 cred. each qtr.)

MUSIC

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Credit is offered to students in the College of Agriculture, Forestry, and Home Economics who may wish to elect work in the Department of Music.

Freshman and Sophomore Courses

1. Ear Training. (2 cred.; all) (No student should register for this course until after he has made arrangements for a placement test in the office of the Department of Music)

4-5-6. Harmony. (9 cred.; all; prereq. 1)

11. Piano.‡

12. Voice.‡

13. Violin.‡

14-26. Other Orchestral Instruments.‡

27. Organ.‡

40-41-42. Orchestra. (3 cred.; all; prereq. consent of director)

43-44-45.* University Chorus. (3 cred.; all; prereq. consent of director)

For additional courses and course descriptions see the Bulletin of the College of Science, Literature, and the Arts.

NAVAL SCIENCE AND TACTICS

Courses in naval science and tactics are given for those who intend to complete the four years of training for a commission in the Naval Reserve. Only students signifying such a purpose will be accepted.

Naval Science I and II with Navigation comprise the Basic Course in training. Naval Science III and IV, or IIIa and IVa, plus any incompleted navigation, comprise the Advanced Course. A student who has completed the Basic Course is admitted to the Advanced Course upon the approval of his application by the professor of naval science and tactics, and upon his agreement to complete the

* A special section for students in the College of Agriculture, Forestry, and Home Economics will be given at University Farm if possible. Consult registrar's office.

‡ A fee of $25 is charged for 1 lesson per week, $50 for 2 lessons per week. For special and practice fees for these courses, see Bulletin of General Information.

course and take an Advanced Course cruise before his graduation, and upon passing a prescribed physical examination.

The Navy Department pays monthly commutation of subsistence to juniors and seniors who maintain a satisfactory standing and attendance. This, with cruise pay, amounts to about one hundred seventy-five dollars ($175) for the two years.

N.R.O.T.C. practice cruises will be held annually as prescribed by the Navy Department. Attendance at one Advanced Course cruise is required of all students enrolled in the Advanced Course. Basic Course students may be authorized to take cruises, and while doing so will receive subsistence but no pay. All N.R.O.T.C. students attending cruises are furnished transportation and subsistence by the United States Government.

Those who complete the Advanced Course, if recommended, will on their application be appointed as ensigns in the Volunteer Reserve without professional entrance examinations.

NAVIGATION

Navigation courses taught under this department are open to all students.

Navigation I. Navigation and Nautical Astronomy. Fundamental principles of astronomy underlying navigation of ships and aircraft, charts, piloting, compasses, compensation of magnetic compass error, sextants, chronometers, dead reckoning. Three hours per week for one quarter. (3 cred.; prereq. plane trig.)

Navigation II. Navigation and Nautical Astronomy. Piloting, time, solar ephemeris, determination of latitude and longitude by the sun, azimuth, astronomical triangles, lines of position, deep sea navigation. Three hours per week for one quarter. (3 cred.; prereq. Nav. I)

Navigation III. Celestial Navigation. Sidereal time, determination of position by moon, stars, and planets, short methods, tides, chart work, star identification, theory and principles of gyroscopes, gyrocompasses. Three hours per week for one quarter. (3 cred.; prereq. Nav. II)

ORGANIC CHEMISTRY

INSTITUTE OF TECHNOLOGY
SCHOOL OF CHEMISTRY

51-52†-153.‡ Elementary Organic Chemistry. (10 or 15 cred.; jr., sr.; prereq. 15 cred. in college chem.)

For additional courses and course descriptions see the Bulletin of the Institute of Technology.

ORIENTATION

1f,w. Freshman Orientation Lectures. Required of all students entering the college except those who have had two years or more work in another college. Students must register for this course in their first quarter in college. (1 cred.)

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $2 per quarter is charged for this course.

PHYSICAL CHEMISTRY

INSTITUTE OF TECHNOLOGY

SCHOOL OF CHEMISTRY

101-102-103. Physical Chemistry. (3 cred. per qtr.; jr., sr., grad.; prereq. two yrs. college chem., one yr. college phys.; a knowledge of calculus is advisable.)
104-105-106.‡ Physical Chemistry Laboratory. (1 or 2 cred. per qtr.)

For additional courses and course descriptions see the Bulletin of the Institute of Technology.

PHYSICAL EDUCATION FOR MEN

The Physical Education Department offers men the opportunity to elect instruction and participation in sports of a recreational nature which men may play during their college career and in later life.

Not more than nine credits in courses in physical activities may be counted toward graduation.

1,2,3. Sports Education. (3 cred.; all; no prereq. All three quarters must be taken in order to receive credit)
6A,B,C. Intramural Sports. (1 cred. per qtr.; all; no prereq.)

A towel and locker fee of $1.25 per quarter is charged all students taking exercise courses. The University furnishes uniforms to students for class work or recreational play for $1 per quarter.

For additional courses and course descriptions and for special four-year professional course in physical education for majors and minors see the Bulletin of the College of Education.

PHYSICAL EDUCATION FOR WOMEN

The General Course in Physical Education offered by the Department of Physical Education for Women provides a wide program of sports and other activities to meet the varying interests and needs of all the women students. The program offers an opportunity to take courses in body building and conditioning and for the acquisition of personal and recreational skills.

All women students will be required to take at least 3 credits in physical education. The courses chosen must be approved by the major adviser in the Department of Physical Education for Women.

Nine credits is the maximum number that can be gained toward the degree by taking courses in physical education activities.

For a special four-year professional course designed to prepare graduates for the responsible direction of physical education activities see the Bulletin of the College of Education.

Statement of fees.—A physical education fee of $1.75 per quarter is charged for all courses except Phys. Ed. 7, Lectures in Physical Education and Health, and Phys. Ed. 8, Horseback Riding. Maximum fee per student, $3.50 per quarter.

Phys.Ed.1-2-3-4-5-6-8. (1 cred. for each quarter) (Phys.Ed. 7, 2 cred.)

‡ A fee of $2 per quarter is charged for this course.

GROUP I. AQUATICS

Canoe Paddling
Swimming, Beginning
Swimming, Elementary
Swimming, Intermediate
Swimming, Advanced
Diving
Lifesaving
Recreational Swimming and Water Games

GROUP II. THE DANCE

Folk Dancing
Modern Dance, Elementary
Modern Dance, Advanced
Social Dancing
Tap Dancing, Elementary
Tap Dancing, Intermediate
Recreational Rhythms

GROUP III. INDIVIDUAL SPORTS AND ACTIVITIES

Archery, Elementary
Archery, Intermediate
Badminton
Golf, Elementary
Golf, Intermediate
Horseback Riding
Individual Body Building (formerly Orthopedics)
Skating, Plain, Figure
Classes meet at the Hippodrome
Tennis, Elementary‡
Tennis, Intermediate‡
Tournament Tennis‡

GROUP IV. TEAM SPORTS AND ACTIVITIES

Baseball
Basketball, Elementary
Basketball, Intermediate
Field Hockey
Group Body Building
Exercises for flexibility, grace and ease of movement)
Posture and Daily Life Skills
Introductory Course in Sport Skills
Speed Ball
Sports and Dance Appreciation Course
(Movies, demonstrations, and talks by experts on sports and the dance)
Volleyball

LECTURES

Lectures on physical education and health.

PHYSICS

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman and Sophomore Courses

1-2†-3. Introduction to Physical Science. (9 cred.; all; prereq. high school algebra and plane geometry)

1a-2a†-3a.‡‡ Introduction to Physical Science. Laboratory included. (12 cred.; all; prereq. high school algebra and plane geometry)

7-8-9.‡‡ General Physics. Laboratory work an integral part of the course. (For students majoring in physics, mathematics, and chemistry and for students in the Institute of Technology.) (15 cred.; all; prereq. M.&M. 12 or Math. 6, or equiv.)

29. Introduction to Meteorology. (3 cred.; all; prereq. high school phys. or equiv.)

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ Students taking tennis must pay $1 for tennis permit.

‡‡ A fee of $2 per quarter is charged for this course.

PHYSIOLOGY

MEDICAL SCHOOL

Freshman and Sophomore Courses

4. Human Physiology. For academic, home economics, pharmacy, and other students. Lectures, recitations, and demonstrations. (4 cred.; all; prereq. 1 qtr. zool., 1 qtr. chem.)

Junior and Senior Courses

51. Human Physiology. (May be substituted for 4) (6 cred.; primarily for phys. ed. students*; jr., sr.; prereq. Zool. 1-2-3; Inorg. Chem. 1-2-3, or 4-5, or equiv; Physiol. 50)
56. Physiological Chemistry. (4 cred.; primarily for dental students*; jr., sr.; prereq. organic chemistry)
57. Physiological Chemistry. (5 cred.; jr., sr.; prereq. 56)
58. Human Physiology. (6 cred.; primarily for dental students*; jr., sr.; prereq. Zool. and Physiol. 56, 57)
59. Human Physiology. (8 cred.; sr.; prereq. 58 or equiv.)
100. Physiological Chemistry. (7 cred.; jr., sr.; prereq. zool., org. chem., and phys.)
101. Physiological Chemistry. (6 cred.; jr., sr.; prereq. 100)
103. Physiology of Circulation, Respiration, etc. (9 cred.; jr., sr.; prereq. zool. and org. chem.)
104. Physiology of Endocrines, Nervous System, etc. (6 cred.; lect. only, 4 cred.; jr., sr.; prereq. 103 or org. chem. and neurology)

For additional courses and course descriptions see the Bulletin of the Medical School.

PLANT PATHOLOGY AND BOTANY

Training in this field may lead to state and Federal Government service, college teaching and experiment station work, and employment in a variety of commercial fields.

Two fields of specialization are available in the division: (1) plant pathology and (2) agricultural botany and applied plant physiology.

A. Plant pathology.—Students interested in plant pathology will ordinarily register in the Science Specialization Curriculum with a view to taking graduate work. A major in plant pathology in the Technical Agriculture Curriculum must have approval of the division.

Recommended for major in plant pathology:

1. **Science Specialization:** Pl Path. 1 or 10; 105-106-107; 111 or 112 or 114; 119, 143.
2. **Technical Agriculture:** Consult adviser in Plant Pathology.

B. Agricultural botany and applied plant physiology.—A major in agricultural botany and applied plant physiology should include basic courses in the Department of Botany in the College of Science, Literature, and the Arts. Since the student may wish to apply his botanical training to one of the several fields of horticulture, agronomy, soils, forestry, and entomology and economic zoology, subjects from these divisions should also be included in either the major or minor.

* Others may be admitted by special permission.

A major in agricultural botany and applied plant physiology in the Technical Agriculture Curriculum must have approval of the division. A major in Science Specialization assumes continuation in graduate work. For courses recommended for major in both the Technical Agriculture and Science Specialization Curricula, consult divisional adviser.

Freshman and Sophomore Courses

1. Plant Pathology. An introductory course in plant diseases. Lectures, laboratory, and reference. (5 cred.; soph., jr., sr.; not open to those who have completed Course 10.; prereq. 10 cred. in plant sciences of which at least 7 shall be in botany)
7. Grasses and Sedges. A study of the grasses and a few of the sedges of this area relative to their identification, anatomy, ecology, and economic value. (3 cred.; fr., soph., jr., sr.; prereq. Bot. 7 cred.)
8. Weeds. A study of the identification, structures, and habits of weed plants in relation to methods of controlling them. (3 cred.; fr., soph., jr., sr.; prereq. Bot. 7 cred.)
9. Weeds and Seed Testing. Detailed study of seed testing methods and seed legislation. Weed and crop seeds and weed plants studied with special reference to identification. (3 cred.; fr., soph., jr., sr.; prereq. Bot. 7 cred.)
10. Forest Pathology. Diseases of forest and shade trees, and the rotting of timber. Symptoms, etiology, and control. Lectures, laboratory, and reference work. Not open to those who have completed Course 1. (5 cred.; soph., jr., sr.; prereq. Bot. 9 cred.)

Junior and Senior Courses

51. Special Problems in Forest Pathology. Collection, identification, and cultural studies of tree pathogens and wood rotting fungi. (2 to 5 cred.; jr., sr.; prereq. 10)
52. Seed Problems. Special seed problems are assigned. Advanced work in seed testing methods. (3 cred.; jr., sr.; prereq. 9)
53. Food Plants of Game Animals. A study of food plants, uses, habits, reproduction, and identification. (3 cred.; jr., sr.; prereq. one yr. of botany and one yr. of zool., or equiv.)

105-106-107. Mycology. Morphology and taxonomy of fungi. Lectures, laboratory, and field work. (3 or 5 cred. per qtr.; jr., sr.; prereq. 1 or 10 or equiv.)

110. Principles of Pathology. A systematic consideration of the basic factors governing the development of plant diseases. (3 cred.; jr., sr.; prereq. 1 or 10, Bact. 53)
111. Diseases of Field Crops. Detailed study of diseases of field crops, including symptomatology, etiology, and practical methods of control. 3 cred.; jr., sr.; prereq. 1 or 10)
112. Diseases of Fruit and Vegetable Crops. Special study of diseases of fruit and vegetable crops, especially those important in Minnesota. Laboratory, lecture, and field work. (3 cred.; jr., sr.; prereq. 1 or 10) (Given in alternate years. Offered in 1940-41)
114. Advanced Forest Pathology. A detailed study of wood rots, including a study of the deterioration of wood products caused by fungi. Lectures and and laboratory work. (3 cred.; jr., sr.; prereq. 1 or 10)

118. Bacterial Diseases of Plants. Bacteria as plant pathogens; representative types with particular reference to technique used in studying bacterial diseases of plants. (3 cred.; jr., sr.; prereq. 1 or 10)
119. Principles of Plant Disease Control. A general consideration of principles and practices in controlling plant diseases. (3 cred.; jr., sr.; prereq. 1 or 10)
141-142. Insects in Relation to Plant Disease. A study of the principal insect vectors and their habits; types of insect injuries affecting health of plants; modes of insect transmission, and dissemination of plant disease; methods of rearing and handling insect vectors. (6 cred.; jr., sr.; prereq. 8 cred. in ent. or plant path.)
143. Methods. Theoretical and practical consideration of methods used in mycological and pathological research. (3 cred.; jr., sr.; prereq. 1 or 10)
160. Plant Histochemistry. The localization, identification, and function of plant constituents. Lectures, demonstrations, and laboratory. (3 cred.; sr.; prereq. bot. and elem. chem.)
161. Transport, Storage, and Ripening of Fruits and Vegetables. The effects of temperature, respiration, packing, etc., on storage life. (3 cred.; sr.; prereq. Plant Physiol. 3 cred.)
162. Physiological Relations of Crop Plants to Temperature. An advanced study of general temperature effects and especially of the relation of plants to low temperatures. Lectures, readings, and translations. (3 cred.; sr.)
163. Applied Plant Physiology. A general discussion of plant physiology as applied to the food industries and to agriculture and forestry. Lectures and demonstrations. (3 cred.; jr., sr.; prereq. Plant Physiol. 3 cred.; Chem. 5 cred.)

POLITICAL SCIENCE

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman and Sophomore Courses

1-2†-3. American Government and Politics—Parts 1-2. National, state, and local. Constitutions and fundamental laws; governmental organization; division and separation of powers; legislative, executive, and judicial procedure and problems. Part 3. Principal functions and services of government, defense, law enforcement, regulation of business, public works, and social services. (9 cred.; all; no prereq.)

For additional courses and course descriptions see the Bulletin of the College of Science, Literature, and the Arts.

PREVENTIVE MEDICINE AND PUBLIC HEALTH

MEDICAL SCHOOL

Freshman and Sophomore Courses

3. Personal Health. Elementary principles of normal body function; predisposing and actual causes of disease; ways in which disease may be avoided. (2 cred.; fr., soph.; no prereq.; not open to students who have taken Human Biology in the General College)

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

4. Health Problems of Adult Life. Personal health and prevention of disease in the family; relation to community health and disease control; important diseases and their prevention. (2 cred.; all; prereq. 3, or Human Biology in the General College)

Junior and Senior Courses

50. Public and Personal Health. Causes of diseases and of physical defects; fundamental principles and working methods of health conservation and disease prevention. Lectures, discussions, and directed readings. (3 cred.; open to jr. and sr. who have not taken 4 or 52; not open to students who have taken Human Biology in the General College; no prereq.)
51. Community Hygiene. Elementary concepts of development, spread, and prevention of preventable diseases; community programs for their control. (3 cred.; jr., sr.; prereq. 3; or Human Biology in the General College; not open to students who have taken 50, 52, or 53)
52. Health Care of the Family. Factors affecting the health of the family as a unit; environmental factors, including elementary sanitation; prevention of accidents; communicable diseases, their transmission and prevention; prenatal and infant hygiene; principal problems in preschool and school hygiene; care of the sick room; observation and care of the patient; elementary symptomatology. For students of home economics. (3 cred.; jr., sr.; not open to students who have taken Human Biology in the General College; prereq. Bact. 53, Physiol. 4)
57. Health of Infant and Preschool Child. Maternal and child health in public health program, problems of infant and maternal mortality, growth and develepoment of infant and young child, care and feeding of normal infant; prevention and correction of physical defects. (2 cred.; jr., sr.; prereq. Psy. 1-2 or P.M.&P.H. 4, 50, 51, 52 or 53)
59. Health of the School Child. For teachers and others interested in the health development of the school child. Mental and physical growth; discovery of physical defects; exercise; fatigue, emotional problems; health habits; diseases of school children; practical problems of health supervision and health instruction. (3 cred.; prereq. 4, 50, 51, 52, or 53; will be waived for teachers and school nurses, but credit granted only after completion of prerequisites)
60. Tuberculosis and Its Control. History of tuberculosis movement and campaign in the United States; early diagnosis and sanatorium treatment; tuberculosis in children; psychology of tuberculosis; supervision of returned sanatoria patients; state program for the eradication of tuberculosis; legislation. (2 cred.; jr., sr.; prereq. 4, 50, 51, 52 or 53 and 62 which may be taken concurrently)
102. Enviromental Sanitation—General. Public health supervision of water supplies; production, processing, and distribution of milk and other foods; treatment and disposal of sewage, excreta, garbage, and other wastes; bathing places; control of occupational health hazards and of animals and insects involved in the spread of disease. Lectures, field and laboratory demonstration. (5 cred.; prereq. Bact. 53, P.M.&P.H. 53, 100 or equiv. or consent of instructor)

For additional courses see the Bulletin of the Medical School.

PSYCHOLOGY

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman and Sophomore Courses

1-2.† General Psychology. (6 cred.; 3rd qtr. fr. with C average, soph., jr., sr.; no prereq.)

3. Psychology Applied to Daily Life. (3 cred.; soph., jr., sr.; prereq. 1-2)

4-5.†‡ Introductory Laboratory Psychology. (4 cred.; soph., jr., sr.; with or without 1-2)

For additional courses and course descriptions see the Bulletin of the College of Science, Literature, and the Arts.

PUBLICATIONS AND RURAL JOURNALISM

50-51-52. Agricultural Journalism. Intended for students who may wish to enter the field of agricultural journalism as a profession. (9 cred.; jr., sr.; prereq. Journ. 13-14-15, 51-52, and permission of instructor) (Not offered in 1940-41)

53. Publicity. For students planning careers in agriculture or some allied industry, in which the co-operation of the press will be needed. (3 cred.; jr., sr.; prereq. Rhet. 1, 2, 3)

For additional courses see the Department of Journalism in the Bulletin of the College of Science, Literature, and the Arts.

RHETORIC

Students upon entering the college are registered in Rhetoric I or II according to the results of their tests in proficiency in English.

Those students who maintain a high standard in Rhetoric II and III and who complete suitable tests may be exempted from the requirement of Rhetoric 51.

Freshman and Sophomore Courses

1. Rhetoric I. Written and Oral Themes. Review of the elements of English composition. (3 cred.; no prereq.)

2. Rhetoric II. Exposition. (3 cred.; prereq. 1 or exemption on basis of placement test.)

3. Rhetoric III. Description and Narration. (3 cred.; prereq. 2)

11. Argumentation. Gathering evidence, reasoning, briefing, formal and informal argument, persuasion, class debating. (3 cred.; soph., jr., sr.; prereq. 3, 22 recommended)

12. Debate and Discussion. Classroom and intercollegiate debating, formal and informal methods of discussion, the elements of persuasion. (3 cred.; soph., jr., sr.; prereq. 3, 22 recommended)

22.* Public Speaking. (3-hour course.) A practical course in fundamentals of speech making. (3 cred.; soph., jr., sr.; prereq. 3)

23.* Public Speaking. (5-hour course.) (5 cred.; soph., jr., sr.; prereq. 3)

* Students may not receive credit for both Rhet. 22 and 23.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

24. Advanced Public Speaking. Types of audiences, persuasion, voice, extemporaneous speeches for special occasions. (3 cred.; soph., jr., sr.; prereq. 22)
28. Play Production. History of the theater, theories of acting, staging, etc. A survey of the problems confronting the producer of amateur plays. (3 cred.; soph., jr., sr.; prereq. 3)
31. Survey of English Literature I. Survey of English literature of the sixteenth, seventeenth, and eighteenth centuries. (5 cred.; soph., jr., sr.; prereq. 3 or permission of instructor)
32. Survey of English Literature II. Survey of English literature of the nineteenth century. (3 cred.; soph., jr., sr.; prereq. 3)
33. American Life in American Literature. A survey of our significant national literature. (3 cred.; soph., jr., sr.; prereq. 3)
34. Books and Reading. The selection of books and periodicals for the home library. (1 cred.; no prereq.)

Junior and Senior Courses

51. Exposition. Reports and thesis writing; articles and essays; criticism; survey of English usage. (3 cred.; jr., sr.; prereq. 3)
59. Advanced Play Production. Continuation of Course 28. Problems of directing, staging, and make-up. Study of representative one-act plays. Each student is required to produce a one-act play. A practical course for teachers. (3 cred.; jr., sr.; prereq. 28 or permission of instructor)
60. Contemporary Literature. Contemporary English and American writers. (3 cred.; jr., sr.; prereq. 3)

ROMANCE LANGUAGES

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

FRENCH

Freshman and Sophomore Courses

1-2.† Beginning French. (10 cred.; all; no prereq.; must complete both qtrs. to receive credit. Credit is not given for more than one beginning language)
3-4. Intermediate French. (10 cred.; all; prereq. 1-2, or two years of high school French. Students who have had three years of high school French may omit Course 3 and take Course 4)
20. Oral and Written French. (5 cred.; all; prereq. 4, or four§ years high school French)

Junior and Senior Courses

53. French Composition. (3 cred.; jr., sr.; prereq. 3-4)
54-55. French Conversation. (4 cred.; jr., sr.; prereq. 53 or 20)
70-71-72.† Survey of French Literature. (9 cred.; jr., sr.; prereq. 3-4)

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

§ Students who have had three years of high school French may be admitted to Course 20 with the consent of the department.

SPANISH

Freshman and Sophomore Courses

1-2.† Beginning Spanish. (10 cred.; all; no prereq.; must complete both qtrs. to receive credit. Credit is not given for more than one beginning language)

3-4. Intermediate Spanish. (10 cred.; all; prereq. 1-2, or two years of high school Spanish. Students who have had three years of high school Spanish may omit Course 3 and take Course 4)

20. Oral and Written Spanish. (5 cred.; all; prereq. 4 or four¶ years of high school Spanish)

Junior and Senior Courses

53. Spanish Composition. (3 cred.; jr., sr.; prereq. 3-4)

54-55. Spanish Conversation. (4 cred.; jr., sr.; prereq. 53 or 20)

74-75-76.† Survey of Spanish-American Literature. (9 cred.; jr., sr.; prereq. 3-4)

For additional courses and course descriptions see the Bulletin of the College of Science, Literature, and the Arts.

SOCIOLOGY AND SOCIAL WORK

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman and Sophomore Courses

1. Introduction to Sociology. (3 or 5 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.)

6. Social Interaction. (3 cred.; soph., jr., sr.; prereq. 1)

14. Rural Sociology. (3 cred.; soph., jr., sr.; prereq. 1)

45. Social Statistics. (5 cred.; soph., jr., sr.; prereq. 1)

49. Social Pathology. (3 cred.; 3rd qtr. soph., jr., sr.; prereq. 10 cred. in soc. or Soc. 1 and 10 cred. in soc. sci. or psy.)

Junior and Senior Courses

60. Social Protection of the Child. (3 cred.; sr. only; prereq. 49)

100. Social Psychology. (3 cred.; jr., sr., grad.; prereq. Soc. 1 and 6, or Psy. 1-2, and 9 cred. in soc. sci., ed., phil., or psy.)

110. Rural Organization. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.)

112. Methods of Rural Social Research. (2 cred.; grad.*; prereq. same as for 110)

114. Rural Social Institutions. (3 cred.; jr., sr., grad.; prereq. same as for 110)

116. The Newspaper As a Social Institution. (3 cred.; jr., sr., grad.; prereq. same as for 110) (Not offered in 1940-41)

119. The Family. (3 cred.; jr., sr., grad.; prereq. same as for 110)

120. Social Life and Cultural Change. (3 cred.; jr., sr., grad.; prereq. same as for 110)

161. Social Aspects of Housing and Standards of Living. (3 cred.; jr., sr., grad.; prereq. same as for 110)

* Primarily for graduates, but mature students who are not graduates may be admitted with the consent of the adviser and the instructor.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

¶ Students who have had three years of high school Spanish may be admitted to Course 20 with the consent of the department.

For additional courses and course descriptions see the Bulletin of the College of Science, Literature, and the Arts.

SOILS

Soils majors in either Technical Agriculture or Science Specialization are expected to take Courses 103, 107, and 108. Technical Agriculture majors should select, with the help of the adviser, a sufficient number of related elective courses in other plant sciences to complete the major sequence. In the Science Specialization Curriculum majors will be expected to select a combination of courses from those offered in botany, chemistry, geology, mathematics, and physics. In either case the subjects selected will be somewhat dependent upon the objective of the course of study being pursued.

Freshman and Sophomore Courses

9. Soils I. Origin, formation, physical properties, moisture relations; principles of soil fertility, use of lime, commercial fertilizers, and stable manure; soil organisms and green manures; tillage. (4 cred.; soph., jr., sr.; prereq. Agr. Biochem. 4)
10. Soils II. Laboratory. Field studies of soil profiles and moisture relationships. Laboratory tests for deficiencies of plant nutrients and lime. (1 cred.; soph., jr., sr.; prereq. Soils 9)

Junior and Senior Courses

50. Forest Soils. Origin, formation, texture, structure; soil profiles, soil mapping; water, air, and heat supply; nutrient maintenance of the forest, soil acidity; forest floor, use of forest litter, effect of forest fires; fertilization in forest nursery practice. (2 cred.; jr. in forestry; prereq. Agr. Biochem. 4. Given at Cloquet)
101. Chemical Analysis of Soils. A laboratory course in the chemical analysis of soils, including the determination of replaceable bases. (3 to 5 cred.; jr., sr.; prereq. 9, quant. anal.)
103. Soil Erosion. Causes and types of erosion; relation of erosion to soil type; principle of control of erosion, by tillage, contour-cultivation, strip farming, choice of crops and terracing; conservation of moisture and plant nutrients; relation of forests to erosion control. Lectures and field observation. (3 cred.; jr., sr.; prereq. 9)
104. Soil Mapping. Principles of soil surveying and classification with field practice in the preparation of soil maps. Lectures and field work. (3 cred.; jr., sr.; prereq. 108)
107. Fertilizers. Development of the use of commercial fertilizers; their sources, preparation, composition, combination, and uses. (3 cred.; jr., sr.; prereq. 9)
108. Physical Properties of Soils. The determination of physical constants of soils, including mechanical composition. Lectures and laboratory. (3 cred.; jr., sr.; prereq. 9 or 50)

THEORY AND PRACTICE OF TEACHING

COLLEGE OF EDUCATION

For courses and course descriptions see the Bulletin of the College of Education.

VETERINARY MEDICINE

Those contemplating matriculation in Veterinary Medicine are referred to the curriculum on pages 14 and 27 and to advisers in this division.

Junior and Senior Courses

50-51-52. Anatomy, Physiology, and Hygiene of Domestic Animals. Fundamentals of structure, function, and reproduction of domestic animals. The principles of animal hygiene, including the etiology and means of control of the more important communicable diseases. (9 cred.; jr., sr.)

ZOOLOGY

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

Freshman and Sophomore Courses

Courses in this department are closely correlated with those offered by the Division of Entomology and Economic Zoology of the College of Agriculture, Forestry, and Home Economics. For courses of that division, see page 84.

Credit is given for acceptable work done at any approved seaside laboratory.

Freshman and Sophomore Courses

14-15.†‡ General Zoology. Structure, physiology, embryology, classification, and evolution of animals. (6 cred.; all; no prereq.) (Lecture section limited to 288; laboratory sections limited to: Sec. 1, 114; Sec. 2, 174)

21.‡§ Histology. (5 cred.; soph., jr., sr.; prereq. 1-2-3)

22.‡‡§ Comparative Anatomy. (5 cred.; soph., jr., sr.; prereq. 1-2-3)

46-47.† Ornithology. (6 cred.; soph., jr., sr.; prereq. 1-2-3 and permission of instructor)

Junior and Senior Courses

50.‡ Introduction to General Physiology. (5 cred.; soph., jr., sr.; prereq. 1-2-3 or 15 cred. in bot., and 10 cred. in chem. or permission of instructor)

51.‡§ Introductory Animal Parasitology. (5 cred.; jr., sr.; prereq. 1-2-3)

52.‡¶ Introductory Entomology. (5 cred.; jr., sr.; prereq. 1-2-3)

53.‡§ Faunistic Ecology. (5 cred.; jr., sr.; prereq. 1-2-3)

107‡-108.‡ Protozoology. (6 cred.; jr., sr., grad.; prereq. 15 cred.)

117‡-118-119.‡ Animal Ecology. (9 cred.; jr., sr., grad.; prereq. 15 cred.)

120. General Ecology of Insects. (3 cred.; jr., sr.; prereq. 15 cred. in zool. or ent.)

125‡-126‡-127.‡ Advanced Entomology. (9 cred.; jr., sr., grad.; prereq. 15 cred.)

144‡-145‡-146.‡ Animal Parasites and Parasitism. (6 or 9 cred.; jr., sr., grad.; prereq. 15 cred.)

149‡-150.‡ Histology and Organology. (6 cred.; jr., sr., grad.; prereq. 15 cred. in zool. Permission of instructor necessary)

For additional courses and course descriptions see the Bulletin of the College of Science, Literature, and the Arts.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $1 per quarter is charged for this course.

‡‡ A fee of $2 is charged for this course.

§ Sections are limited. Written permission must be obtained from the Junior College office, 106 Folwell Hall.

¶ Sections limited to 20 each.

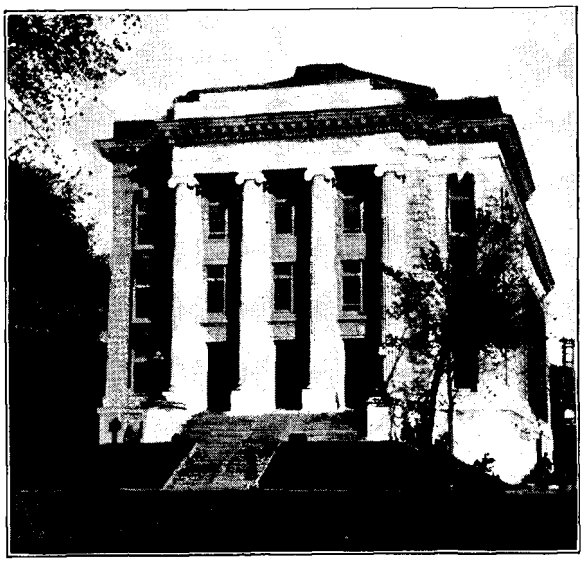
Bulletin of University of Minnesota

Education for Social Work

Special Offerings for Summer Session 1940

First Term: June 17 to July 26

Second Term: July 29 to August 30



ADMINISTRATION BUILDING

Volume XLIII Number 38 May 7, 1940

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SOCIOLOGY AND SOCIAL WORK STAFF

SUMMER SESSION 1940

F. STUART CHAPIN, Ph.D., Professor and Chairman

JOSEPH K. FOLSOM, Ph.D., Professor, Vassar College

FLORENCE L. GOODENOUGH, Ph.D., Professor

LOWRY NELSON, Ph.D., Professor

ANNE F. FENLASON, M.A., Associate Professor

ELIO D. MONACHESI, Ph.D., Associate Professor

ALICE LEAHY SHEA, Ph.D., Associate Professor

MONICA K. DOYLE, M.A., Assistant Professor

ROBERT G. HINCKLEY, B.S., M.D., Assistant Professor

HARRY GREENSTEIN, LL.B., Executive Director of Associated Jewish Charities, Baltimore, Maryland

ELIZABETH ECKHARDT MAY, Ed.D., Lecturer

HELEN U. PHILLIPS, M.S.S., Lecturer

SVEND H. RIEMER, Ph.D., Lecturer

ROBERT M. DINKEL, M.A., Instructor

CLAUDIA K. HARNEY, Ph.B., Instructor

CHARLES J. HUTCHINSON, B.S., M.D., Clinical Instructor

EDGAR C. MCVOY, M.A., Instructor

GRACE E. PRATT, B.A., Instructor

ORVILLE F. QUACKENBUSH, B.A., B.S., Instructor

JOSEPH SCHNEIDER, Ph.D., Instructor

EDUCATION FOR SOCIAL WORK

Experienced social workers are invited to avail themselves of the summer offerings at the University of Minnesota. Such offerings include certain graduate courses available during the regular academic year, special courses offered by visiting lecturers, new seminars in case work and opportunity for field work on a block basis. Courses in related fields are grouped in such a manner as to make possible the completion of a minor for a student desiring to complete requirements for a certificate or Master's degree in social work.

The courses offered in the Summer Session are arranged in two terms of concentrated study, the student taking in each term half the number of courses that would be taken in any quarter. During the summer, nonresident fees are waived.

Certain courses listed as sociology, namely: Group Leadership and Organization, Juvenile Courts and Probation, Social Aspects of Housing and Standards of Living, may be counted as technical social work.

Understanding the individual is stressed in the first term of the Summer Session in courses listed as: Introductory Psychiatry, Descriptive Neuropsychiatry, and Behavior Problems. Administration of Social Agencies and Community Organization receive attention in the second term of the Summer Session.

COURSES IN SOCIOLOGY AND SOCIAL WORK

FIRST TERM

SOCIOLOGY

1su. Introduction to Sociology. An objective analysis of culture with special attention to social change. Survey of culture patterns, cultural processes, and social interaction. (3 cred.; 3rd qtr. fr., soph., jr., sr.; no prereq.; Sec. 1, MTWThF I, 109J., Mr. McVoy; Sec. 2, MTWThF II, 6F., Mr. McVoy; Sec. 3, MTWThF III, 104J., Mr. Quackenbush.)

6su. Social Interaction. The basis and forms of social interaction and social relationships, with detailed attention to patterns of contemporary society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF II; 104J.) Mr. Folsom.

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

53su. Elements of Criminology. The causes and treatment of crime from the point of view of processes of social interaction. (3 cred.; jr., sr.; prereq. 10 cred. in soc. or Soc. 1 and 10 cred. in soc. sci. or psy.; MTWThF II; 109J.) Mr. Riemer.

105su. Criminological Theories—Historical and Contemporary. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy., but including Soc. 53 or consent of instructor; MTWThF I; 104J.) Mr. Riemer.

114su. Rural Social Institutions. Study of the problems of organization of selected rural institutions, especially religious, educational, civic, and recreational. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWF IV and Th VI; 104J.) Mr. Nelson.

119su. The Family. The development of family unity or disunity; the roles of the several members of the family; methods of investigation. (3 cred.; jr., sr., grad.; prereq. same as for 114; MTWThF III; 109J.) Mr. Folsom.

147su. Group Leadership and Organization. This course is designed for volunteer and professional workers who are interested in group work for youth and adults in both rural and urban areas. Special emphasis will be given to problems of organization, sources of material, leadership, program planning, evaluation and community relationships. Each student will be given an opportunity to devote a part of his time to the field of his special interest. (3 cred.; jr., sr., grad.; prereq. Soc. 146 or equiv.; MTWThF II; 10F.) Mrs. May.

200su.* General Seminar. (Ar.) Staff.

SOCIAL WORK

153‡-154‡-155‡su. Field Training in Case Work. (2 to 6 cred. per qtr. to be determined by the adviser in social work; grad.†; prereq. Soc. Work 129; ar.) Mrs. Doyle, Miss Harney, Miss Pratt.

170su. Introductory Psychiatry (Identical with Med. 130). A lecture course, includes a discussion of: mental hygiene; mental mechanisms; psychiatric history-taking; review of schools of psychiatry; classification of mental diseases. (3 cred.; grad.†; no prereq.; MTWThF I; ar.) Dr. Hinckley.

171su. Descriptive Neuropsychiatry (Identical with Med. 131). A study of the general plan of the nervous system and its functions; a consideration of some of the more common functional and nervous system diseases. (3 cred.; grad.†; prereq. Soc. Work 170 or equiv.; MTWThF IX; ar.) Dr. Hutchinson.

173su. Behavior Problems (Identical with Child Welfare 140). (3 cred.; grad.†; prereq. 12 cred. in psy., ed. psy., or soc.; MTWThF III; 202Pt.) Miss Goodenough.

200su. General Seminar. One of the following will be made the focus of study: case recording, interviewing, supervision. (3 cred.; ar.) Mrs. Fenlason.

218su. Seminar in Family Case Work. Study of treatment methods in social case work; an analysis of case records; case presentation. (3 cred.; prereq. Soc. Work 129-130 or consent of the instructor; MTWThF I; 2J.) Mrs. Fenlason.

221‡-222‡-223‡su. Graduate Field Training. (Ar.) Mrs. Doyle.

236su.* Research Topics in Social Work. (Ar.) Staff.

* Course which offers an opportunity to meet the 9-hour requirement for the M.A. degree under Plan B.

† Primarily for graduate students, but mature students who are not graduates may be admitted with the consent of the adviser in social work.

‡ A fee of $3.50 is charged for each course.

SECOND TERM

SOCIOLOGY

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

6su. Social Interaction. The basis and forms of social interaction and social relationships, with detailed attention to patterns of contemporary society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF II; 104J.) Mr. Quackenbush.

14su. Rural Sociology. A study of rural and urban relationships. The position of an agricultural class in an industrial society. (3 cred.; soph., jr., sr.; prereq. Soc. 1; MTWThF I; 6F.) Mr. Dinkel.

120su. Social Life and Cultural Change. A survey of some traditional concepts of change; critique of the problem of change and social organization. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWThF I; 104J.) Mr. Schneider.

132su. Juvenile Courts and Probation. The historical, legal, and social aspects of juvenile courts and probation. A critical survey of juvenile courts and probation work based upon a consideration of the nature of delinquent behavior; its "causes," its modification, and its prevention. (3 cred.; grad.†; prereq. Soc. 53, 102; MTWThF II; 109J.) Mr. Monachesi.

145su. Contemporary Sociological Theory. A survey of sociological theory from the French Revolution to the World War. Attention will be given to both the utopian and scientific aspects of modern sociological thought. (3 cred.; jr., sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWThF III; 2J.) Mr. Schneider.

161su. Social Aspects of Housing and Standards of Living. An analysis of the housing of the masses in relation to the problems arising in urban overcrowding, population distribution, the standard of living as affected by the distribution of national income, and the factors related to personal and social disorganization. (3 cred.; sr., grad.; prereq. 4 courses in soc. or Soc. 1 and 15 cred. in soc. sci., ed., phil., or psy.; MTWF IV and Th VII; 109J.) Mr. Chapin.

200su.* General Seminar. (Ar.) Staff.

SOCIAL WORK

138su. Case Work with Children. A course dealing with the problems of case work in children's agencies. (3 cred.; grad.†; prereq. Soc. Work 130, 153; MTWThF I; 2J.) Mrs. Shea.

153‡-154‡-155‡su. Field Training in Case Work. (2 to 6 cred. per qtr. to be determined by the adviser in social work; grad.†; prereq. Soc. Work 129; ar.) Mrs. Shea, Miss Harney, Miss Pratt.

156‡-157‡-158‡su. Field Training in Group Work. (2 to 6 cred. per qtr. to be determined by the adviser in social work; grad.†; prereq. Soc. Work 125; ar.) Miss Phillips.

197su. Administration of Social Work Agencies. (2 cred.; prereq. Soc. Work 109 and 129; MTW IX; 2J.) Mr. Greenstein.

* Course which offers an opportunity to meet the 9-hour requirement for the M.A. degree under Plan B.

† Primarily for graduate students, but mature students who are not graduates may be admitted with the consent of the adviser in social work.

‡ A fee of $3.50 is charged for each course.

199su. Community Organization. (2 cred.; prereq. Soc. Work 109 and 129; MTW II; 2J.) Mr. Greenstein.

200su. General Seminar. One of the following will be made the focus of study: case recording, interviewing, supervision. (3 cred.; ar.) Mrs. Shea.

221‡-222‡-223‡su. Graduate Field Training. (Ar.) Mrs. Shea, Miss Phillips.

236su.* Research Topics in Social Work. (Ar.) Staff.

FIELD WORK

Field work will be given in a number of private and public agencies in the Twin Cities. A special training center will be maintained in child welfare services, offering a variety of experiences. Whenever possible, field work will continue through the two terms. Arrangements may be made for a full-time field assignment if application is filed in advance.

ADMISSION

Prospective students should make certain that they are eligible for admission if not already admitted to the Graduate Course in Social Work. Beginning students are not admitted in the summer. Admission is by application made in advance of the date of registration. Such admission is determined by the dean of the Graduate School on the recommendation of a departmental committee of major advisers in the Graduate Course in Social Work. Application forms may be secured from the Department of Sociology and Social Work, 108 Jones Hall, University of Minnesota.

For detailed information concerning admission, students should consult the Bulletin of the Graduate School and the Bulletin of the Summer Session, which may be obtained by addressing the registrar, University of Minnesota, Minneapolis, Minnesota.

EXPENSES

The living expenses at the University are never very high, and this is true especially of the Summer Session.

At Pioneer Hall, rooms, without meals, may be secured for men. Application should be made to the director of Pioneer Hall, University of Minnesota. At Sanford Hall, room and board for women may be secured for the first term; in the second term, room only.

* Course which offers an opportunity to meet the 9-hour requirement for the M.A. degree under Plan B.

‡ A fee of $3.50 is charged for each course.

Good accommodations for room may be had from $10 to $15 per month. Meals can be secured for 75 cents and up per day. In addition to the cafeterias conducted on the campus by the University, several good restaurants are to be found in the immediate vicinity of the University. Further information concerning room and board may be obtained by addressing the director, Housing Bureau, Shevlin Hall. It is generally more satisfactory to engage accommodations after arrival than to make reservations in advance, except in the case of reservations at Sanford Hall and Pioneer Hall.

FEES

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

Full-time tuition fee (per term)	$25.80
Incidental fee (per term)	4.20
Total fee (per term)	$30.00
Part time (4 credits or less) (per term)	$15.80
Incidental fee (per term)	4.20
Total (per term)	$20.00
General deposit	2.00
Field work fee for each field course	3.50

For the incidental fee of $4.20 a term the student receives the privileges of the Minnesota Union or Shevlin Hall, the Health Service, the *Minnesota Daily*, and the university post-office service.

REGISTRATION

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

The regular registration days are:

For the first term, Monday, June 17, 9:00 a.m. to 4:00 p.m., and Tuesday, June 18, 9:00 a.m. to 4:00 p.m.

For the second term, Monday, July 29, 9:00 a.m. to 4:00 p.m.

The late registration fees are as follows:

For the first term for those completing the registration on

Wednesday, June 19	$2.00
Thursday, June 20	3.00
Friday, June 21	4.00
Monday, June 24	5.00

No registrations are allowed for the first term after Monday, June 24, without the special permission of the dean of the school or college concerned, and the payment of the late registration fee of $5.

For the second term, for those completing their registration on

Tuesday, July 30	$2.00
Wednesday, July 31	3.00
Thursday, August 1	4.00
Friday, August 2	5.00

No registrations will be accepted later than Friday, August 2, without the special approval of the dean of the school or college concerned, and the payment of the late registration fee of $5.

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

No provision is made for allowing exemption from the late registration penalties to those who are unable to reach the University during the regular registration days.

INFORMATION

Correspondence with reference to the Summer Session and requests for circulars and additional information may be addressed to the Director of the Summer Session, or to the Registrar, University of Minnesota, Minneapolis, Minnesota.

The Bulletin
of the
University of Minnesota

Course in Embalming

September 30, 1940 to June 20, 1941

Vol. XLIII No. 39 May 14 1940

Entered at the post office in Minneapolis as second-class matter, Minneapolis, Minnesota. Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized July 12, 1918

CALENDAR

1940-41

Physical examination	Thursday, Friday, Saturday, September 26, 27, 28, 1940
Last day for completion of registration	Saturday, September 28
Fall quarter classes begin	Monday, September 30
Election Day, a holiday	Tuesday, November 5
Armistice Day, a holiday	Monday, November 11
Midquarter grades due	Tuesday, November 12
Thanksgiving Day, a holiday	Thursday, November 28
Fall quarter closes (Christmas recess)	Thursday, December 19
Winter quarter registration day	Saturday, January 4, 1941
Winter quarter classes begin	Monday, January 6
Lincoln's Birthday, a holiday	Wednesday, February 12
Midquarter grades due	Monday, February 17
Washington's Birthday, a holiday	Saturday, February 22
Winter quarter closes	Saturday, March 29
Spring quarter registration day	Saturday, March 29
Spring quarter classes begin	Monday, March 31
Good Friday, a holiday	Friday, April 11
Midquarter grades due	Monday, May 12
Memorial Day, a holiday	Friday, May 30
Minnesota State Board examinations (Final examinations)	Wednesday, Thursday, Friday, June 18, 19, 20
Spring quarter closes	Friday, June 20

Students in the Course in Embalming will have the regular Christmas recess from December 20 to January 5.

EXAMINATIONS

On June 18, 19, 20, 1941, will be held the State Board examinations for license, as well as the finals of the Course in Embalming.

THE COURSE IN EMBALMING

ANNOUNCEMENT

The University of Minnesota, through the co-operation of the Medical School and other schools of the University, the Minnesota State Department of Health, and the Minnesota Funeral Directors' Association announces the twenty-eighth annual session of the Course in Embalming, September 30, 1940 to June 20, 1941. The complete nine months' course will be conducted in three university terms or quarters of twelve weeks each. The work combines instruction in the academic subjects, particularly the basic sciences, training in the technical details of practical embalming, and instruction in business methods and procedures and in those subjects required by the State Department of Health as essential to the welfare of the community in which the funeral director operates.

The course of instruction for the embalmer was established at the University of Minnesota by act of the Board of Regents on April 4, 1908. No effective organization was made, however, and the work lapsed until it was resumed during the year 1913-14 in the Medical School. The first session began January 5, 1914, and lasted six weeks. At that time, only an eighth grade education was required for entrance to the course. After the second annual session, held in January and February, 1915, the course was extended to eight weeks, and one year of high school work was required for admission. Since then, the length of the course has been successively extended to twelve weeks, twenty-four weeks, and, in 1932, to nine months. The completion of four years of high school work is now required for admission. Since 1921, the administrative control of the course has been entrusted to the General Extension Division.

The student of embalming at the University of Minnesota has certain advantages. The instruction is given by members of the faculties of the Medical School, Institute of Technology (School of Chemistry, Department of Art and Architecture, and School of Mines and Metallurgy), School of Business Administration, College of Science, Literature, and the Arts, and Division of Forestry. All necessary laboratory facilities are available in the several departments, and equipment and supplies are always adequate. University standards of instruction and achievement are maintained. The result is a course comparable with other university courses, and students who successfully complete it are granted a university certificate.

The Twin Cities, Minneapolis and St. Paul, with a population of nearly a million people, offer abundant facilities for clinical study. The State Department of Health and the local association of funeral directors are closely co-operative with the University in the conduct of the course, and every possible source, public and private, for laboratory and case material is made available.

The prospective student should clearly understand that this is not merely a trade school, or training school, for the acquisition of certain skills in techniques of embalming bodies and preparing them for burial. Throughout the course, emphasis is placed upon the basic sciences and on the fundamental knowledge requisite for conducting a business of this kind in the interest of the general public and of the community in which the business may be located.

In addition instruction of a general cultural nature is provided. Finally, there are lectures, demonstrations, and laboratory work in practical embalming.

The University considers this practical training very important but does not overstress it, believing that technical skill may best be acquired through experience gained during the apprenticeship required by state law. All instruction is on the college level.

VOCATIONAL ADVICE

If prospective students have any doubt as to their probable success or satisfaction as embalmers it might be well for them to consult all available sources of information regarding the nature of the work and the personal traits necessary for success in it. One such source is a monograph entitled *Mortuary Operation As a Career.* It is published and sold by the Institute for Research, 537 South Dearborn Street, Chicago, Illinois. Another source is T. J. Bonniwell's *We Have To Die,* published by the Worthington Press, New York. Additional sources of information are the trade journals. Finally, officials of the General Extension Division who have charge of the Course in Embalming are available for consultation.

HEADQUARTERS OF THE COURSE

The office of the director of the General Extension Division, who is also the director of the Course in Embalming, is Room 402, Administration Building on the University campus. This building may be reached by the Minneapolis-St. Paul street cars running via Washington and University Avenues. Passengers should get off at Washington Avenue S.E. and Church Street.

GENERAL INFORMATION

ADMISSION

General.—Applicants for admission must be nineteen years of age and graduates of a four-year high school or of a three-year high school preceded by junior high school. An equivalent education properly certified may be accepted by the director. It is not advisable for students to enter younger than nineteen because, by action of the Minnesota State Board of Health, no examination for the state license will be given to applicants under twenty years of age.

No previous experience in embalming is required for entrance to the course; but no amount of experience will be accepted in place of the required high school training.

Special notice for Minnesota students.—Students who desire to become eligible for the embalmer's license in the state of Minnesota (see pages 10-11) must have completed a year (45 quarter credits, or 30 semester credits, or their equivalent) of general study in an accredited college or university, before entering the Course in Embalming. (The General Extension Division will determine for applicants whether their work has been in an acceptable accredited institution.) Those who do not conform to this rule will not be considered candidates for the embalmer's license in Minnesota. The subject-matter to be covered in this study is not prescribed. It is recommended, however, that it include a full year of English composition, together with some work in general biology (botany, zoology, or human physiology), and in the social sciences (economics, political science, or sociology). Other subjects may be of the student's own choice. It is further recommended that this choice should not include work that appears to correspond to any of the requirements (except English) of the Course in Embalming.

N.B.—This year of college study must not be considered a prerequisite to admission to the Course in Embalming. Those not interested in a license to practice in Minnesota or in any other state having a college requirement may disregard it.

But prospective students should ascertain the exact requirements of their own state, or the state in which they hope to secure a license, before entering this or any other school.

Applications for admission.—Applicants for admission will be supplied with a standard blank on which is to be given certain information. This includes a certified statement from the high school principal, or other proper official, covering the applicant's high school record and an estimate of his probable success. If the applicant has studied at a collegiate institution beyond high school, a similar certified statement must be submitted by the institution attended showing the applicant's complete record, including an honorable dismissal. This record is important in cases where students wish to substitute previous work for any part of the requirements for the Course in Embalming. (See page 11.)

The application for admission blank, properly and completely filled out, should be sent to the General Extension Division for consideration. It must be accompanied by letters or certificates signed by a reputable physician and a reliable business man or firm attesting to the good moral character of the applicant. Applications, if satisfactory, will be accepted in the order of their receipt. The right is reserved to limit the number of registrations, and application for admission should be filed as much in advance of the registration date as possible.

N.B.—New students will not be admitted except at the beginning of the fall quarter.

REGISTRATION

Registration days.—Applicants whose applications have been accepted will register in person at Room 402, Administration Building, on the campus of the University of Minnesota. This registration must be completed by the payment of fees on or before Saturday, September 28, 1940, by 12 o'clock noon. The acceptance of registrations offered later than this day cannot be guaranteed; but late registrations accepted are subject to an extra fee (see Fees and Expenses, below). Registrations, with the payment of fees, for subsequent quarters must be completed before noon of the Saturday preceding the first meeting of the class.

FEES AND EXPENSES

Tuition.—The tuition fee for residents of the state of Minnesota is $50 for each quarter; for residents of other states, $70 per quarter. This is payable by the quarter, at registration. All checks should be made payable to the University of Minnesota, and should be drawn **for not more than the amount due.**

Incidental fee.—All students of the University are charged an incidental fee of $8.50 per quarter, payable at registration, covering the following items: the privileges of the Coffman Memorial Union, the Testing Bureau, the *Minnesota Daily* including the Official Daily Bulletin, the university post-office service, *University Address Book,* the University Health Service which includes a complete physical examination, and other items.

General deposits.—At the student's first registration a deposit fee of $5 is required. From this are deducted from time to time such charges as may arise for locker rental, laboratory breakages, library fines, damage to university property, or any other similar matters. If the deposit becomes exhausted at any time another

deposit of $5 must be paid. The unused balance of the deposit will be returned at the close of the course, or upon withdrawal of the student at any earlier time.

Privilege fees.—The fee for the privilege of late registration, or late payment of fees is $2 through the third day of classes, on the fourth day the fee is $2.50 and then increases 50 cents per day to a maximum of $5. The fee for late change of registration is $2.

Chemical laboratory.—Each student at the beginning of the course will purchase at the chemistry storehouse a $5 card; against this will be charged the laboratory fee of $2, and materials and breakage for the quarter. Subsequent cards will be required in succeeding quarters, but unused portions may be returned for refund.

Examinations.—A special fee of $1 is charged for an examination to remove the grade of condition, and this becomes a $5 fee when the examination is taken at other than the set time.

Books.—The student should be prepared to purchase textbooks to the amount of at least $25.

Living expenses.—Good rooms for lodging may be secured in the vicinity of the campus for from $12 to $15 per month per student. This cost may be somewhat reduced when two students occupy the same room. These charges do not include personal laundry. Board may be obtained for from $5 to $8 per week. The Coffman Memorial Union maintains a cafeteria at which meals are furnished at a moderate cost. Information about lodgings may be obtained from the Housing Bureau on the campus.

STUDY REGULATIONS

Each student will complete the entire amount of work prescribed in the course of study, except in cases where some part of the required work has previously been satisfactorily completed. In all cases attendance is required for the full three quarters. (See Course of Study, page 11.) This work is not measured in credits, and is ordinarily not transferable, except on petition, to other institutions, or to the colleges of this University, in terms of credits toward a degree.

Quality of work.—Four grades, A, B, C, and D, are given for work of varying degrees of merit, D being the lowest passing grade. Work below passing is graded E, a condition, or F, failure. Work which is of passing grade, but for acceptable reasons not complete, may be graded I, incomplete, provided not more than one fourth remains incomplete, pending its satisfactory completion.

A condition is a temporary grade, representing a deficiency which may be made up, without repeating the course, either by doing additional work, or by examination, or by both, as the instructor may prescribe. (See examination fees, above.)

A failure must be made up by repeating the work, when it is next given. The work of the several quarters is not ordinarily repeated until the next year, hence a failure means a return to the University for completion. A student who in any quarter is deficient in an inordinate amount of work may be required to withdraw from the course and return a following year to repeat the work in which he is deficient.

N.B.—In all classes which run for more than one quarter, final grades are given only at the end of the last quarter of such class. Temporary grades, however, are given consideration in determining the status of students at the end of each quarter.

Attendance.—Students are expected to attend regularly all classes, laboratory sessions, lectures, and clinical calls. Instructors will report irregularities in attendance or excessive absence, for attention by the Students' Work Committee of the General Extension Division.

Tests.—All students, except those who have already completed satisfactory work in English composition, will be required to take the regular university college aptitude and English placement tests. These are ordinarily given in the first week of the fall quarter.

MISCELLANEOUS

Employment.—Students of this course sometimes obtain part-time employment in the mortuaries of Minneapolis and St. Paul. A list of these mortuaries is available on request. The cost of room rent is thus defrayed and perhaps some additional money earned. **The student should be advised, however, that he may carry only a limited amount of such outside work if he expects to complete the course successfully. The curriculum is crowded and will demand most of his time and energy.** Moreover, he is on call at all daytime hours to attend autopsies or to take part in the technical work of clinical cases. **Students are strongly advised not to attempt to attend this course unless they are able to make adequate provision for financing the year's work.**

Freshman Week.—Students in the Course in Embalming are invited to take part in the exercises of Freshman Week, September 25-28, provided for all new entering students. These days are occupied with a variety of events that have been found profitable to new students.

How To Study Institute.—Students in the Course in Embalming are also welcome to attend without charge the series of five lectures on how to study which come at 7:00 o'clock, Monday to Friday evenings, September 23-27.

Physical examination.—At some time during the three days September 26, 27, 28, all new students will present themselves at the Health Service for the compulsory physical examination.

University Library.—The University of Minnesota General Library, one of the most complete in the country, with a special division in the biological and medical sciences, is available for use by students in this course. The library has certain rules and regulations, copies of which will be furnished the students.

Athletic recreation.—The university facilities for physical education, recreational sports, and intramural activities are open to students of the Course in Embalming. Participation is invited. A booklet, giving detailed information regarding physical education and athletics for men, is issued to all students at the time of the physical examination, September 26, 27, 28. Any additional information may be obtained at the Intramural Athletics office, 203 Cooke Hall. Since membership on intercollegiate squads is limited to students who are candidates for a degree they are not open to students of this course.

Athletic tickets.—Students in the Course in Embalming are eligible to obtain the regular university athletic season tickets at the customary reduced rates. Directions for obtaining these tickets and schedules of games may be found in the Official Daily Bulletin.

EXAMINATIONS FOR UNIVERSITY CERTIFICATE

At the end of the last quarter of any class running for more than one quarter, examinations are given which cover the work of all preceding quarters in this class. The degree of success attained by any student in these examinations determines his final grades. At the close of the spring quarter the University Certificate in Embalming is issued to those students who have successfully completed all the work of the course. This is the University's recognition of satisfactory work; it should be understood that the certificates are issued entirely without reference to the legal requirements for the issuance of the Minnesota state embalmer's license. The requirements for that license and the qualifications for applicants are given below.

EXAMINATIONS FOR MINNESOTA STATE LICENSE

Candidates for a Minnesota embalmer's license must pass satisfactorily the examination given by the Minnesota Department of Health. The examination is conducted annually and is open to all applicants who have complied with the requirements of the law and the regulations of the Minnesota Department of Health, and is generally given at the close of the school year. The Department of Health is responsible for its examinations and collects a fee of $10 from each applicant. After complying with the necessary qualifications given below and passing these examinations, the applicant will receive the state license. Students in this course should discriminate carefully between the state requirements for a license and the requirements of the University for a certificate.

Necessary qualifications.—The Minnesota Department of Health requirements for embalmer's license are as follows:

Embalmers—Examination and License

29. Every person who wishes to qualify as competent to embalm dead human bodies, prepare for shipment or ship them, or have charge in cases of death from any communicable disease, as required by the laws of the State of Minnesota (Sections 5817-5820 inclusive, 1940 Supplement to Mason's *Minnesota Statutes, 1927)* shall comply with the following requirements:

He shall make application to the Minnesota State Board of Health for a license. Such application shall contain the name of the applicant in full, age, and place of residence. It shall be endorsed by a licensed embalmer and two registered physicians of good repute as to the applicant's general standing.

Necessary Qualifications

The applicant must be at least twenty-one years of age; must have satisfactorily completed at least one scholastic year in a general educational course at an accredited college or university, and in addition thereto must have completed a course of study and secured a certificate of graduation from the Course in Embalming conducted by the University of Minnesota or any established school of embalming recognized and graded "AA" or "A" by the Conference of Embalmers Examining Boards of the United States, Incorporated.

N.B.—It is required that the year of collegiate education be completed in advance of the Course in Embalming. Examinations for license will not be given unless this requirement is fulfilled.

Provided further, said applicant has had at least one year of practical experience (apprenticeship) under a licensed embalmer, during which he has embalmed or helped to embalm at least twenty-five bodies, such practical experience (apprenticeship) having been served in its entirety subsequent to having completed the educational work outlined herein, and on condition applicant has been registered with the State Board of Health during the full period of his practical experience, or apprenticeship. Applicant must be of good moral character. Applicant

must attain a proficiency of at least seventy-five (75) per cent in each of the following subjects, in which he shall be examined by the State Board of Health:

Anatomy	10 questions
Bacteriology	10 questions
Elementary Chemistry	10 questions
Public Health, Sanitation, and Laws and Regulations	20 questions
The Practice of Embalming	20 questions
Business Methods	5 questions

N.B.—By recent action of the Minnesota State Board of Health no examination for a license will be given to anyone under twenty years of age.

For further information concerning the state embalmer's license apply to the State Department of Health, State Office Building, St. Paul.

COURSE OF STUDY

The following subjects constitute the work of the Course in Embalming; hours indicated are approximate. These subjects are divided among the three quarters which constitute the year and a program of their times and places of meeting is issued at the beginning of each quarter. Each student will consider himself obligated to do all the work prescribed. Students who have satisfactorily completed in some recognized collegiate institution any studies that appear equivalent to any of the required subjects may apply for permission to substitute these studies for a portion of the requirement. Applications for this permission will be considered on their individual merits and no general conditions of acceptance are set up. Two considerations must be kept in mind: students who are candidates for a Minnesota license must take the final examinations in subjects required for that license, even tho they have substituted credits; and no substitutions may operate to shorten the time of the course.

ANATOMY

Shirley P. Miller, Ph.D., Assistant Professor of Anatomy, and assistants.

144 hours. Lectures, recitations, and laboratory demonstrations of the thoracic and abdominal viscera. The laboratory work will deal with both microscopic anatomy and gross dissection. Each student will obtain experience in personally raising different arteries, and will familiarize himself with the anatomy relating to practical embalming. Subjects of study:

1. The cells, tissues, organs
2. The framework of the body
3. The musculature: topography of the viscera
4. The alimentary canal
5. The circulatory system
6. The respiratory system
7. The urinary system
8. The reproductive system

ART

S. Chatwood Burton, M.A., Professor of Fine Arts.

24 hours. Lectures and practical demonstrations in sculpture, color, light, and design. Subjects of study:

Sculpture.—(1) The art of modeling and its applications to the rebuilding of the human body. (2) The structure of the skull. (3) Muscular structure. (4) Differences in muscular coverings. (5) Forms to be found in the eyes, mouth, nose, and other portions of the face, head, and body. (6) Methods and materials used in the making of death masks.

Color.—(1) Analyses of color. (2) How color reveals or destroys form. (3) Color to give the effect of beauty. (4) Effect of environment on the appearance of color. (5) Subtractive and additive methods of mixing colors.

Light and shade.—(1) Light and shade in vision and the arts. (2) Light and its effect on form. (3) Exterior lightings. (4) Reflective light and its uses. (5) Light to express moods. (6) Light to present beauty and character.

Design.—Its application to floral arrangements, caskets, and interiors.

BACTERIOLOGY

Winford P. Larson, M.D., Professor of Bacteriology, and assistants.

72 hours. Lectures, recitations, demonstrations, and practical work for each student. Subjects of study:

1. Classification of bacteria. Morphological types
2. Saprophytic bacteria in their relation to the natural processes of putrefaction, liquefaction, and oxidation of animal and vegetable tissues
3. Parasitic or disease-producing bacteria
4. Methods of differentiating bacteria
5. Methods of cultivating bacteria
6. Methods of estimating the number of bacteria in measured quantities of material
7. Practical studies of disinfection and disinfectants

BUSINESS METHODS

Reuel I. Lund, M.A., C.P.A., Instructor in Accounting.

24 hours. It is intended that this course shall survey the broad field of business activities as they may apply more or less directly to the vocation of embalming. Topics covered will be:

1. Accounting, both financial and cost accounting, having special reference to the general adoption of uniform methods
2. Selling and pricing
3. Economic institutions with which the embalmer comes into immediate contact; banking, insurance
4. Office methods and business correspondence

CHEMISTRY

Norville C. Pervier, Ph.D., Assistant Professor of Chemistry.

180 hours. Lectures, demonstrations, and individual laboratory work covering fundamental ideas of inorganic and organic chemistry. The chemistry of the body and of disinfection and sanitation and certain general chemical actions involved in the work of embalmers will be presented. Subjects of study:

1. General Principles: (a) the science of chemistry, (b) the structure of matter, (c) the behavior of matter, (d) chemical action, (e) types of chemical change.
2. Inorganic Chemistry: (a) typical nonmetallic elements, (b) solutions, (c) acids, bases, and salts, (d) ionization, (e) typical metallic elements, (f) naming of chemical compounds.
3. Organic Chemistry: (a) classification, (b) structure, (c) reaction, (d) naming.
4. Physiological Chemistry: (a) enzymes and enzyme action, (b) compounds usual in organizing life, (c) respiratory processes, (d) digestive processes, (e) chemical actions in the tissues, (f) colloids.
5. Toxicology: (a) classification of poisons, (b) action in the body, (c) diagnosis of poisoning, (d) tests, (e) antidotes, (f) Minnesota law.
6. Chemical Changes in Cadavers: (a) signs of death, (b) rigor, (c) autolysis, (d) putrefaction, (e) adipocere, (f) tissue gas, (g) lividities.
7. Disinfection: (a) standardization, (b) chemicals and concentrations used, (c) methods, (d) calculations.
8. Embalming Fluids: (a) ingredients, (b) chemical actions in the body, (c) testing, (d) compounding, (e) analysis, (f) calculations.

ENGLISH

Ray Livingston, B.S., Instructor in English.

72 hours. The fundamentals of good spoken and written English together with an orientation in modern periodical literature and the problems it deals with. Some reading in the literature of the profession. Lectures and drills on the fundamentals of grammar and rhetoric. Practice in writing themes, research papers, business correspondence; practice in preparing and giving oral reports and speeches.

FUNERAL LAW

Arthur L. H. Street, Attorney, Lecturer.

12 hours. Lectures on basic funeral law and mortuary jurisprudence.

FUNERAL MANAGEMENT

Twin City funeral directors and university instructors.

24 hours. These lectures are intended to acquaint the student with the best current practice in funeral management. They offer an opportunity to meet local morticians of long experience and high standing, and to acquire practical, dependable information about the important aspects of operating a funeral establishment—an opportunity whose value students will readily appreciate. The lectures will deal with such subjects as the following:

History of Embalming, Ancient and Modern Burial Customs
The Literature of Mortuary Practice
The Ethics of Funeral Directing
The Conduct of Catholic, Episcopal, Jewish, Fraternal Organization, and Military Funerals
First Aid
Building and Remodeling Funeral Homes
Furnishing a Funeral Establishment
Metal Caskets and Vaults
Wooden Materials Used in Mortuary Practice
Automotive Equipment
Showrooms and Salesmanship
Costs and Overhead Expenses
Advertising
Selling
Credits and Collections
The Funeral Director's Place in the Community
The State Association of Funeral Directors

INTRODUCTION TO ACCOUNTING

Reuel I. Lund, M.A., C.P.A., Instructor in Accounting.

48 hours. Preparation of financial statements, and their significance; analysis of transactions for their debit and credit entries to the ledger; journalization; posting; trial balance and its use; adjusting and closing entries; division of the journal; columnar journals. At the close an accounting set for a funeral establishment will be developed.

PATHOLOGY AND AUTOPSIES

Elexious T. Bell, M.D., Professor of Pathology, and assistants.

72 hours. Lectures on gross pathology, with demonstration. Attendance at autopsies when arrangements can be made.

PERSONAL HYGIENE AND ELEMENTARY SANITATION

Bernard A. Watson, M.D., Assistant Professor of Hygiene.

24 hours. Elementary principles of normal body functions; predisposing and actual causes of disease; ways in which disease may be avoided.

PRACTICAL EMBALMING AND FUNERAL DIRECTION

F. Lloyd Hansen, M.A., Instructor in Embalming.

144 hours. Lectures, demonstrations, and other visual presentations, laboratory practice, and clinical work. Class participation in actual embalming will be emphasized. Subjects of study will include the following:

1. Scope of profession
2. Modes of death
3. Signs of death
   a. Livoris mortis
   b. Algor mortis
   c. Rigor mortis
   d. Decomposition and putrefaction
4. Discoloration
   a. Cause
   b. Prevention
   c. Removal
5. Embalming
   a. Pre-embalming technique
   b. Arterial
   c. Cavity
   d. Penetration
6. Violent deaths
   a. Poisons
   b. Gunshot wounds
   c. Mutilated cases
7. First call
8. Lay-out of body
9. Dressing of body
10. Analysis of cases
    a. Tissue gas and gas gangrene
    b. Edema
    c. Jaundice
    d. Frozen bodies
    e. Burns
    f. Communicable diseases
    g. Preparation for transportation
    h. Autopsies
11. Embalming hygiene
12. Funeral directing and management
    a. Pricing
    b. Salesroom arrangement and selling
    c. Advertising
    d. Collections
    e. Funeral arrangements

PSYCHOLOGY

Wendell White, Ph.D., Assistant Professor of Psychology.

24 hours. Research conducted in psychology laboratories has made possible the formation of many principles on the subject of dealing with people. It will be the purpose of this course to present to the funeral director those principles which bear directly on his two major problems—getting the client to make the proper decision regarding his purchases and comforting those in distress.

PUBLIC HEALTH

The Minnesota State Department of Health staff will give a series of lectures arranged by the executive officer, Dr. A. J. Chesley, and the directors:

Donald A. Dukelow, M.D., Director, Health Education
Harold A. Whittaker, B.A., Director, Division of Sanitation
R. R. Sullivan, M.D., Epidemiologist, Division of Venereal Diseases
Gerda C. Pierson, Director, Division of Vital Statistics
Viktor O. Wilson, M.D., Director, Division of Child Hygiene
O. C. Pierson, Director, Division of Administration

36 hours. The purpose of this series of lectures is to set forth the basic principles of public health and to explain the important duties and activities of the state department of health. It offers the future embalmer and funeral director

valuable orientation in his responsibilities for the health of his community and in his relationships with the state department of health. Presentation will be through lectures and motion pictures. Subjects of study will include:

1. Public health laws and regulations
2. Preventable diseases
3. Public sanitation
4. Venereal diseases
5. Vital statistics
6. Child hygiene

EMBALMING CLINICS

Throughout the year all students will be subject to call to attend cases made available through the courtesy of Twin City funeral directors, the local morgues, or other agencies. These clinical demonstrations are under the direction of practicing embalmers regularly employed for the purpose. Every possible opportunity will be given students to observe the techniques of different embalmers, and when practicable, to assist in preparations. Attendance at these sessions is compulsory, but the practical value of the demonstrations makes such a requirement unnecessary

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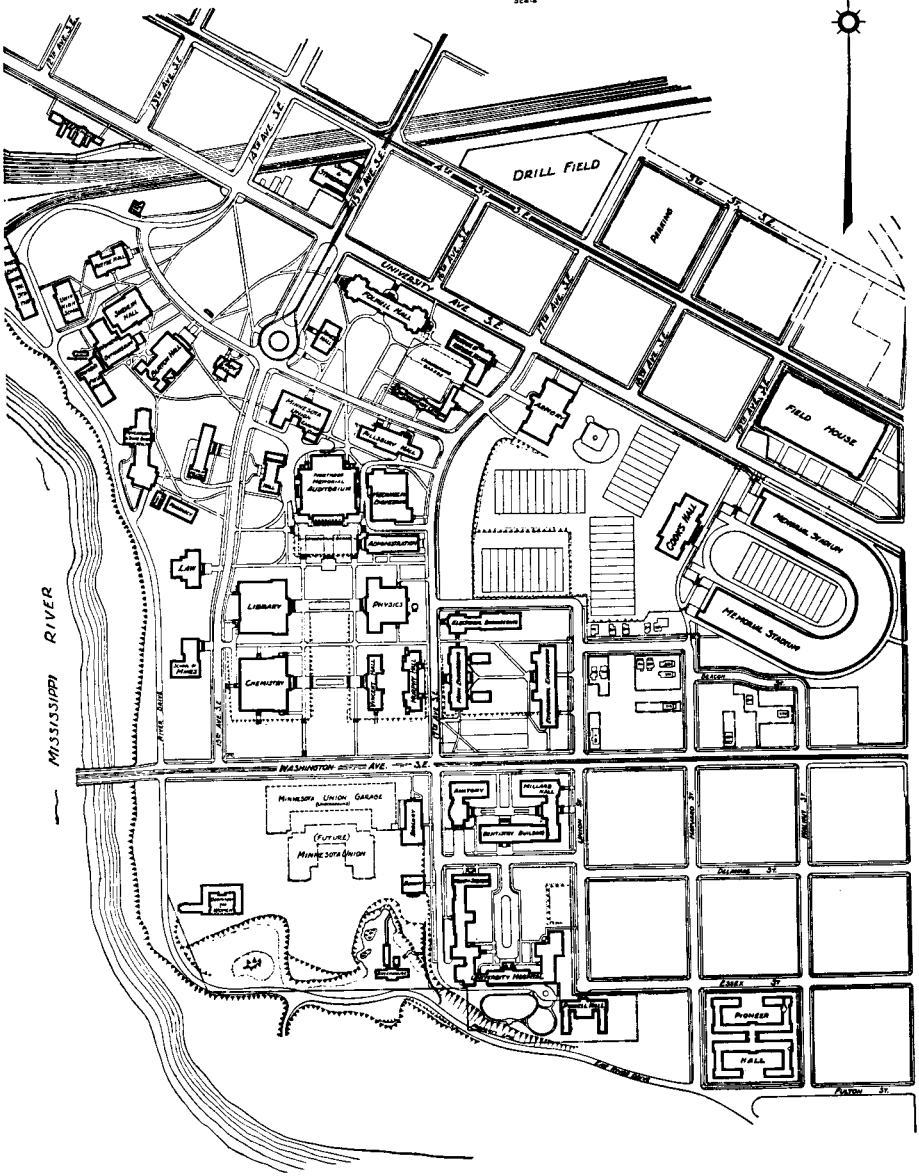
Correspondence should be addressed to

THE GENERAL EXTENSION DIVISION,
RICHARD R. PRICE, Director
UNIVERSITY OF MINNESOTA,
MINNEAPOLIS, MINNESOTA

UNIVERSITY OF MINNESOTA

MAIN CAMPUS



The Bulletin of the
UNIVERSITY *of* MINNESOTA

Division of Library Instruction
Announcement for the Year 1940-1941

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OFFICERS AND FACULTY

Guy Stanton Ford, Ph.D., Litt.D., LL.D., L.H.D., President

Frank K. Walter, M.A., M.L.S., University Librarian, Director of the Division of Library Instruction, and Professor of Library Methods

Rodney M. West, B.A., Registrar

Lura C. Hutchinson, B.A., Associate Professor of Cataloging, Classification, Reference, and Selection of Books

Harold Russell, B.A., B.L.S., Reference Librarian, University of Minnesota Library, Assistant Professor of Library Methods and Bibliography

Margaret R. Greer, B.A., B.S., Director of School Libraries, Minneapolis Board of Education, Instructor in School Library Administration

Perrie Jones, B.A., Librarian, St. Paul Public Library, Instructor in Hospital Librarianship

Della McGregor, B.A., Chief, Juvenile Department, St. Paul Public Library, Instructor in Library Work with Children

Mildred L. Methven, B.A., B.L.S., Institution Librarian, Minnesota State Board of Control, Instructor in Hospital Librarianship

Raymond H. Shove, B.S. in L.S., M.A., Head of Order and Binding Department, University of Minnesota Library, Instructor in Library Methods and Bibliography

Carl Vitz, B.A., B.L.S., Librarian, Minneapolis Public Library, Instructor in Public Library Administration

Isabelle T. Anderson, B.A., B.S. in L.S., Librarian, Ramsey County Medical Society, Lecturer on Medical Reference

Joyce Davenport, M.A., B.S., Reference Assistant, University of Minnesota Library, Lecturer on Library Methods

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Blanche Moen, B.A., Reference Assistant, University of Minnesota Library, Lecturer on Library Methods

Marguerite E. Ogden, B.S., Assistant, University of Minnesota Library, Lecturer on Library Methods

GENERAL INFORMATION

The Division of Library Instruction of the University of Minnesota was established by the regents of the University in April, 1928. It is an instructional unit and does not admit students or confer degrees. Students who wish to elect its courses must be registered in some one of the colleges of the University. The purpose of the division is to unite all the facilities of the University for training for professional service in libraries of varied types. It prepares and conducts for the various instructional units of the University interested in such training, curricula or programs to be offered for credit by these units.

Credits for its courses are given by the schools or colleges approving them for inclusion in their curricula. Students who offer these courses as a partial requirement for a degree must comply in every particular with the specific requirements of the school or college from which the degree is desired. These specific requirements are described in the regular announcements of the various schools and colleges of the University, which are obtainable on application to the registrar of the University.

The professional courses in library instruction are for Senior College students. At least two full years of approved college work are required as prerequisite for regular admission to any of these courses and at least three years of approved preliminary college work, in addition to a full year in library instruction, are required for a degree. The College of Science, Literature, and the Arts and the University College accept only library training students with senior standing. The College of Education will credit a minor of library training during the junior year, but requires a full four-year program for a degree. (See page 10.) School of Business Administration students desiring library instruction credits must have senior standing. Students in the College of Agriculture, Forestry, and Home Economics may also receive credit by special arrangement. Persons not eligible for regular registration may be admitted as unclassed students only by complying with such college regulations or by passing such tests as may be required.

Library instruction implies a good educational background. Students in full senior standing are eligible for admission, but all who are able to complete a full four-year college course *before* admission to this division are urged to do so. Many in each class have at least a Bachelor's degree before entering this division. Admission to the second (or graduate) year of library schools offering advanced work is usually conditioned on at least five years' preparation (four full years of college work and a year of library training). Most of the more responsible library positions have the same requirements and graduates of the division without this five-year preparation are becoming increasingly handicapped in obtaining suitable employment.

Experience in a good library enables students to gain a knowledge of library organization and terminology which is of real advantage especially in the first quarter of the course. Inexperienced students who can obtain such experience in *a well-organized library* should plan to do so for at least a month, through voluntary service or otherwise.

Library work involves making records of various kinds. Legible handwriting is important. Both legibility and speed are needed in making records and all pro-

spective students should have some facility in the use of the typewriter. Since there is little time or opportunity to acquire it during the course, this ability to type should be acquired in advance. Inability to use a typewriter, at least reasonably well, often proves a disadvantage in applying for a library position. Since it is not possible to provide free typewriter service for all students it is very advantageous for students to have typewriters of their own or to rent them for personal use from the several agencies near the campus.

Employment.—The number of persons trained for library work at present exceeds the number of suitable positions available. Consequently, library boards are generally demanding broader education, acceptable personality, and more professional training and experience on the part of candidates for library positions. Prospective students of low or mediocre scholastic standing, unsuitable personality, impaired health, or marked physical disability are not advised to register in this division. There are very few positions for such persons or for those who have failed in other vocations, those unable or unwilling to obtain adequate training, or those over thirty-five years of age.

Every effort is made by the division and the other appropriate placement agencies of the University to assist students to obtain positions, but no promise of employment can be made, and the division cannot hold itself responsible for failure to secure employment. Local and general economic conditions determine the number and kind of positions available at any given time. These may vary from year to year and the division is powerless to control either the conditions or the positions. Even when positions are available, all that can be done for the student is to introduce him, as favorably as truth will permit, to prospective employers. His personal and professional qualifications must eventually determine his securing and holding the position.

Nonresident students.—Preference in admission is given to suitably prepared residents of Minnesota. The University has established a quota for out-of-state students. Nonresidents of Minnesota are therefore advised to apply and present their credentials as early as practicable to increase their chances of admission.

Registration.—All students, whether full time or part time, or auditors must be regularly registered. Full information concerning registration is given in the Bulletin of General Information, which may be obtained on application to the registrar of the University.

Lib. Meth. 1 is not a part of the professional curriculum of the Division of Library Instruction. Lib. Meth. 51 to 126 are professional courses open only to senior students or graduates (except those taking them as a major or a minor in the College of Education). The completion of a full year in library methods is accepted for graduation as the equivalent of the senior year in the College of Science, Literature, and the Arts, the College of Education, and the University College. Senior students from other colleges may be admitted and receive credit on approval by the dean of the college concerned and the director of the Division of Library Instruction.

The division is accredited as a Class III school (one requiring less than four years of college work for admission) by the American Library Association. It is also a member of the Association of American Library Schools.

COURSES OF STUDY

Two programs, one of one year in the College of Science, Literature, and the Arts, and the other in the College of Education, leading to the degree of bachelor of science are offered. Each requires for its completion four full years of work, including a full year of professional training (45 quarter credits) in library methods, in the college in which the student is registered. All regulations of the college from which the degree is desired must be complied with before the degree will be granted. Credit for certain courses in library instruction will also be given in the School of Business Administration and the College of Agriculture, Forestry, and Home Economics. Permission for such credit must be obtained from the deans of these colleges. Special programs involving a full year of library work and eligibility for a degree may be arranged with the director of the University College. Since the course is a full year's sequence it is not advisable to begin it at any time other than at the beginning of the fall quarter. A special course in Hospital Librarianship is offered in the spring quarter. See pages 10-11 for the special requirements for admission.

Credits from other approved library training schools of equivalent grade may be accepted as prerequisites to advanced courses in the same fields but cannot be used to shorten the year of resident work required in the Division of Library Instruction. Resident credit will be given for the satisfactory completion of Summer Session courses offered by the University under the general direction of the division. Up to the present, certain conditions which apply particularly to the school libraries of the state have made it impossible to offer these summer courses in the order of the regular schedule and thus shorten materially the time required in residence for a degree with a library training major.

Correspondence study courses.—A few correspondence study courses are offered by the General Extension Division. These courses are not conducted by the Division of Library Instruction and no credit is given for them in the regular course. They may be offered as prerequisites for advanced resident work in their specific subjects.

DESCRIPTION OF COURSES

COURSE NUMBERING

A course is designated by a department name, a number, and a letter. It has the same number in whatever quarter it is offered. The quarter is indicated by the letter (f, fall; w, winter; s, spring; su, summer), e.g.:

1f-2w, a two-quarter course given in the fall and winter.
1w-2s, the same course given in the winter and spring.
3f,w,s, a one-quarter course given each quarter.

Senior College courses are numbered as follows: courses primarily for juniors and seniors, from 50 to 99; for juniors, seniors, and graduates, from 100 to 199; for graduates only from 200 up. The hours of recitation are numbered by roman numerals, the day by the appropriate initial, the room by an arabic numeral, and the building by an abbreviation. For example, (MWF III; 5Lib.) means that the

class meets Monday, Wednesday, and Friday, the third recitation hour, in Room 5, Library.

FRESHMAN AND SOPHOMORE NONPROFESSIONAL COURSE

Lib.Meth. 1f,w,s. Use of Books and Libraries. Study of reference material for personal study and research. No credit toward a degree in library instruction, but general credit is given in the College of Science, Literature, and the Arts, and in such other schools and colleges as may, by special arrangement, desire their students to be registered in the course. (2 cred.; fr., soph. only except by special permission; no prereq.; Sec. 1, MW II, 3Lib., Mr. Russell, Miss Moen; Sec. 2, MW IV, 3Lib., Mr. Shove, Miss Ogden; Sec. 3, MW VI, 3Lib., Miss Davenport.)

PROFESSIONAL COURSES*

For the courses below, aggregating a full year of college work, credit is given only to students who have met all the requirements for admission to the Senior College courses in the colleges specified above, except as specified on pages 8-10. Courses 52, 54, 61, and 62 are required of all candidates for a degree.

Lib.Meth. 51f. Bibliography. Trade and national bibliography of the United States, Great Britain, and Europe; book ordering methods. (3 cred.; no prereq.; MWF III; 5Lib.) Mr. Shove.

Lib.Meth. 52f. Cataloging. Elements of dictionary cataloging. Lecture, problems, and practice. Required of all candidates for a degree in library methods. (3 cred.; no prereq.; Sec. 1, MWF I, education students; Sec. 2, MWF IV; 5Lib.) Miss Hutchinson.

Lib.Meth.53w. Advanced Cataloging. Continuation of Lib.Meth. 52, with special attention to difficult books and administrative aspects of a catalog department. (3 cred.; prereq. Lib.Meth. 52; MWF IV; 5Lib.) Miss Hutchinson.

Lib.Meth. 54f. Classification. Classification by the Dewey Decimal System, author numbers, shelf and accession records. Required of all candidates for a degree. (3 cred.; no prereq.; TThS II; 5Lib.) Miss Hutchinson.

Lib.Meth. 55w. Advanced Classification. Continuation of Lib.Meth. 54. Library of Congress and other classifications; classed catalogs; special adaptations of classification. (3 cred.; prereq. Lib.Meth. 54; TThS II; 5Lib.) Miss Hutchinson.

Lib.Meth. 57s. Secondary School Libraries. Administrative methods and problems, including methods of teaching the use of the library. (3 cred.; prereq. 9 cred. in library methods; W VIII, S I, IV; 5Lib.) Miss Greer.

Lib.Meth. 58s. Public Library Administration. Administration, equipment, finance, and extension work of public libraries. (3 cred.; prereq. 9 cred. in library methods; TThS II; 5Lib.) Mr. Vitz.

Lib.Meth. 60f. Library Binding. Economics of library binding. Materials, processes, records, book repair. (1 cred.; no prereq.; T III; 5Lib.) Mr. Walter.

Lib.Meth. 61f,w,s. Library Practice. Practice, under supervision, in Minneapolis and St. Paul libraries. The time and character of the practice will be individually arranged to suit student aptitudes, usually in the second and third quarters. Required of all candidates for a degree in library methods. See pages 8-10 for College of Education regulations. (4½ cred. for College of

* See Fees and Expenses, page 10.

Education students to meet requirements of the Minnesota State Education Department for school librarians; others, 3 cred.; prereq. 15 cred. in library methods or satisfactory library experience.) Mr. Walter, Miss Hutchinson.

Lib.Meth. 62w. Reference. Reference books and other material with emphasis on methods of search and adaptation of material to needs of users. Required of all candidates for a degree in library methods. (3 cred.; no prereq.; MWF III; 5Lib.) Miss Hutchinson.

Lib.Meth. 63s. Advanced Reference. Continuation of Lib.Meth. 62. Specialized reference material, public documents, and periodicals. Reference lists and reports on special problems. (3 cred.; prereq. Lib.Meth. 62; MWF III; 5Lib.) Miss Hutchinson.

Lib.Meth. 64s. Selection of Books for Adolescents. Principles of selection and criticism of representative books. Study and preparation of book lists for adolescents in school and public libraries. (3 cred.; prereq. 9 cred. in library methods; MWF II; 5Lib.) Miss McGregor.

Lib.Meth. 67w. Library Printing. Preparation of copy, editing, proofreading, layout of library publications. Criticism of typical printed material. (1 cred.; no prereq.; T III; 5Lib.) Mr. Walter.

Lib.Meth. 68s. Circulation Work. Lending systems and records. Library publicity. (1 cred.; prereq. 9 cred. in library methods; T III; 5Lib.) Mr. Walter.

Lib.Meth. 69f. Current Library Problems. Discussion of typical problems and conditions in American libraries. (3 cred.; prereq. 9 cred. in library methods or simultaneously with Lib.Meth. 51, 52, 54; MWF II; 5Lib.) Mr. Walter.

Lib.Meth. 70w. Current Library Problems. Continuation of Lib.Meth. 69. Library administration, college and university libraries, library buildings, library surveys, etc. (3 cred.; prereq. Lib.Meth. 69; MWF II; 5Lib.) Mr. Walter.

Lib.Meth. 71w. Library Work with Children. Administration of children's rooms and book selection. (3 cred.; prereq. 9 cred. in library methods or 6 cred. and one 3-cred. course in library training simultaneously with 71; MWF I; 5Lib.) Miss McGregor.

Lib.Meth. 72s. Library Work with Children. Continuation of Lib.Meth. 71. Further discussion of administration of children's rooms and book selection. (3 cred.; prereq. Lib.Meth. 71; MWF I; 5Lib.) Miss McGregor.

Lib.Meth. 73f. Selection of Books for Adults. Principles of selection and criticism of representative books. Criticism and preparation of book lists. (2 cred.; no prereq.; ThS III; 5Lib.) Miss Hutchinson.

Lib.Meth. 74w. Selection of Books for Adults. Continuation of Lib.Meth. 73. Further discussion of books and aids to book selection. (2 cred.; prereq. Lib.Meth. 73; ThS III; 5Lib.) Miss Hutchinson.

Lib.Meth. 75s. Selection of Books for Adults. Continuation of Lib.Meth. 74. (2 cred.; prereq. Lib.Meth. 73, 74; ThS III; 5Lib.) Miss Hutchinson.

Lib.Meth. 76s. Library Service in Hospitals. Organization and technical methods suitable for hospital libraries. (3 cred.; TThS I; 3Lib.) Miss Jones.

Lib.Meth.77s. Book Selection for Hospital Patients. Criticism and discussion of reading suitable for varied types of patients. Lectures, and assigned problems. (3 cred.; MWF IV; 3Lib.) Miss Jones, Miss Methven.

Lib.Meth. 78s. Reading and the Mental Patient. Special problems of work with varied types of mental patients. (2 cred.; TS III; 3Lib.) Miss Jones.

Lib.Meth. 79s. Medical Reference. Reference books and technical methods for hospital staffs. (3 cred.; MWF II; 314Lib.) Mr. Walter, Miss Anderson, Miss Norris.

Lib.Meth. 80s. Hospital Library Practice. A six-week internship in approved hospitals. (4 cred.; prereq. Lib.Meth. 76, 77, 78, 79.) Miss Methven.

Lib.Meth. 126s. Subject Bibliography. National and subject bibliographies of important countries. Special emphasis on research material and methods. (Prereq. senior or graduate standing, reading knowledge of French or German, and some experience in research or bibliographic study or projects; MWF I; 3Lib.) Mr. Russell.

CURRICULUM IN THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

For the course in library training, leading to the degree of bachelor of science in the College of Science, Literature, and the Arts, a student must first complete satisfactorily three years of academic work. During his third year the student will elect work in the Senior College subject to the approval of the assistant dean for the Senior College. During these three years the student must secure at least 135 credits, and an average of one honor point per credit for all credits earned.* At least 30 credits must be in Senior College courses. The student is subject to all the regulations which govern the work of other Arts students. He must complete his academic requirements before beginning the courses in library instruction.

For admission to the fourth year of this course the student must secure the written approval of the assistant dean for the Senior College of the College of Science, Literature, and the Arts.

During the fourth year a student will elect not less than 45 credits from courses listed on pages 6-8, and must maintain an average of one honor point per credit for all the credits earned.

College graduates technically ineligible for the degree who meet all other requirements and who complete satisfactorily a full year of work in the division will be given a certificate.

Students from other institutions desiring a degree in library training must meet the same specific requirements which students of the University of Minnesota must meet. A full college year of work is required for the degree in library instruction, hence "transfer credits" in this field cannot be accepted.

COLLEGE OF EDUCATION

SPECIALIZED CURRICULA FOR SCHOOL LIBRARIANS

The following curricula have been arranged in co-operation with the College of Education to offer professional library training to persons who desire to do library work in connection with the public schools.

Successful completion of one of the four-year curricula will entitle the student to the degree of bachelor of science. Curriculum A will also entitle the student to receive the Minnesota high school general certificate for teaching academic subjects in junior and senior high schools.

Students qualify for a secondary school certificate by completing requirements for a teaching major or two teaching minors in subjects commonly taught in Minnesota high schools. It will usually be wisest to choose majors and minors in the fields of English, history, and the social studies. Such students are required to take special methods and directed teaching in the teaching major or in one of the minors. They are also required to take five credits in education selected from the list of education electives. (See College of Education Bulletin.)

* The number of credits required may be reduced by application of the "quality credit" rules given in paragraphs 34, 35, 36 on page 6 of the Bulletin of the College of Science, Literature, and the Arts, 1939-40.

Students registered in the College of Education are expected to do part of their practice work in the University High School library and part in another approved school library or public library branch doing school library work.

Graduates of the College of Education who already have an elementary or secondary school certificate and who complete an additional year of library training (45 credits) as registered students in the college, will be granted an official certificate for library work on satisfactory completion of a year's work in the division.

The College of Education requires of all students a C+ average in the major for graduation. The C+ average in these curricula is based on the 45 credits of library work.

A. FOUR-YEAR CURRICULUM FOR SCHOOL LIBRARIANS WITH CERTIFICATE FOR TEACHING ACADEMIC SUBJECTS

Junior College, College of Science, Literature, and the Arts

Freshman Year

Course No.	Title	Credits
Eng. A-B-C or	Freshman English	15
Comp. 4-5-6	Freshman Composition (or exemption from the requirement)	9
Hist. 1-2-3	European Civilization	12
	Language	15
Phys.Ed. 1-2-3	General Course in Physical Education	3
	Total	45

Sophomore Year

Psy. 1-2	General Psychology	6
	Natural Science	10
	Language	5
Phys.Ed. 4-7	General Course in Physical Education	2
	Electives†	24
	Total	47

College of Education

Junior Year

Lib.Meth. 52	Cataloging	3
Lib.Meth. 54	Classification	3
Lib.Meth. 62	Reference	3
Lib.Meth. 57 Lib.Meth 58 Lib.Meth. 64	Secondary School Libraries Public Library Administration Selection of Books for Adolescents } any two	6
Lib.Meth. 71	Library Work with Children	3
Ed. 51A-B-C	Introduction to Secondary School Teaching	9
	Continuation of required elective academic courses†	18
	Total	45

Senior Year

Special Methods and Directed Teaching§	9
Completion of academic requirements—fall, winter, spring.	
Library courses	27
Electives in education†	5
General electives†	4
Total	45

† Electives should be selected to meet the requirements of one teaching major or two teaching minors. Electives should also include five credits selected from the list of professional courses on pp. 21-22 College of Education Bulletin, 1938-40.

§ Passing the qualifying examination in English is prerequisite to this course.

B. SCHOOL LIBRARIANS WITHOUT TEACHING DUTIES

Students who wish to qualify as full-time librarians but *not as teachers* of academic subjects will be required to take 22½ selected quarter hours in education. These 22½ credits shall include Ed.51A-B-C, Introduction to Secondary School Teaching or Ed.61A-B-C, Introduction to Elementary School Teaching, 9 credits; Lib.Meth.58, Secondary School Libraries; and Lib.Meth.61, Library Practice, 4½ credits. The remaining 6 credits are to be selected from the list of education electives. (See College of Education Bulletin.) The remainder of the curriculum is the same as curriculum A.

MINOR IN LIBRARY TRAINING

Students who complete 18 credits selected from Course 52, 54, 57, 58, 62, 64, 71, and 72 will satisfy the requirement for a minor in library training in the College of Education.

TRAINING FOR HOSPITAL LIBRARIANSHIP

A course in Hospital Librarianship is offered in the spring quarter. It is given with the active co-operation of the Minnesota State Department of Social Security, which has jurisdiction over all hospitals and other institutions for the sick, underprivileged, and the socially maladjusted, supported by the state. The demand for specially trained librarians for hospital, medical, and institutional libraries is increasing.

As far as a preliminary investigation indicates, no extended course of this kind is given in any other institution for the training of librarians. Lectures, discussions, reports, and observation and a six-week period of practice, or internship, in selected institutions are essential parts of the course. The regular instructors are assisted by a large group of medical and library experts in the special fields treated.

CURRICULUM

The course in addition to the prerequisites noted in the section on "Admission" (see below) includes the following specific courses in library methods: 76s, 77s, 78s, 80s. For details see pages 7-8.

ADMISSION

Candidates for admission to this special course must have completed satisfactorily (1) at least three years of approved college work and at least two quarters of work in an approved library school or an equivalent of approved experience in hospital library work, and (2) the following courses or their equivalents: Preventive Medicine and Public Health 50, Public and Personal Health, (3 credits); Psychology 1-2, General, (6 credits); Psychology 144-145, Abnormal Psychology, (6 credits); Sociology 1, Introduction, (5 credits); Sociology 49, Social Pathology, (3 credits); Sociology 90, Survey of Social Work, (5 credits); Zoology 1-2-3, General Zoology, (10 credits). Students are advised to register only for the entire group of courses, and no candidates for a special certificate will be excused from field observation and practice. Opportunity for individual study of problems of special interest will be given as far as practicable. All prospective students who have not taken their preliminary work at the University of Minnesota must apply for admission to this University and must submit their credentials to the registrar of the University of Minnesota, Minneapolis, Minnesota. Since each application

requires special consideration early application is extremely desirable. It is expected that only those who are genuinely interested in work in hospitals, who are physically able to do such work, are willing to accept positions in them, and have personal and educational qualifications for such work will apply.

For admission to the Library School and to the Course in Hospital Librarianship a special certificate must be secured from the assistant dean for the Senior College of the College of Science, Literature, and the Arts.

Credit toward the degree bachelor of science will be given properly qualified students. Those who are not candidates or eligible for the degree, as well as graduates who satisfactorily complete this special work, will be given a special certificate for the satisfactory completion of the entire course, including the six weeks' internship. Students in this course will normally register in the College of Science, Literature, and the Arts and must comply with the regulations of that college as given in the Bulletin of General Information of the University.

FEES AND EXPENSES

A fee of $3 per credit hour for residents of Minnesota and $3.50 for nonresidents is charged for all courses under the jurisdiction of the Division of Library Instruction. Residents of Minnesota may elect the full 15 hours for $40, nonresidents, $50. An incidental fee of $8.50 for the quarter gives the student the privileges of the University Health Service, the Coffman Memorial Union, and certain other privileges. A matriculation deposit, $10, is charged to cover locker rent, library fines, or damage to university property. Any unused balance will be refunded by mail after the beginning of the first quarter the student is no longer in attendance. Room and board costs from $80 upward for the quarter. Further information and assistance regarding rooms and board can be obtained from the director of housing, University of Minnesota, Minneapolis, Minnesota. From $40 to $50 should be allowed for expenses attending the field practice and internship. Textbooks will cost about $25 for the year. Each prospective student should obtain the Bulletin of General Information, which is obtainable on application from the registrar, for further information regarding fees, expense, room and board, and general university requirements.

REGISTRATION

Students should report for registration on the dates announced in the Bulletin of General Information. Registration and payment of fees must be completed within the period indicated to avoid privilege fees.

The Bulletin of the
UNIVERSITY *of* MINNESOTA

Institute of Technology
1940-1941

Volume XLIII, Number 41 June 3, 1940

UNIVERSITY CALENDAR

1940-41

Fall Quarter

1940			
September	19	Thursday	Payment of fees closes, except for new students[1]
September	23	Monday	Entrance tests
September	23-24		Registration for Freshman Week for all new students entering the freshman class
September	23-27		Examinations for removal of conditions Physical examinations
September	25-28		Freshman Week
September	26-27		Registration days,[2] for all students in the Institute of Technology. Payment of fees closes for new students
September	30	Monday	Fall quarter classes begin 8:30 a.m.[3]
October	17	Thursday	Senate meeting, 4:30 p.m.
October	26	Saturday	Homecoming Day
November	5	Tuesday	Election Day; a holiday
November	6	Wednesday	Mid-quarter grades due
November	11	Monday	Armistice Day; a holiday
November	16	Saturday	Dads Day
November	28	Thursday	Thanksgiving Day; a holiday
December	13-14 and 16-19		Final examination period
December	19	Thursday	Commencement Convocation Senate meeting, 4:30 p.m. Fall quarter ends 6:00 p.m.

Winter Quarter

December	26	Thursday	Payment of fees closes for all students in residence fall quarter[1]
1941			
January	3	Friday	Entrance tests
January	4	Saturday	Registration day for all students in the Institute of Technology. Payment of fees closes for new students at 12:00 noon, January 4
January	6	Monday	Winter quarter classes begin 8:30 a.m.[3]
February	7	Friday	Mid-quarter grades due
February	12	Wednesday	Lincoln's Birthday; a holiday
February	20	Thursday	Charter Day Convocation Senate meeting, 4:30 p.m.
February	22	Saturday	Washington's Birthday; a holiday

See footnotes on page 3.

March 14-15 and 17-20			Final examination period
March	20	Thursday	Commencement Convocation
			Payment of fees closes for all students in residence winter quarter[1]
			Winter quarter ends 6:00 p.m.

Spring Quarter

March	29	Saturday	Registration day for all students in the Institute of Technology
March	31	Monday	Spring quarter classes begin 8:30 a.m.[3]
April	11	Friday	Good Friday; a holiday
May	2	Friday	Mid-quarter grades due
May	10	Saturday	Mothers Day
May	15	Thursday	Cap and Gown Day Convocation
			Senate meeting, 4:30 p.m.
May	30	Friday	Memorial Day; a holiday
June 6-7 and 9-13			Final examination period
June	8	Sunday	Baccalaureate service
June	13	Friday	Spring quarter ends 6:00 p.m.
June	14	Saturday	Sixty-ninth annual commencement

Summer Session

June	16-17		Registration, first term
June	18	Wednesday	First term Summer Session classes begin 8:00 a.m.
July	4	Friday	Independence Day; a holiday
July	24	Thursday	Commencement Convocation
July	25	Friday	First term closes
July	28	Monday	Registration and payment of fees for second term close
			Second term classes begin 8:00 a.m.
August	29	Friday	Second term closes

Entrance Examinations

Entrance examinations for admission to the Institute of Technology will be conducted for students whose credentials do not meet the requirements.

Candidates wishing to take any of these examinations should notify the registrar in writing not later than September 1 or December 1.

For further information concerning these examinations see "Admission by Examination," page 20.

[1] New students must pay fees on dates announced for registration in the registration instructions.

[2] Registration subsequent to the date specified will necessitate the approval of the college concerned. See also privilege fees for late registration, page 22. No student will be allowed to register in the University after one week from the beginning of the quarter excepting in unusual cases wherein special circumstances shall justify the appropriate committee of the college concerned permitting registration at a later date.

[3] First hour classes begin at 8:15 a.m. at University Farm.

INSTITUTE OF TECHNOLOGY

Embracing the College of Engineering and Architecture, the School of Chemistry, and the School of Mines and Metallurgy

FACULTY AND STAFF

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Ora M. Leland, B.S., C.E., Dean of Administration
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Lloyd H. Reyerson, Ph.D., Administrative Assistant (Chemistry)
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Howard D. Myers, B.S.(C.E.), Chairman of Advanced Standing Committee (Engineering and Architecture)
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Carl A. Herrick, M.E., Chairman of Registration, Schedule, and Admissions Committees
Lillian Cohen, Ph.D., Chairman of Registration and Schedule Committees (Chemistry)
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M. Cannon Sneed, Ph.D., Chairman of Freshman Students' Work Committee
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Norville C. Pervier, Ph.D., Chairman of Students' Work Committee (Chemistry)
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Charles A. Koepke, M.S.(M.E.), Chairman of Students' Work Committee for five-year combined courses
George Filipetti, Ph.D., Secretary of Students' Work Committee for five-year combined courses
Hervey H. Barber, Ph.D., Superintendent of Supply and Equipment (Chemistry)

AERONAUTICAL ENGINEERING

John D. Akerman, B.S.(Aero.E.), Professor of Aeronautical Engineering and Head of the Department
Jean F. Piccard, D.Sc., Professor of Aeronautical Engineering (Stratosphere)
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Burton J. Robertson, B.S., E.E., Associate Professor of Internal Combustion Engines
Joseph A. Wise, B.S.(C.E.), Associate Professor of Structural Engineering
Charles Boehnlein, B.S., M.E., Assistant Professor of Aerodynamics

Edward E. Brush, B.S., Instructor in Aeronautical Engineering
Sidney M. Serebreny, B.S.Ae.Ed., Instructor in Airway Meteorology
———, Teaching Assistant in Aeronautical Engineering
Ho-Shen Lu, B.S.(Aero.E.), Research Fellow in Aeronautical Engineering

AGRICULTURAL ENGINEERING

Arthur J. Schwantes, M.S.(Ag.E.), Associate Professor of Farm Machinery and Land Clearing, Chief of the Division
William Boss, Professor Emeritus of Agricultural Engineering
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Andrew Hustrulid, Ph.D., Assistant Professor of Farm Electric Power
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J. Grant Dent, Instructor in Mechanical Laboratory
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CHEMISTRY

Inorganic Chemistry

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Organic Chemistry

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Edward C. Ritchell, B.Ch.E., Hormel Fellow

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———, Teaching Assistant in Civil Engineering

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Fredrick C. Teske, M.S., Instructor in Drawing and Descriptive Geometry
Garvin L. von Eschen, B.Aero.E., M.S., Instructor in Drawing and Descriptive Geometry

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O. William Muckenhirn, M.S., Instructor in Electrical Engineering

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Robert M. Saunders, B.E.E., Teaching Assistant in Electrical Engineering
———, Teaching Assistant in Electrical Engineering

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Ledru O. Guthrie, M.A., Instructor in English
Clifford I. Haga, B.A., Instructor in English
Stephen Humphrey, M.A., Instructor in English
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James Hall, M.A., Teaching Assistant
Theodore F. Meltzer, M.A., Teaching Assistant

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Axel B. Algren, M.S.(M.E.), Assistant Director Engineering Experiment Station
Richard C. Jordan, Ph.D., Instructor in Heating and Ventilation
Clarence E. Lund, M.S.(M.E.), Mechanical Engineer
Kenneth A. Anderson, B.(C.E.), Research Assistant
Enos J. Carlson, B.(C.E.), Research Assistant
Ho-Shen Lu, B.S. (Aero.E.), Research Assistant
Thomas E. Murphy, B.S.(M.E.), Research Assistant
Reuben M. Olson, B.(M.E.), Research Assistant
Harold E. Ostdahl, B.(M.E.), Research Assistant
———, Research Assistant
———, Research Assistant
———, Research Assistant

GENERAL ENGINEERING

Victor L. Fixen, E.M., LL.B., Lecturer in Engineering Contracts and Specifications

GENERAL SCIENCE

Alburey Castell, Ph.D., Assistant Professor of Philosophy

MATHEMATICS AND MECHANICS

George C. Priester, Ph.D., Professor of Materials of Engineering and Acting Head of the Department
William E. Brooke, B.C.E., M.A., Professor of Mathematics and Mechanics, Emeritus
Hans H. Dalaker, Ph.D., Professor of Mathematics and Mechanics, Emeritus
Lorenz G. Straub, Ph.D., C.E., Professor of Hydraulics
Hugh B. Wilcox, B.S.(E.E.), M.S., Professor of Mechanics
Carl A. Herrick, M.E., Associate Professor of Mathematics and Mechanics
Charles Boehnlein, B.S., M.E., Assistant Professor of Aerodynamics
Harry A. Doeringsfeld, C.E., Assistant Professor of Mathematics and Mechanics
William M. McClintock, M.A., Assistant Professor of Mathematics and Mechanics, Emeritus
Forrest E. Miller, M.S., Assistant Professor of Materials of Engineering

Glenn H. Peebles, Ph.D., Assistant Professor of Mathematics and Mechanics
James C. Sanderson, Ph.D., Assistant Professor of Mathematics and Mechanics
Roderick W. Siler, B.S., Assistant Professor of Mathematics and Mechanics
Hugh L. Turrittin, Ph.D., Assistant Professor of Mathematics and Mechanics
John A. Henry, B.S.(C.E.), Instructor in Mathematics and Mechanics
Edward S. Loye, M.S., Instructor in Mathematics and Mechanics
William R. McEwen, M.A., Instructor in Mathematics and Mechanics
John S. McNown, M.S.(Hyd.Eng.), Instructor in Mathematics and Mechanics
Isaac Opatowski, Dr.Eng., Ph.D.(Math.), Instructor in Mathematics and Mechanics
F. G. Eric Peterson, M.S., Instructor in Mathematics and Mechanics
Albert R. Poole, Ph.D., Instructor in Mathematics and Mechanics
John F. Ripken, B.S.(C.E.), Instructor in Mathematics and Mechanics
Max G. Scherberg, Ph.D., Instructor in Mathematics and Mechanics
E. Neil Shawhan, Ph.D., Instructor in Mathematics and Mechanics
Neal R. Amundson, B.Ch.E., Assistant in Mathematics and Mechanics
Howard L. Daniels, B.S.(E.E.), Assistant in Mathematics and Mechanics
Robert L. Evans, M.S., Assistant in Mathematics and Mechanics
———, Assistant in Mathematics and Mechanics
———, Assistant in Mathematics and Mechanics
———, Assistant in Mathematics and Mechanics

MECHANICAL ENGINEERING

John R. DuPriest, B.S.(E.E.), M.E., M.M.E., Professor of Mechanical Engineering and Head of the Department
Charles A. Koepke, M.S.(M.E.), Professor of Industrial Engineering and Superintendent of Shops
Frank B. Rowley, B.S., M.E., Professor of Mechanical Engineering and Director of the Engineering Experiment Station
Charles F. Shoop, B.S., B.S.(M.E.), Professor of Steam Engineering
John V. Martenis, M.E., Associate Professor of Machine Design
Burton J. Robertson, B.S., E.E., Associate Professor of Internal Combustion Engines
Robert E. Summers, B.S.(M.E.), M.S.(Chem.E.), Associate Professor of Mechanical Engineering
Axel B. Algren, M.S.(M.E.), Assistant Professor of Mechanical Engineering
Arthur R. Ford, M.S.(M.E.), Assistant Professor of Internal Combustion Engines
Thomas P. Hughes, M.S.(Met.), Assistant Professor of Mechanical Engineering and Assistant Superintendent of Shops
William H. Richards, Assistant Professor of Woodworking
James J. Ryan, M.E., Assistant Professor of Machine Design
Arnold C. Cobb, M.S.(M.E.), Instructor in Mechanical Engineering
Bert A. Crowder, B.S.(M.E.), Instructor in Machine Shop
William H. Easton, M.S.(M.E.), Instructor in Mechanical Engineering
C. Roger Freberg, M.S.(M.E.), Instructor in Mechanical Engineering
Fulton Holtby, M.E., M.S., Instructor in Foundry Practice
Henry R. Kroeger, B.S.(M.E.), Instructor in Mechanical Engineering
Otis M. Larsen, M.S.(M.E.), Instructor in Mechanical Engineering
Herald K. Palmer, B.S., B.S.(E.E.), M.S.(M.E.), Instructor in Mechanical Engineering
Carmine Sacco, B.S.(M.E.), Instructor in Forging and Welding

Lee S. Whitson, M.S.(M.E.), Instructor in Mechanical Engineering
———, Instructor in Mechanical Engineering
Richard C. Akerman, B.S.(M.E.), Assistant in Mechanical Engineering
William A. Andres, B.S.(M.E.), Assistant in Mechanical Engineering
Paul E. Earle, B.S.(Chem.E.), Assistant in Mechanical Engineering

METALLURGY

Thomas L. Joseph, M.A., Professor of Ferrous Metallurgy and Head of the Department
William R. Appleby, M.A., Professor of Metallurgy, Emeritus
Peter Christianson, B.S., E.M., Professor of Ferrous Metallurgy, Emeritus
Ralph L. Dowdell, Met.E., Ph.D., Professor of Metallography
Levi B. Pease, M.S., Professor of Nonferrous Metallurgy
Henry S. Jerabek, Ph.D., Assistant Professor of Metallography
John N. Searles, E.M., M.S., Assistant Professor of Ore Dressing
Arthur C. Forsyth, Met.E., Ph.D., Instructor in Metallography
Albert W. Schlechten, B.S., Instructor in Nonferrous Metallurgy
Frank W. Scott, M.S., Instructor in Ferrous Metallurgy
Carrie H. Green, Teaching Assistant in Metallography
Martin H. Kalina, M.S., Teaching Assistant in Metallography
Charles A. Nagler, M.S., Teaching Assistant in Metallography
Charles F. Quest, B.Ch.E., Teaching Assistant in Metallurgy

MINES EXPERIMENT STATION

Edward W. Davis, E.E., Professor and Superintendent of Mines Experiment Station
John J. Craig, E.M., Metallurgist
Henry H. Wade, E.M., Metallurgist
John C. Durfee, Met.E., Junior Metallurgist Engineer

MINING AND PETROLEUM ENGINEERING

Elting H. Comstock, M.S., Professor of Mine Plant and Mining and Head of the Department
Edwin M. Lambert, M.E., Professor of Mining Engineering
Walter H. Parker, E.M., Professor of Mining and Petroleum Engineering
Louis S. Heilig, E.M., Associate Professor of Mine Plant and Mining
Washington D. Lacabanne, M.S., Instructor in Petroleum Engineering

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

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Willem J. Luyten, Ph.D., Professor of Astronomy

BOTANY

C. Otto Rosendahl, Ph.D., Professor of Botany and Chairman of the Department
Ned L. Huff, M.A., Assistant Professor of Botany

GEOLOGY AND MINERALOGY

William H. Emmons, Ph.D., Professor of Geology and Mineralogy and Head of the Department
Frank F. Grout, Ph.D., Professor of Geology and Mineralogy
Clinton R. Stauffer, Ph.D., Professor of Geology and Mineralogy

John W. Gruner, Ph.D., Associate Professor of Geology and Mineralogy
George M. Schwartz, Ph.D., Associate Professor of Geology and Mineralogy
George A. Thiel, Ph.D., Associate Professor of Geology and Mineralogy
Reuben B. Ellestad, Ph.D., Instructor in Rock Analysis
Franklin B. Hanley, B.A., Instructor in Geology and Mineralogy

GERMAN

Oscar C. Burkhard, Ph.D., Professor of German and Chairman of the Department
Carl P. Klitzke, Ph.D., Instructor in German
Alvin E. Prottengeier, M.A., Instructor in German
Frederick Wagman, M.A., Instructor in German

HISTORY

Lester B. Shippee, Ph.D., Professor of History and Chairman of the Department
Herbert Heaton, M.A., D.Litt., M.Com., Professor of History

JOURNALISM

Thomas F. Barnhart, M.A., Professor of Journalism

PHYSICS

J. William Buchta, Ph.D., Professor of Physics and Chairman of the Department
Henry A. Erikson, Ph.D., Professor of Physics, Emeritus
Louallen F. Miller, Ph.D., Professor of Physics
John T. Tate, Ph.D., Dean of the College of Science, Literature, and the Arts, and Professor of Physics
Anthony Zeleny, Ph.D., Professor of Physics, Emeritus
Edward L. Hill, Ph.D., Associate Professor of Physics
Alfred O. C. Nier, Ph.D., Associate Professor of Physics
Lynn H. Rumbaugh, Ph.D., Associate Professor of Physics
Joseph Valasek, Ph.D., Associate Professor of Physics
John H. Williams, Ph.D., Associate Professor of Physics
John Bardeen, Ph.D., Assistant Professor of Physics
Wilfred W. Wetzel, Ph.D., Assistant Professor of Physics
Otto H. Schmitt, Ph.D., Instructor in Physics

POLITICAL SCIENCE

William Anderson, Ph.D., Professor of Political Science and Chairman of the Department
Clarence C. Ludwig, M.A., C.P.A., Associate Professor of Political Science
Asher N. Christensen, B.A., Assistant Professor of Political Science
Evron M. Kirkpatrick, Ph.D., Assistant Professor of Political Science

ZOOLOGY

Dwight E. Minnich, Ph.D., Professor of Zoology and Chairman of the Department
Jerry E. Wodsedalek, Ph.D., Professor of Zoology
Ralph Dawson, Ph.D., Assistant Professor of Zoology
Magnus Olson, Ph.D., Instructor in Zoology

COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

AGRICULTURAL BIOCHEMISTRY

Ross A. Gortner, Ph.D., D.Sc., Professor of Agricultural Biochemistry and Chief of the Division
Clyde H. Bailey, Ph.D., Professor of Agricultural Biochemistry and Vice-Director of Experiment Station
William F. Geddes, Ph.D., Professor of Agricultural Biochemistry
Leroy S. Palmer, Ph.D., Professor of Agricultural Biochemistry
David R. Briggs, Ph.D., Associate Professor of Agricultural Biochemistry
W. Martin Sandstrom, Ph.D., Associate Professor of Agricultural Biochemistry

AGRICULTURAL ECONOMICS

Oscar B. Jesness, Ph.D., Professor of Agricultural Economics and Chief of the Division
George A. Pond, Ph.D., Professor of Agricultural Economics

AGRONOMY AND PLANT GENETICS

Herbert K. Hayes, D.Sc., Professor of Agronomy and Plant Genetics and Chief of the Division
Royse P. Murphy, M.S., Instructor in Agronomy and Plant Genetics

ANIMAL AND POULTRY HUSBANDRY

Walter H. Peters, M.Agr., Professor of Animal Husbandry and Chief of the Division

DAIRY HUSBANDRY

James B. Fitch, M.S., Professor of Dairy Husbandry and Chief of the Division
Willes B. Combs, M.A., Professor of Dairy Husbandry
Harold Macy, Ph.D., Professor of Dairy Bacteriology

FORESTRY

Henry Schmitz, Ph.D., Professor of Forestry and Chief of the Division
Edward G. Cheyney, B.A., Professor of Forestry

HORTICULTURE

William H. Alderman, B.S.A., Professor of Horticulture and Chief of the Division
Wilfrid G. Brierley, Ph.D., Professor of Horticulture

RHETORIC

Robert C. Lansing, M.A., Associate Professor of Rhetoric
William J. Routledge, B.A., Assistant Professor of Rhetoric
Ralph G. Nichols, M.A., Instructor in Rhetoric

SOILS

Frederick J. Alway, Ph.D., Professor of Soil Chemistry and Chief of the Division
Clayton O. Rost, Ph.D., Professor of Soils
Paul R. McMiller, M.S., Assistant Professor of Soils

MEDICAL SCHOOL

BACTERIOLOGY AND IMMUNOLOGY

Winford P. Larson, M.D., Professor of Bacteriology and Immunology and Head of the Department
Robert G. Green, M.A., M.D., Professor of Bacteriology and Immunology
H. Orin Halvorson, Ch.E., Ph.D., Professor of Bacteriology and Immunology
Arthur T. Henrici, M.D., Professor of Bacteriology and Immunology
Charles E. Skinner, Ph.D., Assistant Professor of Bacteriology and Immunology

PHYSIOLOGICAL CHEMISTRY

Maurice B. Visscher, Ph.D., M.D., Professor of Physiological Chemistry and Head of the Department
George O. Burr, Ph.D., Professor of Physiological Chemistry
Wallace D. Armstrong, M.D., Ph.D., Associate Professor of Physiological Chemistry
L. Earle Arnow, Ph.D., Assistant Professor of Physiological Chemistry
Alan Hemingway, Ph.D., Assistant Professor of Physiological Chemistry
Leo T. Samuels, Ph.D., Assistant Professor of Physiological Chemistry

SCHOOL OF BUSINESS ADMINISTRATION

Russell A. Stevenson, Ph.D., Dean of the School of Business Administration
John J. Reighard, M.A., C.P.A., Assistant Dean of the School of Business Administration
George Filipetti, Ph.D., Professor of Economics and Business Administration and Adviser in Engineering Business Courses
Roy G. Blakey, Ph.D., Professor of Economics
Frederic B. Garver, Ph.D., Professor of Economics
Ernest A. Heilman, Ph.D., Professor of Accounting
Arthur W. Marget, Ph.D., Professor of Economics and Finance
Bruce D. Mudgett, Ph.D., Professor of Economics and Statistics
J. Warren Stehman, Ph.D., Professor of Economics and Finance
Roland S. Vaile, M.A., Professor of Economics and Marketing
Dale Yoder, Ph.D., Professor of Economics and Industrial Relations
Arthur M. Borak, Ph.D., Associate Professor of Economics
Richard L. Kozelka, Ph.D., Associate Professor of Economics and Statistics
Harry J. Ostlund, B.A., Associate Professor of Accounting
Emerson P. Schmidt, Ph.D., Associate Professor of Economics
Arthur R. Upgren, Ph.D., Associate Professor of Economics and Finance
A. Hamilton Chute, Ph.D., Assistant Professor of Marketing
Alfred B. Cummins, J.D., M.S. in M.E., Assistant Professor of Economics and Business Administration
Walter R. Myers, Ph.D., Assistant Professor of Economics and Finance
George J. Stigler, Ph.D., Assistant Professor of Economics
Francis M. Boddy, Ph.D., Lecturer in Economics
Franklin D. Gray, B.A., B.C.L., Lecturer in Business Law
Ben W. Palmer, M.A., LL.B., Lecturer in Business Law
Marshman Wattson, B.A., LL.B., Lecturer in Business Law
Helen G. Canoyer, M.A., Instructor in Economics and Marketing
Richard K. Gaumnitz, M.A., Instructor in Statistics

Richard A. Graves, M.A., Instructor in Economics and Insurance
Reuel I. Lund, M.A., C.P.A., Instructor in Economics and Accounting
Clarence A. Nelson, B.B.A., Instructor in Accounting
Edmund A. Nightingale, M.A., Instructor in Economics and Transportation

MILITARY SCIENCE AND TACTICS

Charles A. French, Lieutenant Colonel, Coast Artillery Corps, B.S., Professor of Military Science and Tactics
Edwin L. Brackney, Lieutenant Colonel Medical Corps, M.D., Assistant Professor of Military Science and Tactics
Coburn L. Berry, Major, Coast Artillery Corps, B.S., Assistant Professor of Military Science and Tactics
Thomas H. Maddocks, Captain, Signal Corps, M.S., Assistant Professor of Military Science and Tactics
William E. Bowen, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics
Carl Cihos, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics
Leslie V. Closson, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics
Kenneth Cruse, Sergeant, Detached Enlisted Men's List, Instructor in Military Science and Tactics

NAVAL SCIENCE AND TACTICS

Frank H. Kelley, Jr., Captain, United States Navy, Professor of Naval Science and Tactics
Bayard H. Colyear, Commander, United States Navy, Associate Professor of Naval Science and Tactics
Harold F. Pullen, Lieutenant Commander, United States Navy, Associate Professor of Naval Science and Tactics
Calvin A. Walker, Jr., Lieutenant, United States Navy, Assistant Professor of Naval Science and Tactics

PHYSICAL EDUCATION

PHYSICAL EDUCATION FOR MEN

Frank McCormick, B.A., LL.B., Professor of Physical Education for Men and Director of Athletics
Bernard W. Bierman, B.A., Professor of Physical Education for Men and Head Football Coach
Louis F. Keller, M.A., Associate Professor of Physical Education for Men
Edwin L. Haislet, Ed.D., Assistant Professor of Physical Education for Men
David MacMillan, B.S., Assistant Professor of Physical Education for Men
Ralph A. Piper, M.A., Assistant Professor of Physical Education for Men
David C. Bartelma, M.A., Instructor in Physical Education for Men
Phil Brain, Instructor in Physical Education for Men
Clarence R. Osell, M.S., Instructor in Physical Education for Men
Niels Thorpe, B.S., Instructor in Physical Education for Men

PHYSICAL EDUCATION FOR WOMEN

J. Anna Norris, M.D., Professor and Director of Physical Education for Women

FOR NEW SCHOLASTIC REQUIREMENTS SEE REQUIREMENTS FOR GRADUATION, PAGE 24.

GENERAL INFORMATION

INSTITUTE OF TECHNOLOGY

The Institute of Technology was established by action of the Board of Regents on October 19, 1935, to embrace the College of Engineering and Architecture, the School of Chemistry, and the School of Mines and Metallurgy, effective November 1, 1935.

College of Engineering and Architecture

The College of Engineering and Architecture had its beginning in the College of Agriculture and the Mechanic Arts which was authorized by the legislative act of 1868. Courses in Civil and Mechanical Engineering were first offered in 1871. In the reorganization of the University, in 1872, the College of Mechanic Arts was established. It became the College of Engineering, Metallurgy, and the Mechanic Arts in 1892, the College of Engineering and the Mechanic Arts in 1897, and the College of Engineering and Architecture in 1916. A course in Electrical Engineering was first offered in 1887. Architecture was announced in 1912. In 1925, the name of the Department of Architecture was changed to the School of Architecture. The Agricultural Engineering course was offered in 1925, and the courses in Aeronautical Engineering in 1928. Combined courses with Business Administration were established in 1934.

The departments of this college occupy the following buildings on the Main campus: Main Engineering, Electrical Engineering, Mechanical Engineering, and the Experimental Engineering Laboratories. Portions of the School of Chemistry and the Armory are also utilized. The Hydraulic Laboratory is situated at the St. Anthony Falls of the Mississippi River about a mile upstream from the campus. Agricultural Engineering has its own building on the Agricultural campus. The libraries of Engineering and Architecture are situated in the Main Engineering Building.

The purpose of this college is to give the students a broad foundation in the fundamental principles of engineering and architecture, together with sufficient knowledge of professional practice to enable them to apply those principles successfully. It is not possible in college to educate a fully trained engineer, as the application of the principles to the practice of engineering is to be learned through experience. There are certain subjects, such as surveying and drafting, in which some proficiency is required. This enables a student upon graduation to fill satisfactorily a subordinate position while obtaining a basis for growth and advancement.

It is intended that all of the technical courses given in this college shall be taught by men who have had practical experience in their respective fields in addition to their professional training.

The field of engineering is very broad and is continually becoming more extensive. From the technical lines of design, construction, maintenance, and operation of engineering works, which have always belonged to him, the trained engineer has been drawn into the business world to occupy positions of an executive character. To meet the demand for such service, the importance of the broader training in economic and commercial principles and industrial relations is recognized.

Withal, it is intended that the young graduate shall have obtained material assistance in developing those traits of character which will make him a loyal and exemplary citizen and a true gentleman.

School of Chemistry

The School of Chemistry was established in 1897 as a school of analytical and applied chemistry, subsidiary to the College of Science, Literature, and the Arts. In 1904 it was made a separate unit of the University, and in 1919, its present name was adopted, and its administration was correlated with that of the College of Engineering and Architecture under one dean.

The courses in Chemistry and Chemical Engineering were developed from the beginning of the school. The course in Physics was established in 1936.

The school occupies a large modern building, 180 by 200 feet, having six floors. Its laboratories are designed to afford facilities for instruction in the various branches of chemistry. The Chemistry library is well provided with complete sets of journals and compendia of chemical literature, among which are important sets not frequently found in university libraries. Many special laboratories for private research have been provided and ample facilities are available for graduate work leading to the higher degrees.

School of Mines and Metallurgy

The School of Mines and Metallurgy was established by the Board of Regents in 1888, upon recommendation of the general faculty of the University. A course in Mining and Metallurgy was announced in 1889. The school was affiliated with the College of Engineering, under the name of the College of Engineering, Metallurgy, and the Mechanic Arts, until 1897, when the School of Mines was made an independent college. In 1926 the name was changed to School of Mines and Metallurgy.

The school occupies the building provided by the Legislature of 1913. This building contains the library of the school together with the offices, classrooms, drafting rooms, and laboratories necessary to administer the courses in Mining, Metallurgy, Metallography, and Petroleum Engineering. For other fields of work necessary to the completion of well-rounded curricula advantage is taken of the instruction afforded by various departments in other units of the University.

The Mines Experiment Station was established by the Board of Regents in 1911. It occupies a specially constructed laboratory building of which a portion is assigned to the North Central Station of the United States Bureau of Mines.

The mining districts of Minnesota are within a few hours of Minneapolis by rail or paved road. The heartiest co-operation exists between the officials of the various mining companies and the school. As a result, 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.

Ample opportunity for field work in metallurgy is also available. Numerous fabrication and heat treating plants are located in the Twin Cities. Plants for the study of smelting and other processes can be reached with not more than an overnight trip by rail.

Students in the School of Mines and Metallurgy have, therefore, all the advantages afforded by a large university combined with ample opportunity for field observation and experience.

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Engineering Experiment Station

The Engineering Experiment Station of the Institute of Technology provides facilities for graduate research and technical investigations in a variety of fields. The Saint Anthony Falls Hydraulic Laboratory located on Hennepin Island, and the Oak Street Laboratories on University Avenue are exceptionally well adapted to special large-scale investigations, many of which may be profitably conducted in co-operation with technical societies, associations, and industries. Several investigations of this type are now under way and provide an opportunity for advanced students in the institute to come in contact with industrial and technical problems. In many cases the projects provide graduate fellowships and part-time employment for advanced students.

COURSES AND DEGREES

The College of Engineering and Architecture offers four-year courses of study in Aeronautical, Agricultural, Civil, Electrical, and Mechanical Engineering, and a five-year course in Architecture. These courses lead to the degree of bachelor of areonautical, agricultural, civil, electrical, or mechanical engineering, or architecture. In some of the courses, optional groups of electives are arranged for the guidance of students who desire to devote special attention to certain fields.

The Engineering Pre-business course requires the first two years of work in this college. This is followed by two years in the School of Business Administration upon the completion of which the degree of bachelor of business administration is conferred.

In co-operation with the College of Science, Literature, and the Arts, a six-year course in Arts and Architecture is offered. It leads to the degrees of bachelor of arts, at the end of four years in the College of Science, Literature, and the Arts, and bachelor of architecture at the end of the sixth year in the Institute of Technology.

The School of Chemistry offers four-year courses in Chemistry, Chemical Engineering, and Physics, leading to the degree of bachelor of chemistry, bachelor of chemical engineering, or bachelor of physics, respectively.

Five-year combined courses in Engineering or Chemistry with Business Administration lead to two bachelor's degrees, one in each of the two fields.

The School of Mines and Metallurgy offers four-year courses in Mining, Geological, Petroleum, and Metallurgical Engineering leading to the respective degrees of bachelor of mining engineering, B.Min.E.; bachelor of geological engineering, B.Geol.E.; bachelor of petroleum engineering, B.Pet.E.; and bachelor of metallurgical engineering, B.Met.E.

These colleges also offer work in the Graduate School leading to the Master's degree in the appropriate branch of engineering, in architecture, or in chemistry, or to the Doctor's degree.

The professional degree of aeronautical, agricultural, chemical, civil, electrical, geological, mechanical, metallurgical, mining, or petroleum engineer will be conferred upon those who have received the degree of bachelor of aeronautical, agricultural, chemical, civil, electrical, geological, mechanical, metallurgical, mining, or petroleum engineering, when they have completed the equivalent of one additional year's college work, four years of engineering experience in positions of responsibility, and have presented a satisfactory professional thesis.

Graduates of these colleges may be granted permission to pursue the year of graduate study *in absentia* under the direction of the faculty. It is recommended,

however, that this year be spent in residence at this University and that the Master's degree be obtained in this manner. There are many advantages in taking this year immediately following graduation from the four-year course, thus making a five-year course leading to the Master's degree in the corresponding branch of engineering or in architecture. Then after four years of approved experience and the preparation of the professional thesis, the Engineer degree may be obtained. This procedure is especially recommended to those students whose undergraduate work is of high grade and who desire additional preparation for the higher positions which require strong character and leadership.

Candidates for the Engineer degrees register in the Graduate School.

ADMISSION

Detailed information concerning admission, entrance requirements, advanced standing, and expenses will be found in the Bulletin of General Information which will be sent to any address upon application to the registrar, University of Minnesota.

Students are admitted on certificate or by examination. In special cases, with the approval of the dean of the college, persons of mature age (twenty-four years or older) and experience may be admitted as adult special students to pursue specific courses of study.

Admission by certificate.—Applicants must present twelve units of work obtained in the last three years of high school (senior high school) of which at least nine must be included in Groups A, B, C, D, and E as listed below. These nine units must include a major or three units in one group and two minors of two units each in two other groups. Subject to these requirements, the applicant for admission to the Institute of Technology must include at least two units of English and two units of mathematics, including elementary algebra and plane geometry. One unit of mathematics and one unit of foreign language taken in the ninth grade may be counted in these groups. Applicants who stand in the upper 60 per cent of their high school class on the basis of their scholastic records, will be admitted directly; those in the lower 40 per cent will be given individual consideration and may be permitted to take special tests to qualify for admission. Chemistry is desirable for admission to the School of Chemistry.

Students who expect to enter the Institute of Technology are urged to include in their high school courses additional mathematics, beyond the two years required, especially higher algebra and solid geometry; Latin, two units; German or French, two units; chemistry, one unit; physics, one unit; ancient, modern, and American history; and American government or civics. French is desirable for students in architecture. German is important for students entering the School of Chemistry. French is also desirable for chemistry students who plan to enter the Graduate School.

Students who are able are advised to take as many courses in the College of Science, Literature, and the Arts as may be possible or desirable before entering the Institute of Technology or during the courses therein. If a bachelor of arts degree were taken first, enough of the required basic courses in science and mathematics could be included to shorten the subsequent Bachelor's course in the Institute of Technology to three years. Such broadening and cultural courses are becoming increasingly important in the training of engineers and scientists.

Applicants deficient in either or both higher algebra and solid geometry will be admitted provisionally at the beginning of the school year. In order to continue in the Institute of Technology these deficiencies must be removed during

the fall quarter. Opportunities to remove the deficiencies will be offered within the institute in the fall quarter. Students with deficiencies in mathematics will be required to attend one Summer Session if they desire to graduate in four years. It is recommended that such deficiencies be made up in the Summer Session before entering the institute, thereby avoiding the complications incident to making them up during the freshman year.

List of entrance subjects.—Only those subjects included in the following groups may be counted toward admission.

The term *unit* means not less than five recitations of forty minutes each per week for a school year of thirty-six weeks. In laboratory, drawing, and other manual courses, twice this amount of class time is required for one unit.

Group A English: 2 or 3 units.

Group B Foreign languages: Latin, Greek, German, French, Spanish, Scandinavian, 1 to 4 units each.

Group C History and social sciences: European history, ½ to 2 units; English and American history, ½ or 1 unit each; economics and sociology, ½ unit each; American government, commercial geography, and history of commerce, ½ or 1 unit each.

Group D Mathematics: elementary algebra and plane geometry, 1 unit each; unified mathematics, 2 units; higher algebra, ½ or 1 unit; solid geometry and trigonometry, ½ unit each.

Group E Natural sciences: biology, physics, and chemistry, 1 unit each; botany and zoology, ½ or 1 unit each; physiology, astronomy, and geology, ½ unit each.

Group F Vocational and miscellaneous subjects: The three units which are not required to be in Groups A, B, C, D, E, may be in work which the superintendent certifies as being of acceptable nature and as having been counted toward the applicant's graduation.

Admission by examination.—Applicants who are high school graduates or at least nineteen years of age may be admitted provisionally and subject to one year of satisfactory work, upon passing the following tests:

a. College aptitude test
b. Test of proficiency in English
c. Test in mathematics including arithmetic, algebra, and geometry
d. Test in chemistry, if entering School of Chemistry.

Applicants failing to pass test (b), (c), or (d) may apply for a subsequent examination at any scheduled date on payment of a fee of five dollars. Those failing to pass test (a) may enter only upon satisfactorily meeting the entrance requirements by the certificate method.

Time of admission.—The regular time to enter the institute is in September. However, students will be admitted at the beginning of the winter quarter in January. Such students must have entrance credits in higher algebra and solid geometry and should have credits in high school chemistry. Students cannot be admitted at the beginning of the spring quarter, since no beginning courses in mathematics, chemistry, English, or drawing are given in this quarter.

ADVANCED STANDING

Students who have pursued courses of study in other colleges of recognized standing may receive advanced credit under the rules of the University and of the institute. See Requirements for Graduation.

Students transferring from other accredited colleges to the School of Chemistry will receive credit in only those courses in which they present a grade of at least C. A transfer student who presents a grade of D in a required chemistry course must attain a grade of at least C in the course either by means of a com-

prehensive examination (see page 23) or by repeating the course in the School of Chemistry.

Students who have taken college algebra or trigonometry in high school with satisfactory records may be permitted to take comprehensive examinations for credit in these subjects, if they apply before registration day at the office of the Department of Mathematics and Mechanics.

REGISTRATION

All undergraduate students are required to pay the prescribed fees to the university bursar at the beginning of each quarter. Necessary classification blanks showing the courses a student expects to pursue are to be filled out and filed either at the beginning of the fall quarter for the entire year or at the beginning of each quarter during the college year. Classification and enrolling of students registering in Aeronautical, Agricultural, Civil, Electrical, Mechanical, or Prebusiness Engineering and Architecture take place in the Main Engineering Building; for those registering in Chemistry, Chemical Engineering, and Physics in the Chemistry Building; and in Mining, Metallurgical, Geological, and Petroleum Engineering in the Mines Building.

All students entering the institute for the first time must send or present their credentials to the registrar of the University, who will notify each applicant in regard to his admission. Before registering, all new matriculants are required to take a physical examination, and the following tests:

1. Co-operative English test.
2. Impromptu English theme.

On the basis of his standing in these tests and his scholarship rank in preparatory school, he will be classified in one of the two groups in English as follows:

1. Required to take English 4-5-6, nine (9) credits in composition.
2. Required to make up minimum essentials as a preliminary to English 4-5-6.

Any student who takes these tests when they are given in the high school and preparatory schools of the state and who applies for admission to the University before September 1 will be mailed a card showing his classification in English. Those who have not taken the tests will be required to take them on Friday or Saturday preceding the regularly scheduled Freshman Week. *No freshman will be allowed to register without presenting a card giving his assignment in English.*

Students should consult the university calendar in regard to registration dates.

Students will not be allowed to register for more than 19 credit hours without the approval of the Students' Work Committee.

Freshmen are not permitted to take additional courses (except Military or Naval Science and Tactics) without permission of the Freshman Students' Work Committee.

No change in registration will be permitted later than 10 days after the beginning of the quarter. A late fee of $2 is charged for changes in registration made after the second day of the quarter.

FEES AND EXPENSES

The annual fee for students in this college is $90 for residents and $135 for nonresidents, one third of which is due at the beginning of each quarter. Fellows,

scholars, assistants, and instructors are not required to pay university fees or tuition when they are regularly enrolled in the Graduate School.

Tuition fee (per quarter):	
Residents of Minnesota	$30.00
Nonresidents	45.00
Matriculation deposit‡ (first quarter only)	10.00
Incidental fee, per quarter	8.90
Special fees:	
Examination for removal of condition	1.00
Examination for credit (after the first six weeks in residence)	5.00
Special examination	5.00
Chemistry deposits, including laboratory fee of $2.00 per quarter	10.00
Graduation fee	7.50

Privilege fees.—The fee for the privilege of late registration or late payment of fees is $2 through the third day of classes, on the fourth day the fee is $2.50 and then increases 50 cents per day to a maximum of $5. The fee for late change of registration is $2 beginning the third day of the quarter.

Living expenses.—Detailed statements regarding living expenses may be found in the Bulletin of General Information. For students not living at home, the approximate expense of a year in this college has been estimated at about $500 minimum, $800 average, and $1,000 liberal, not including clothing, traveling, or vacations. The average estimate is based upon the following details:

Tuition and laboratory fees	$135.00
Laundry	40.00
Room rent	120.00
Meals	270.00
Books and instruments	35.00
Incidentals	200.00
Total	$800.00

For nonresidents of Minnesota, $45 should be added for tuition.

A great deal depends upon the frugality of the student. By reducing the amount spent for incidentals and by obtaining cheaper board and room many students will be able to live for less than the amount estimated above. Likewise other students will pay more for board, room, and incidentals and will not be able to live within these amounts. To live within the minimum amount, a student should expect to forego all luxuries and economize in every way possible.

When coming to the University for the first time, the student should have money enough to cover the full expense for at least the first quarter without depending upon outside employment for his support. After a term at the University, he will know more about the possibilities of supplementing his income by employment, especially as regards the spare time at his disposal for such work.

UNIT OF CREDIT

The standard unit of credit in the University is the quarter credit, or simply, the *credit*. It corresponds to one class period per week for one quarter. This class period may be a one-hour lecture or recitation, or a two- or three-hour class

‡ Such charges as may be incurred for lockers, library penalties, laboratory breakage, etc., will be deducted from the amount of this deposit and the balance will be refunded by mail upon graduation or after the beginning of the first quarter the student fails to return to the University.

in laboratory, drawing, surveying, or computations, but in any case one credit is supposed to require three actual hours of the average student's time per week for one quarter. One hour of recitation is assumed to require two hours of preparation or study. A two-hour laboratory period may require one hour of home work to complete the credit. A three-hour period usually carries one credit without additional work outside of class. The credit allowed for a lecture may be from one-third to one hour depending upon the amount of outside work or study required in connection with it.

CREDIT FOR OUTSIDE WORK

Credit for certain courses, as a result of work done outside of the regular classes, may be obtained by satisfactorily passing comprehensive examinations. This includes work done in extension classes, by correspondence study, by the aid of a private tutor, by individual study, through practical experience, or otherwise.

The comprehensive examination will be of such thoro and searching character as to determine whether the student has done all the work of the course. It should require at least three times the work of the usual final or condition examination and will be conducted by a committee appointed by the head of the department in which the course is given.

Permission to take the examination must be obtained from the Students' Work Committee, and the usual fee of $5 for each special examination must be paid unless it be taken within six weeks after first entering the University.

EXTENSION COURSES

Courses in engineering, architecture, and chemistry are offered by the General Extension Division of the University in evening classes and by correspondence study. Persons who are unable to attend the regular university courses may obtain valuable instruction in this manner.

Credits will be accepted from the Extension Division for the following types of courses:

1. Nontechnical courses taken in residence (residence as defined by the University Senate ruling).
2. Such other residence courses as have been approved by the department concerned of the Institute of Technology and by the dean, which courses shall have been designated as credit courses by the Extension Division.
3. Credits obtained by correspondence study courses including College Algebra, Trigonometry, Analytical Geometry, and English and in other subjects not required in the student's curriculum will be accepted, not to exceed a total of nine.

ATTENDANCE

It is expected that all students will be regular in attendance at all class exercises and that they will do all the work of their courses. Neglect of work, as indicated by irregularity in attendance or low scholarship, will be sufficient reason for exclusion from class. Any student who has unexcused absences equal to the number of credits in a course, but in no case less than two, may be dropped from the class with a record of failure in the course.

INSPECTION TRIPS

All seniors registered in Chemical Engineering are required to go on a trip of inspection and observation through certain large industrial plants. This trip is usually taken during the spring vacation and is under the personal supervision and guidance of members of the faculty. It includes plants in Milwaukee, Chicago, and near-by points. The expenses of the trip are minimized as far as possible, and

must be defrayed by the individual student. They amount to from $75 to $100 per student.

Seniors in Aeronautical Engineering are required to take an inspection trip during the spring vacation to visit aeronautical manufacturing, operating, and research establishments in the central and eastern portions of the United States. The expense to each student is estimated at about $75.

In Mines and Metallurgy, field trips are required at the end of the sophomore and junior years. The sophomore trip embraces mine surveying on the iron ranges in northern Minnesota for four weeks beginning about June 15, the expense amounts to about $60. Field work in geologic mapping is also required. The junior mining and nonferrous metallurgy, and petroleum trips cover a study of mine plants and operations in leading mining or oil fields in the western part of the country for nearly three weeks beginning about September 1. The expense amounts to approximately $125. The junior geology trip embraces standard types of geological field work in the Black Hills region. The expense amounts to about $100. The junior ferrous metallurgy trip includes inspection and reports upon iron and steel plants, fabrication plants, and heat treating plants in the Middle West. The expense amounts to approximately $100.

An inspection trip for electrical engineers, carrying two credits, and under faculty supervision is a required part of the senior curriculum. Industrial plants in Minnesota and neighboring states are visited. The trip is taken during the spring vacation. Costs are borne individually by the student. Expense is estimated at about $40.

Seniors in mechanical engineering are required to take an inspection trip in the spring quarter to various industrial plants to study mechanical equipment, manufacturing methods and processes. The expense to each student is estimated at about $40.

REQUIREMENTS FOR GRADUATION

To be recommended for the degree of bachelor of aeronautical, civil, electrical, or mechanical engineering, chemistry or physics, the student must satisfactorily complete all of the courses prescribed in the corresponding curriculum together with sufficient electives to make a total of at least 207 credits. In the five-year course in architecture, 225 credits are required for graduation. In agricultural engineering 210 credits are required for graduation. For the degree of bachelor of interior architecture, the requirements are 192 credits, including all required courses, plus 90 honor points from the first two years. For the degree of bachelor of chemical engineering, 218 credits are required. For the degree of bachelor of business administration in combination with engineering or chemistry, a student must complete the requirements for the Bachelor's degree in one of the engineering or chemistry curricula and include the 74 prescribed credits in business subjects. In mining and petroleum engineering a total of 235 credits must be completed. Metallurgical engineering requires 222 credits and geological engineering 233 credits.

In cases of continued low scholarship, even tho all the courses of the curriculum have been passed, the faculty reserves the right to require additional work to be completed, over and above the regular curriculum, and with a specified grade, before the degree will be recommended.

Students entering with advanced standing from other colleges or universities must spend at least one year in residence here before they will be recommended for graduation. If the term of residence is only one year it must be the senior year; and in any case such a student must spend two "quarters" of his senior year in residence.

College of Engineering and Architecture

Every student entering the College of Engineering and Architecture on or after the fall of 1940 will be required to have a *cumulative honor point average* of at least 1.00 in order to be eligible for a degree. Each student will also be expected to meet, at the end of any year, the minimum cumulative honor point average given below. The method used for calculating honor points is given in the paragraph under computation of honor point averages.

REQUIRED CUMULATIVE HONOR POINT AVERAGES

(To be calculated at the end of each college year in June)

2 or 3 quarters in residence	.75
4 to 6 quarters in residence	.88
7 or more quarters in residence	1.00

A student having completed 9 or more quarters in residence must earn an average of at least 1.00 honor points for each year.

In calculating the cumulative honor point average for a student at any given time the honor points of *all* his past work in the College of Engineering and Architecture are first added and this sum is then divided by the sum of all the credits for which final grades have been given during this time. The number of credits published in the normal curriculum is not considered in this calculation. When and if a course, having previously been failed, is finally passed, the positive honor points, if any, are added to the previous negative honor points. In other words, negative honor points can be counterbalanced but never eliminated. All required courses for which a grade of F has been received must be repeated. If a grade of D has been received, they may be repeated at the option of the student. Elective courses for which a grade of D or F has been received may also be repeated.

The low requirements of .75 for the freshmen and of .88 for the sophomore allow the slow-starting student to catch up gradually but prevent him from waiting until his last years in college to do so.

If at the end of any year a student stands below the cumulative honor point requirement, he may be allowed to make up the deficiency not only by repeating the courses in which he has received a D or an F but, in the case of elective courses, by taking additional courses. If the student is in his third year these additional courses must be of a technical and professional nature. In any case of additional courses being taken, the student, whose cumulative honor points are below the requirements as given above, must obtain the written approval of his choice from the head of the department in which he is registered. Such application shall be made in triplicate on blanks provided by the departmental office.

Transfer students coming from other colleges or universities will be subject to the cumulative honor point requirements as given above, in order to enter the College of Engineering and Architecture. Honor points obtained in other institutions are used only for this computation. Once these transfer students have entered the College of Engineering and Architecture, their qualifications for continuing in the college are computed solely from the honor points earned in the college.

Honor point averages are calculated in June, at the end of each school year. Any honor points earned during summer sessions are included in the cumulative figures of the following year. Each student is advised to calculate his own cumulative honor point average at the end of each quarter in order to know where he stands. This is particularly necessary at the close of the spring quarter so

that the student may know quickly whether or not he will be permitted to continue his study in the regular manner.

Transitory period.—Students who were in residence prior to the fall of 1940 will be required to meet the cumulative honor point averages, see page 25. These students of the transitory period will have the option of having their cumulative honor point averages calculated either by omitting or by including their work done before the fall of 1940. A student who desires the latter procedure, i.e., of having his previous record included in the calculation, should file a notice of such intention in duplicate on blanks provided by the college office. This filing must be done before the end of his first quarter in residence after the fall of 1940.

Each student is responsible for ascertaining his own honor point average at the end of every quarter. Any student who has not completed all of his required freshman courses must report to Professor M. C. Sneed if his cumulative honor point average at the end of any quarter falls below his classification as given below. All other students must report to Professor R. W. French if their cumulative honor point averages at any time fall below their classifications as follows:

Up to and including the first spring quarter	0.75
Up to and including the second spring quarter	0.88
Up to and including the third spring quarter	1.00
Thereafter	1.00

A student is removed from probation at the end of a quarter or a Summer Session if his cumulative point average is again above the probation level.

A student on probation for two successive quarters is not permitted to register for the third quarter unless his cumulative point average is above the probation level. Such a student desiring to re-enter may do so but he must wait until the beginning of the quarter corresponding to the quarter in which he was first on probation. A student under this rule is readmitted on probation and if he continues to do work below the minimum requirements he will be suspended for not less than two quarters.

Students suspended for low scholarship must receive permission from the Students' Work Committee before they may re-register.

A student on probation must register for a minimum of 10 credit hours per quarter or 5 credits per Summer Session.

School of Chemistry

1. Students registered in the School of Chemistry shall be assigned honor points on the completion of any course as outlined on page 28.

2. As a requirement for graduation, a student must obtain at least 1 honor point per credit in each quarter of the prescribed courses of the freshman and sophomore years in inorganic chemistry and qualitative analysis, and an *average* of 1 honor point per credit in Analytical Chemistry 1-2. The satisfying of this requirement in any quarter of the courses in inorganic chemistry and qualitative analysis is a prerequisite to registration for the work of any succeeding quarter. A student who fails to satisfy this requirement in any course must repeat the course in class the next time the course is offered.

3. As a requirement for graduation a student must obtain an average of at least one honor point per credit for his total work in courses which do not belong to his freshman or sophomore years.

Excess Honor Points and Quality Credits

4. The term "excess honor points," for any course is defined as the total number of honor points received by a student for that course minus the number of honor points associated with a grade of C.

5. For every course in which a student obtains a grade above C he shall receive not only the stated credits for the course but in addition quality credits equal to the excess honor points divided by the factor ten. These quality credits are to be accepted on the same basis as the nominal or stated credits in satisfying the credit requirement for graduation.

Special Regulations for Students Proceeding to the Degree of Bachelor of Chemistry

6. Students who at the end of the junior year have an honor point average of less than 1.9 in all courses taken while registered in the school will pursue in their senior year the prescribed curriculum and will be eligible for graduation when their total credits (stated plus quality) amount to the required number, namely 207. Students with an honor point average *close to 1.9* should be able, in the spring quarter of their senior year, to register in the Graduate School and obtain *some* residence and graduate credit.

7. A student who at the end of the junior year has an honor point average of more than 1.9 in all courses taken while registered in the school will pursue in his senior year *a course of study prescribed for him* by an adviser after thoro study by the adviser of the needs, qualifications, and desires of the student. Toward the end of his junior year or at the beginning of his senior year, the student shall select an adviser from among the chiefs of the divisions of the school. An adviser so selected may delegate his duties in this connection to a member of his staff.

8. As soon as the senior student, following the course of study prescribed by his adviser, has accumulated a total of 207 quarter credits (stated plus quality) he shall be eligible to be recommended for the Bachelor's degree.

Special Regulations for Students Proceeding to the Degree of Bachelor of Chemical Engineering

9. Students in the Chemical Engineering Curriculum will be recommended for graduation when they have *completed the prescribed courses,* have satisfied the requirements of paragraphs (2) and (3) and have accumulated at least 218 quarter credits (stated plus quality.) Students whose honor point average at the end of the junior year *does not greatly exceed unity* will register in the senior year for the prescribed courses and usual electives. Students with an honor point average *considerably greater than unity* will consult with the chief of the Department of Chemical Engineering or with an adviser assigned by him, who will *prescribe the work* to be undertaken in the senior year. In exceptional cases, the adviser is authorized to *waive the requirement* that *any* given courses are prerequisite to graduation. In any case, gifted students will be able in the spring quarter of their senior year to obtain credit in the Graduate School for an appreciable fraction of the work of that quarter.

Students Entering with Advanced Standing

10. The above regulations shall apply to students entering with advanced standing as far as the work taken by them after entering the University of Minnesota is concerned. Honor point averages and quality credits will be computed

from grades received in courses taken at the University of Minnesota.

A student entering as a sophomore may transfer from outside the School of Chemistry not more than one half of the total number of elective credits allowed for graduation; in the same manner a junior will be permitted to transfer only three quarters of the total number of elective credits allowed for graduation.

School of Mines and Metallurgy

Students registered in the School of Mines and Metallurgy shall be assigned honor points on the completion of any course. A student must have at least as many honor points as there are credits required for graduation.

Calculation of Honor Points in the Institute of Technology

Honor points per credit hour are calculated for the different grades as follows:

Grade A=3 honor points	Grade †E=0 honor points
Grade B=2 honor points	Grade †I=0 honor points
Grade C=1 honor point	Grade F= −1 honor point
Grade D=0 honor points	

The following gives an example of how the cumulative honor point average is calculated:

Subject	Credits	Grades	Honor points
First quarter:			
M.&M. 11, College Algebra	5	B	10
Drawing 1	3	C	3
Chemistry 4	(4)*	E or I†	0
English 4	3	F	−3
Completion:			
Chemistry 4	4	C	4
Second quarter:			
Drawing 2	3	D	0
M.&M. 12, Trigonometry	5	C	5
Chemistry 5	4	D	0
English 4	3	A	9
Total	30		28
Cumulative honor point average:	28 : 30 = 0.93		

When and if a course, having previously been graded with F, is finally passed, the positive honor points, if any, are added to the previous negative honor points. In other words, negative honor points can be counterbalanced but never eliminated.

SCHOLARSHIPS AND PRIZES

Research fellowships.—In the Engineering Experiment Station research fellowships are available from time to time which are open to engineering graduates, including chemical engineers. The holder is required to give twenty hours per week, that is, about half of his time, to such research service as may be assigned him. In addition he is expected to carry half-time work in the Graduate School toward an advanced degree.

Teaching fellowships in civil and electrical engineering are open to gradu-

* Not counted.

† In calculating honor point averages the grades E and I are not counted. Nor are the credits counted for which the grades E and I have been received.

ates in these fields. Each fellow renders part-time service in instruction while pursuing graduate study.

The Shevlin Fellowship in Chemistry.—The Shevlin Fellowship in Chemistry, established by the late Thomas H. Shevlin, of Minneapolis, is awarded annually and yields $500. Candidates for this fellowship should file their applications before March 1 with the dean of the Graduate School. The Shevlin fellow devotes his entire time to graduate work and is not required to render any service to the University.

The du Pont Fellowship in Chemistry.—This fellowship was founded by E. I. du Pont de Nemours and Company, Wilmington, Delaware, and yields $750 annually. The holder devotes his entire time to graduate work and is not required to render any service to the University. Applications for this fellowship should be submitted to the dean of the Institute of Technology before March 15.

Fellowships in public administration.—The University of Minnesota awards annually a limited number of *pre-service fellowships in public administration* to college and university graduates without previous experience in government service. These fellowships carry stipends of $650 plus an additional amount sufficient to pay tuition and fees in the Graduate School. Holders of these fellowships devote their entire time to graduate study. They are open to graduates of professional and technical schools, preference being given to applicants who have had preparation in political science and related social sciences. Upon the satisfactory completion of a year of resident study, the fellowship will be renewed for a second year to provide internship training with some governmental agency in the particular field of government service in which the student is especially interested.

The University also offers several *in-service fellowships in public administration* to college and university graduates who are employed in government service and who have been in such service for at least three years. The stipends for these fellowships vary from $1,000 to $1,500. The period of training includes the three quarters of the regular academic year and the first term of the Summer Session. Persons holding professional and technical positions in national, state, and local governments are eligible to apply. Preference is given to those who have had at least some preparation in political science and related social sciences.

Assistants.—The School of Chemistry employs 42 graduate assistants at from $500 to $600 per year, on part time. They devote from eight to twelve hours per week to instruction and other assigned work, thereby obtaining valuable experience in laboratory teaching under competent direction. In addition to these duties, each assistant is expected to pursue graduate work toward a higher degree. Application should be made to the dean of the Institute of Technology.

Prizes.—Various prizes in the University are open to students in these colleges. A list of them is given in the bulletin, University Aids for Student Expenses. Certain prizes are awarded to students in Engineering only, such as the prizes of the Northwestern section of the American Society of Civil Engineers and the Twin Cities section of the American Society of Mechanical Engineers. The Tau Beta Pi, Chi Epsilon, Eta Kappa Nu, and Pi Tau Sigma honorary engineering fraternities also offer prizes.

Two prizes are open to sophomores in chemistry and chemical engineering. These have been established by the Phi Lambda Upsilon honorary chemical fraternity and the Twin City Alumni Association of the Alpha Chi Sigma chemical fraternity. The chemistry faculty offers a prize to seniors.

Prizes and medals are open to students registered in the School of Architecture. Medals are offered by the American Institute of Architects, Alpha Rho Chi, and the Scarab Fraternity. Prizes have been established, respectively, by the Alpha Alpha Gamma Sorority, the Gargoyle Club, and the Northern States Power Company.

Loan funds.—Various loan funds are available from which worthy students may obtain financial assistance after they have been in attendance a sufficient length of time to establish satisfactory records of accomplishment. Application should be made to the dean of student affairs and to the head of the student's department.

RESERVE OFFICERS TRAINING CORPS

Army

The War Department has established at this University units of medical, coast artillery (anti-aircraft), and signal corps, in which both basic and advanced courses are given. The coast artillery and signal corps units are made up almost entirely of students in the Institute of Technology for whom this technical and military training is particularly valuable. The Basic Course is open to all physically fit male students and carries one credit per quarter for six quarters; the Advanced Course is open to selected students who have completed the Basic Course.

Students in the institute who are admitted to the Advanced Course of the signal or coast artillery corps under the prescribed regulations receive for this work fifteen and eighteen elective credits toward graduation, respectively. They receive an allowance of cash and clothing from the government during the two years of the course, pay and transportation to attend one summer training camp and, if successful, a commission in the Officers' Reserve Corps of the United States Army after graduation.

Besides receiving technical instruction, the student in the Advanced Course has the opportunity to develop and exercise leadership and discipline which will be of value to him in his professional career. Special arrangements may be made in the student's program to enable him to take this course, the advantages of which are recognized.

Navy

This department is a unit of the Naval Reserve Officers' Training Corps and is administered by commissioned officers of the regular Navy, all of whom are graduates of the United States Naval Academy, with considerable experience at sea. This department offer undergraduate four-year courses which may be counted toward a degree. Satisfactory completion of the four-year course and one cruise of about three weeks' duration on a naval vessel at the end of the junior year will qualify the student for a commission as ensign, United States Naval Reserve, or as second lieutenant, United States Marine Corps Reserve, provided he applies for the commission, obtains a degree from the University, is recommended by the professor of naval science and tactics, and passes a prescribed physical examination. If commissioned as a reserve officer, he may be detailed for active duty only upon his own request, except in case of national emergency.

Students must be citizens of the United States, regularly enrolled in the University as candidates for a degree and will not be permitted to register for the courses in Naval Science until they have been accepted by the officer in charge of the Minnesota Naval Unit.

Uniforms and equipment are furnished by the government without charge. Upon satisfactory completion of the course the uniform becomes the property of

the student. Monthly commutation of subsistence together with transportation and cruise pay are paid by the Navy Department to juniors and seniors who maintain a satisfactory standing and attendance.

SELF-SUPPORT AND OUTSIDE ACTIVITIES

A large number of students contribute to their financial support by means of part-time work during the college year. Frequently such students undertake too much. They are advised to carry a lighter program of studies and to plan to spend more than four years in the college course if outside work requires a large amount of their time. Information regarding work for self-support during the college course may be obtained from the University Employment Service or the University Young Men's Christian Association.

Freshmen, in particular, are advised that the work of the first year in the institute will require their closest attention and application if they are to succeed. They should refrain from participation in unnecessary outside activities, while bearing in mind the importance of physical as well as mental development.

CHANGES IN BULLETIN

The faculties of the Institute of Technology reserve the right to change their curricula and to cancel or change without notice any course printed in this bulletin. The bulletin is a statement of present conditions, and is subject to modification in any particular by faculty action.

SOCIETIES

Branches of the following national professional societies are maintained at the University of Minnesota by students and faculty members: American Chemical Society, American Institute of Chemical Engineers, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers, American Society of Agricultural Engineers, and the Institute of the Aeronautical Sciences. In addition there are the Architectural Society, the School of Mines and Metallurgy Society, and the University of Minnesota Flying Club.

FOR NEW SCHOLASTIC REQUIREMENTS SEE REQUIREMENTS FOR GRADUATION, PAGE 24.

CURRICULA

COLLEGE OF ENGINEERING AND ARCHITECTURE

Aeronautical Engineering
Agricultural Engineering
Architecture
Interior Architecture*
Civil Engineering
Electrical Engineering
Engineering and Business Administration
Engineering Pre-Business
Mechanical Engineering

SCHOOL OF CHEMISTRY

Chemistry
Chemical Engineering
Physics

SCHOOL OF MINES AND METALLURGY

Mining Engineering
Metallurgical Engineering
Geological Engineering
Petroleum Engineering

STUDENTS ENTERING WITHOUT CHEMISTRY, HIGHER ALGEBRA, OR SOLID GEOMETRY AND THOSE REQUIRED TO TAKE THE COURSE IN SUBFRESHMAN ENGLISH COMPOSITION

Applicants deficient in either or both higher algebra and solid geometry, will be admitted provisionally at the beginning of the school year. Students entering without high school chemistry will be required to carry a special course in college chemistry during their freshman year. Students entering with deficiencies in higher algebra or solid geometry or both and all students required to take the course in subfreshman English composition must register for such deficiencies in the fall quarter. In order to continue in the Institute of Technology these deficiencies must be removed during the fall quarter. Applicants deficient in either higher algebra or solid geometry will not be admitted at the beginning of the winter or spring quarter.

If students who enter with deficiencies in mathematics desire to graduate in four years, it will be necessary to attend the Summer Session immediately following their freshman year. It is recommended that such deficiencies be made up in the Summer Session before entering the institute.

Chemistry.—Students entering the engineering divisions of the College of Engineering and Architecture and the School of Mines and Metallurgy who have not had high school chemistry will take Inorganic Chemistry 14f-15w, four credits per quarter, instead of Inorganic Chemistry 4f-5w. Those entering the School of Chemistry who have not had high school chemistry will take Inorganic Chemistry 6f-7w-12s, five credits per quarter, instead of Inorganic Chemistry 9f-10w-12s.

Higher algebra.—Freshmen entering without higher algebra will take Course 9 (Higher Algebra) without credit, and all students except architects who have had higher algebra will register for Course 11 (College Algebra). Course 9 will be followed by all students except architects by Courses 11, 12, and 13 dur-

* Discontinued. Not open to students entering after 1939-40.

ing the winter and spring quarters and the following Summer Session, respectively. Architectural students take Courses 3 and 4 during the winter and spring quarters.

Solid geometry.—Students who do not offer solid geometry for entrance will take Drawing 10 (Solid Geometry) during the fall quarter and without university credit. Students in the engineering courses in the College of Engineering and Architecture should follow this by Drawing 1, 2, and 3 in the winter and spring quarters and the Summer Session, respectively; in the School of Chemistry, by Drawing 7 and 8 in the winter and Summer Session; and in the School of Mines and Metallurgy, by Drawing 7, three credits, in the winter and Drawing 9, three credits, in the spring quarter. Students in architecture will add solid geometry to their fall quarter program.

English.—Students who are required to take the course in subfreshman English Composition will take this course during the fall quarter without university credit. The required courses in Composition, English 4-5-6 should follow in the winter and spring quarters and the Summer Session, respectively. Students register in subfreshman English Composition in the Extension Division. Fee $7.50.

AERONAUTICAL, AGRICULTURAL, CIVIL, ELECTRICAL, AND MECHANICAL ENGINEERING, AND PRE-BUSINESS

FRESHMAN YEAR§

(For students entering with chemistry, higher algebra, and solid geometry and who pass their English tests.)

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 11	College Algebra	5	5	.....	.....
Inorg. Chem. 4	General Inorganic Chemistry	4	1	3	3
Engl. 4	Composition	3	3	.....	.....
Draw. 1	Engineering Drawing	3	.....	.....	8
M.E. 11*	Metal Working (for Pre-bus.)	2	.....	2	3
G.E. 11	Orientation	0	.....	1	.....
	Winter Quarter				
M.&M. 12	Trigonometry	5	5	.....	.....
Inorg. Chem. 5	General Inorganic Chemistry	4	1	3	3
Engl. 5	Composition	3	3	.....	.....
Draw. 2	Engineering Drawing	3	.....	.....	8
M.E. 8*	Foundry Practice (for Pre-bus.)	2	.....	2	3
G.E. 12	Orientation	0	.....	1	.....
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	.....	.....
Inorg. Chem. 16	Qualitative Chemical Analysis	5	.....	3	6
Engl. 6	Composition	3	3	.....	.....
Draw. 3	Descriptive Geometry	3	.....	.....	8
M.E. 4*	General Woodwork (for Pre-bus.)	2	.....	2	3
G.E. 13†	Orientation	0	.....	1	.....

* Freshmen in Engineering Pre-Business are required to take Shop Practice, M.E. 4, 8, and 11, 2 credits per quarter; not required of the others.

† Women take one of the following courses in place of G.E. 13, Phys.Ed. 1f, 2w, 3s, 4f, 5w, or 6s.

§ See statement on page 32.

AERONAUTICAL ENGINEERING

Four-year course leading to the degree of bachelor of aeronautical engineering, B.Aero.E.

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 207 credits for graduation.

The course in aeronautical engineering is intended to provide instruction and training for students who wish to enter this field of engineering as a profession. With the rapid development of aviation in recent years, aeronautical engineering has assumed a prominent and important position among the engineering professions. The production of airplanes in the United States is increasing at a rapid rate. Attention is given to lighter-than-air craft. Extensive optional courses are available for those who wish to specialize in meteorology. Aeronautical engineers are required in all stages of the process, from the research work preliminary to improvements in design to the actual construction, testing, operation, and maintenance. Students trained in aerodynamics and the designing of light structures have been in demand in recent years in many industries.

The aeronautical engineering course is similar to other professional engineering courses. The first year of the course is the same as that of agricultural, civil, electrical, and mechanical engineering. The fundamental studies are the same. As a result, the graduates in aeronautical engineering should be prepared to enter various branches of the engineering field if, for any reason, they should prefer to do so.

As in other technical courses, so in aeronautical engineering, mathematics plays an important part. No student should enter this course who feels poorly prepared in mathematics.

It should be understood that this is a professional engineering course and not a training course for airplane pilots. It deals with the preparation of students for research, design, construction, operation, management, and maintenance of aircraft from the standpoint of the engineer or manager. However, practical flight training is important for aeronautical engineers and students are urged to take advantage of their opportunities to obtain it through the University of Minnesota Flying Club, Army Air Corps, National Guard, Naval Reserve, Civil Aeronautics Authority's Flight Training Program, or private organizations.

Students taking the five-year combined course in aeronautical engineering and business administration may substitute business courses for C.E. 17, Met. 152, and six credits of the optional courses listed in the footnote on page 36.

For freshman year, see page 33.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Phys. 7	General Physics	5	1	4	2
Draw. 28†	Drafting	2	.....	.....	6
Aero.E. 1	Aeronautics	3	3	.....	.....
M.E. 5*	Pattern Practice	2	.....	2	3
or					
M.E. 13*	Forging, Heat Treating, and Welding	2	.....	2	3
or					
C.E. 17*	Surveying	3	.....	1	7
M.E. 70	Mechanical Technology	1	.....	2	.....

* M.E. 5, 13 and C.E. 17 must be taken during sophomore year.

† For permissible substitute, see page 75

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Phys. 8	General Physics	5	1	4	2
Aero.E. 2	Aircraft and Auto Engines	3	1	2	2
M.E. 5†	Pattern Practice	2	.....	2	3
or					
M.E. 13†	Forging, Heat Treating, and Welding	2	.....	2	3
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
Phys. 9	General Physics	5	1	4	2
Aero.E. 3	Aeronautics	3	3	.....	.....
C.E. 17†	Surveying	3	.....	1	7
or					
M.E. 5†	Pattern Practice	2	.....	2	3
Draw. 29	Drafting	2	.....	.....	6
	JUNIOR YEAR§				
	Fall Quarter				
M.&M. 129	Hydraulics	4	3	1	.....
M.&M. 143	Hydraulics Laboratory	1	.....	.....	2
Aero.E. 100	Aerodynamics	3	3	.....	.....
M.E. 30	Steam Engineering	3	3	.....	.....
M.E. 32	Elementary Mechanical Laboratory	2	.....	.....	4
M.E. 17	Machine Shop Practice	3	.....	2	6
	Electives*				
	Winter Quarter				
M.&M. 128	Strength of Materials	5	5	.....	.....
M.&M. 141	Materials Testing Laboratory	2	.....	1	2
Aero.E. 101	Aerodynamics	3	3	.....	.....
M.E. 26	Mechanism and Kinematics	3	3	.....	.....
M.E. 31	Thermodynamics	3	2	1	2
	Electives*				
	Spring Quarter				
M.&M. 127	Technical Mechanics (Dynamics)	5	5	.....	.....
Aero.E. 83	Stresses in Simple Structures	3	3	.....	.....
Aero.E. 102	Aerodynamics	3	3	.....	.....
Aero.E. 140	Aeronautical Laboratory	2	.....	.....	6
Aero.E. 170	Air Transport	2	2	.....	.....
M.E. 27	Machine Design	3	.....	2	3
	Electives*				
	SENIOR YEAR§				
	Fall Quarter				
E.E. 46	Electric Power	3	3	.....	.....
M.E. 150	Internal Combustion Engines	3	3	.....	.....
Met. 152	Metallography	3	.....	2	3
Aero.E. 115¶	Airplane Stresses	3	2	.....	2
or					
M.&M. 180w	Advanced Strength of Materials	3	3	.....	.....
Aero.E. 120	Airplane Design	3	2	.....	3

* For list of elective courses in other colleges, see page 74.

† M.E. 5, 13, and C.E. 17 must be taken during sophomore year.

§ Students who contemplate an extra quarter in residence should arrange their programs for this time from such courses as Aero.E. 159, 160, 164, 165, 170, 173, 174, 175, 190, 191, 193, 194, 195, in order to have the proper sequence of courses.

¶ Students may substitute M.&M. 180w, Advanced Strength of Materials, 3 cred., for Aero.E. 115f.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
E.E. 47	Electric Power	3	2	.....	2
M.E. 151†	Advanced Internal Combustion Engines	3	3	.....	.....
M.E. 154†	Design of Airplane Engines	2	.....	.....	6
Aero.E. 121	Airplane Design	4	2	.....	6
Aero.E. 141	Aerodynamics Laboratory	3	1	.....	6
Aero.E. 190	Seminar	1	1	.....	.....
	Electives*				
	Spring Quarter				
M.E. 158	Aero Engine Testing	2	.....	.....	6
Aero.E. 122	Airplane Design	3	1	.....	6
Aero.E. 159	Inspection Trip (spring vacation)	1	.....	.....	.....
Aero.E. 160†	Airships	3	2	.....	3
Aero.E. 191	Seminar	1	1	.....	.....
	Electives*				

AGRICULTURAL ENGINEERING

Four-year course leading to the degree of bachelor of agricultural engineering, B.Ag.E., in co-operation with the College of Agriculture, Forestry, and Home Economics.

Requirements for graduation include all prescribed courses with sufficient approved electives to make a total of at least 207 credits. This is an average of 17¼ credits per quarter for 12 quarters.

Agricultural engineering activities are usually grouped under the heads of *farm power and machinery, farm structures,* and *land reclamation.* There is also need for service in the entire field necessitating general preparation in all three lines.

The farm machinery field covers the selection and management of machinery and equipment best suited to produce good results locally on any given type of farm, the design and construction of such machinery or equipment where it does not yet exist, the improvement of such design to meet special needs, and the adaptation of available types of power to local farm conditions. The farm structures field covers arrangement of the structures on the farmstead for economy, convenience, and comfort, the design and construction of farm buildings and related structures, and the adaptation of available types of structural materials to local farm conditions. The land reclamation field covers development of virgin lands suited to agriculture and the improvement of lands already under cultivation through economical clearing operations, and soil conditioning through efficient design and proper installation of drainage and irrigation works and control of soil erosion.

The field, as yet comparatively new and uncrowded, offers many opportunities among which the following are prominent: with manufacturers of farm machinery, equipment, and building materials; as executives, research engineers, publicity and sales managers, and technical field experts; as managers of large farms requiring extensive machinery or equipment; as reclamation engineers with the local, state,

* For list of elective courses in other colleges, see page 74.

† Any one or two of the following courses: Aero.E. 160, Airships, and M.E. 151, Advanced Internal Combustion Engines, or M.E. 154, Design of Airplane Engines, but not *both* of these M.E. courses, may be replaced by an equal number of approved elective credits in any of the following fields: aerodynamics, airplane design and stresses, internal combustion engines, and air transport and meteorology; also in business for students taking the five-year combined course with business administration.

and federal governments, and with development companies; as agricultural advisers with power companies in development of rural service; as agricultural engineering editors for farm papers and trade journals; as rural architects and builders; as teachers, investigators, and extension specialists in state agricultural colleges, experiment stations, and in the United States Department of Agriculture; as consulting agricultural engineers in general practice.

Students taking the combined five-year course in agricultural engineering and business administration may fill all junior and senior elective opportunities in the junior and senior years with required business courses under the direction of the agricultural engineering adviser and with the approval of the School of Business Administration.

For freshman year, see page 33.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Phys. 7	General Physics	5	1	4	2
Ag.E. 43	Mechanical Laboratory	3	.....	1	5
Agron. 1	General Farm Crops	3	3	.....	.....
Econ. 8	General Economics	3	3	.....	.....
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Phys. 8	General Physics	5	1	4	2
Soils 9	Soils	4	4	.....	.....
Econ. 9	General Economics	3	3	.....	.....
	Spring Quarter				
M.&M. 26	Technical Mechanics: Statics	5	5	.....	.....
Phys. 9	General Physics	5	1	4	2
Ag.E. 21	Elements of Surveying	4	.....	1	9
Ag.E. 18	Agricultural Automotives	4	.....	2	6

JUNIOR YEAR

	Fall Quarter				
M.&M. 127	Technical Mechanics: Dynamics	5	5	.....	.....
M.&M. 129	Hydraulics	4	3	1	.....
M.&M. 143	Hydraulics Laboratory	1	.....	.....	2
Ag.E. 5	Farm Structures Laboratory	3	.....	1	4
Geol. 5	Engineering Geology	3	.....	3	.....
Ag.E. 52	Elements of Farm Machinery	3	1	1	3
	Winter Quarter				
M.&M. 128	Strength of Materials	5	5	.....	.....
Ag.Econ. 102	Farm Management: Organization	3	.....	3	.....
Ag.E. 51†	Land Reclamation	5	1	4	.....
or					
Soils 108	Physical Properties of Soils	3	.....	1	6
M.E. 26	Mechanism and Kinematics	3	3	.....	.....
M.E. 31	Thermodynamics	3	2	1	2

† Given only in alternate years, 1941-42, 1943-44, etc.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
A.H. 1	Livestock Production	3	.....	3	3
M.E. 27	Machine Design	3	.....	2	3
Ag.E. 53	Farm Structures	3	1	1	3
Ag.E. 72†	Applied Electricity	3	.....	1	6
or					
Ag.E. 73*	Steam Boilers and Heat Engines	3	1	1	3
C.E. 37	Structural Engineering	3	.....	2	4
Ag.E. 37	Rural Sanitation	3	.....	3	.....

SENIOR YEAR

	Fall Quarter				
Ag.E. 67	Advanced Farm Structures Design	3	1	1	4
Ag.E. 71	Design and Economics of Agricultural Machinery	3	.....	2	3
C.E. 146	Plain Concrete	3	.....	2	4
D.H. 1	The Dairy Industry	3	.....	3	.....
	Electives to complete program.				
	Winter Quarter				
Ag.E. 51†	Land Reclamation	5	1	4	.....
or					
Soils 108	Physical Properties of Soils	3	.....	1	6
G.E. 101	Contracts and Specifications	3	.....	3	.....
Rhet. 22	Public Speaking	3	3	.....	.....
	Electives to complete program.				
	Spring Quarter				
A.H. 1	Livestock Production	3	.....	3	3
Ag.E. 72†	Applied Electricity	3	.....	1	6
or					
Ag.E. 73*	Steam Boilers and Heat Engines	3	1	1	2
	Electives to complete program.				

RECOMMENDED ELECTIVES§

The following courses are suggested for the guidance of students who wish to elect work along the general lines indicated.

Farm Structures

Course No.	Title	Credits
Ag.E. 44s	Advanced Drawing	2
Ag.E. 111f,112w,113s	Farm Building Problems, per quarter	2-6
Arch. 57f,58w,59s	Building Materials and Methods, per quarter	2
For. 10w	Farm Forestry	3
G.E. 81s	Estimating	3
Hort. 24w	Principles of Landscape Design	3

* Given only in alternate years, 1940-41, 1942-43, etc.

† Given only in alternate years, 1941-42, 1943-44, etc.

§ Students taking the combined five-year course in agricultural engineering and business administration see statement on page 37.

Farm Power and Machinery

Course No.	Title	Credits
M.E. 18f,w,	Machine Shop Practice	3
M.E. 121f	Machine Design	2
M.E. 131w,132s	Thermodynamics, per quarter	3
M.E. 150f,w	Internal Combustion Engines	3
Met. 156w	Metallography	3
Ag.E. 121f,122w,123s	Farm Power and Machinery Problems, per quarter	2-6
Ag.E. 126w	Selection of Farm Equipment	3
E.E. 43f,44w,45s	Electric Power, per quarter	3

Land Reclamation and Development

Ag.E. 28w	Land Clearing	3
Ag.E. 101f,102w,103s	Advanced Drainage Problems, per quarter	2-6
C.E. 161f	Power	4
M.&M. 130f	Open Channel Flow	3
M.&M. 193w	Hydraulic Measurements	3

General

Ag.Econ. 103	Farm Operation	3
Bot. 1	General Botany	3
Hort. 6	Fruit Growing	3

ARCHITECTURE

The work in architecture offered by the Institute of Technology includes courses dealing with the history, theory, and practice of architecture and the allied arts of design. It can be taken in accordance with any one of the four following plans:

1. Four-year course leading to the degree of bachelor of arts (B.A.) with a major in architecture, in the College of Science, Literature, and the Arts.
2. Four-year course leading to the degree of bachelor of arts (B.A.) with a major in fine arts, in the College of Science, Literature, and the Arts.

Plans 1 and 2 are intended for students who want to combine with their academic training, whether for cultural or vocational reasons, some study of architecture, drawing, painting, or sculpture. Plan 1 offers an advantageous approach to the five- and six-year professional courses in architecture described below, or to further training in the special fields of community and regional planning, landscape architecture, or decorative and industrial design. For further information see the Bulletin of the College of Science, Literature, and the Arts and the Combined Class Schedule.

3. Five-year course leading to the degree of bachelor of architecture (B.Arch.) in the Institute of Technology.
4. Six-year course leading to the degree of bachelor of arts (B.A.) with a major in architecture, in the College of Science, Literature, and the Arts and the degree of bachelor of architecture (B.Arch.) in the Institute of Technology.

Plans 3 and 4 are intended primarily for students who expect to enter the professional practice of architecture in any of its recognized phases. They provide training which, when supplemented by practical experience in architects' offices, places the student in line for recognition as a practicing architect according to the registration laws of the various states. Secondarily, they serve as advantageous approaches to various fields allied to architecture. For further information see page 40 for the five-year course, page 43 for the six-year course.

The work in architecture included in these courses falls into three general divisions. One is theory, presenting the science, philosophy, and history which

forms the background of architectural design. The second is practice in drawing and modeling as a means of expression in architectural design. The third and principal division is continued practice in all phases of architectural design itself, including both composition and construction.

As high school preparation for either the five-year or six-year course, higher algebra and solid geometry are essential; physics, chemistry, history, and foreign language are strongly recommended; instrumental and freehand drawing are advantageous.

Whether the student elects the five-year or the six-year course will depend on the time and means at his disposal. He will find it highly desirable to supplement and broaden his technical training by as much general academic work of college grade as he finds possible. College work taken at institutions other than Minnesota can be readily adjusted either to Plan 3 or to Plan 4. In any such work college algebra, trigonometry, and analytic geometry must be included as essential prerequisites to certain courses in structural design. Selections from language, history, economics, political science, sociology, physics, and chemistry are recommended. Prospective students should note that it takes normally four years to complete the required work in architectural design, regardless of how much other work they may have to their credit, and should calculate their time accordingly.

FIVE-YEAR COURSE

In addition to the prescribed courses, sufficient approved electives must be taken to complete a total of at least 225 credits.

The following program is that normally followed by students entering from high school. It will naturally be modified and condensed for students with previous college experience. It may also be modified by the student's progress in design and drawing since that is based on achievement, rather than time. The work of the first year is identical with the first year of the major in architecture in the College of Science, Literature, and the Arts and students may transfer from one course to the other at the end of that time without loss of credit toward either degree.

The choice and distribution of elective subjects should be arranged in advance by consultation with the faculty. Their purpose is: (1) to provide as much general education as possible, (2) to provide a certain degree of professional specialization along the line of each student's particular interests.

FIRST YEAR*

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Engl. 4	Composition	3	3	.....	.....
Arch. DP-I	Drawing and Painting, Grade I	2	.....	.....	4
	Electives†§				

* See statement on page 32 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in preliminary English.

† For list of elective courses in other colleges, see page 74.

§ Students entering without previous college or professional experience should include Arch. 1-2-3, Introduction to Architecture, 1 cred. per qtr. In addition, foreign language, history, and a physical science are recommended. The normal program will accommodate French 1-2-3 or 4; History 1-2-3; Chemistry 1-2-3, or Chemistry 9-10; Geology 8; Geography 11; Physics 1-2. Students who have not had physics in high school should take physics in either the first or second year.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
M.&M. 3	Freshman Mathematics for Architects	5	5	.....	.....
Engl. 5	Composition	3	3	.....	.....
Arch. DP-I	Drawing and Painting, Grade I	2	.....	.....	4
	Electives†§				
	Spring Quarter				
M.&M. 4	Freshman Mathematics for Architects	5	5	.....	.....
Engl. 6	Composition	3	3	.....	.....
Arch. DP-I	Drawing and Painting, Grade I	2	.....	.....	4
	Electives†§				
	SECOND YEAR				
	Fall Quarter				
M.&M. 91	Calculus for Architects	4	4	.....	.....
Arch. 4	Graphic Representation	2	.....	1	3
Arch. DP-II	Drawing and Painting, Grade II	2	.....	.....	4
Arch. AD-I	Architectural Design, Grade I	5	.....	.....	15
	Electives†				
	Winter Quarter				
M.&M. 92	Mechanics for Architects	4	4	.....	.....
Arch. 5	Graphic Representation	2	.....	1	3
Arch. DP-II	Drawing and Painting, Grade II	2	.....	.....	4
Arch. AD-I	Architectural Design, Grade I	5	.....	.....	15
	Electives†				
	Spring Quarter				
M.&M. 93	Strength of Materials for Architects	4	4	.....	.....
Arch. 6	Graphic Representation	2	.....	1	3
Arch. DP-II	Drawing and Painting, Grade II	2	.....	.....	4
Arch. AD-I	Architectural Design, Grade I	5	.....	.....	15
	Electives†				
	THIRD YEAR				
	Fall Quarter				
Arch. 51	History of Architecture	3	.....	3	.....
Arch. 57	Building Materials and Methods	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
C.E. 38	Structural Analysis and Design	3	.....	3	.....
	Electives†				
	Winter Quarter				
Arch. 52	History of Architecture	3	.....	3	.....
Arch. 58	Building Materials and Methods	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
C.E. 39	Structural Analysis and Design	3	.....	3	.....
	Electives†				

† For list of elective courses in other colleges, see page 74.

§ Students entering without previous college or professional experience should include Arch. 1-2-3, Introduction to Architecture, 1 cred. per qtr. In addition, foreign language, history, and a physical science are recommended. The normal program will accommodate French 1-2-3 or 4; History 1-2-3; Chemistry 1-2-3, or Chemistry 9-10; Geology 8; Geography 11; Physics 1-2. Students who have not had physics in high school should take physics in either the first or second year.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
Arch. 53	History of Architecture	3	.....	3	.....
Arch. 59	Building Materials and Methods	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
C.E. 41	Structural Analysis and Design	3	.....	3	.....
	Electives†				
	FOURTH YEAR				
	Fall Quarter				
Arch. 101	Building Materials and Methods	2	.....	2	.....
Arch. AD-III	Architectural Design, Grade III	9	.....	.....	27
E.E. 40	Electrical Wiring and Equipment	2	.....	2	.....
	Electives†				
	Winter Quarter				
Arch. 102	Building Materials and Methods	2	.....	2	.....
Arch. AD-III	Architectural Design, Grade III	9	.....	.....	27
C.E. 171	Sanitary Engineering	2	.....	2	.....
	Electives†				
	Spring Quarter				
Arch. 103	Building Materials and Methods	2	.....	2	.....
Arch. AD-III	Architectural Design, Grade III	9	.....	.....	27
M.E. 164	Heating and Ventilation	2	.....	2	.....
	Electives†				
	FIFTH YEAR				
	Fall Quarter				
Arch. AD-III	Architectural Design, Grade III	9	.....	.....	27
	Electives†				
	Winter Quarter				
Arch. AD-III	Architectural Design, Grade III	9	.....	.....	27
Arch. 105	Professional Practice	2	.....	2	.....
	Electives†				
	Spring Quarter				
Arch. AD-IV	Architectural Thesis	12	.....	.....	36
	Electives†				

ARCHITECTURAL ELECTIVES

In addition to the courses listed above as required for the bachelor of architecture degree, the following elective courses are offered by the School of Architecture:

Course No.	Title	Credits
Arch. 1f-2w-3s	Introduction to Architecture, per quarter	1
Arch. 61f-62w-63s	Tutorial Work in History of Architecture, per quarter	2
Arch. 104f	Housing	3
Arch. 106s	Housing	2
Arch. 107f-108w-109s	Furniture and Decoration, per quarter	2
Arch. ID-If,w,s	Interior Design	24
Arch. DP-IIIf,w,s	Drawing and Painting, Grade III	6
Arch. DP-IVf,w,s	Drawing and Painting, Grade IV	6
Arch. M-If,w,s	Modeling, Grade I	6
Arch. M-Iaf,w,s	Modeling for Architects	2
Arch. M-IIf,w,s	Modeling, Grade II	6

† For list of elective courses in other colleges, see page 74.

SIX-YEAR COURSE IN ARTS AND ARCHITECTURE

During the first four years of this course the student is registered in the College of Science, Literature, and the Arts and follows the plan of study prescribed for a bachelor of arts degree with a major in architecture.

The following courses should be completed during this period:

Required for the major sequence:

Course No.	Title	Credits
Arch. 1-2-3	Introduction to Architecture	3
Arch. 4-5-6	Graphic Representation	6
Arch. 51-52-53	History of Architecture	6
Arch. 57-58-59	Building Materials and Methods	6
Arch. 61-62-63	Tutorial Work in History of Architecture	6
Arch. DP-I	Drawing and Painting, Grade I	6
Arch. DP-II	Drawing and Painting, Grade II	6
Arch. AD-I	Architectural Design, Grade I	15
Arch. AD-II	Architectural Design, Grade II	18

Additional requirements:

Math. 7-6-30	College Algebra, Trigonometry, Analytic Geometry	15
M.&M. 91-92-93	Calculus, Mechanics, Strength of Materials	12
C.E. 38-39-41	Structural Analysis and Design	9
	Total	111

During the last two years of the course, or upon completion of the requirements for the bachelor of arts degree, the student is registered in the School of Architecture of the Institute of Technology to complete the requirements for a bachelor of architecture degree as prescribed for the five-year course on page 40.

See also the Junior and Senior College requirements as given in the Bulletin of the College of Science, Literature, and the Arts; and Architecture, in the Combined Class Schedule.

INTERIOR ARCHITECTURE*

Four-year course leading to the degree of bachelor of interior architecture, B.Int.Arch.

This course requires normally four years for its completion, the first two years in the College of Science, Literature, and the Arts, and the last two years in the Institute of Technology, including 180 credits.

For the freshman and sophomore years, students register in the College of Science, Literature, and the Arts and complete the requirements of the Junior College for the major in architecture, including the following courses:

Course No.	Title	Credits
Arch. 4-5-6	Graphic Representation	6
Arch. DP-I	Drawing and Painting, Grade I	6
Arch. DP-II	Drawing and Painting, Grade II	6
Arch. AD-I	Architectural Design, Grade I	15

Having satisfied the requirements of the Junior College, students transfer to

* Discontinued. No students accepted after 1939-40.

the Institute of Technology and pursue the following curriculum, amounting to 90 credits for the remaining two years:

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Arch. 51	History of Architecture	3	.....	3	.....
Arch. 57	Building Materials and Methods	2	.....	2	.....
Arch. 107	Furniture and Decoration	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
	Electives				
	Winter Quarter				
Arch. 52	History of Architecture	3	.....	3	.....
Arch. 58	Furniture and Decoration	2	.....	2	.....
Arch. 108	Building Materials and Methods	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
M.E. 3	Wood-Finishing	2	.....	.....	6
	Electives				
	Spring Quarter				
Arch. 53	History of Architecture	3	.....	3	.....
Arch. 59	Building Materials and Methods	2	.....	2	.....
Arch. 109	Furniture and Decoration	2	.....	2	.....
Arch. AD-II	Architectural Design, Grade II	6	.....	.....	18
	Electives				

SENIOR YEAR

	Fall Quarter				
Arch. DP-III	Drawing and Painting, Grade III	2	.....	.....	4
Arch. ID-I	Interior Design	8	.....	.....	24
	Electives				
	Winter Quarter				
Arch. DP-III	Drawing and Painting, Grade III	2	.....	.....	4
Arch. ID-I	Interior Design	8	.....	.....	24
	Electives				
	Spring Quarter				
Arch. 56	History of Architecture	2	.....	2	.....
Arch. DP-III	Drawing and Painting, Grade III	2	.....	.....	4
Arch. ID-I	Interior Design	8	.....	.....	24
	Electives				

CHEMISTRY AND CHEMICAL ENGINEERING

*Freshman and Sophomore Years**

FRESHMAN YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 11	College Algebra	5	5	.....	.....
Inorg.Chem. 9	General Inorganic Chemistry	5	1	3	5
Engl. 4	Composition	3	3	.....	.....
Draw. 7	Drawing and Descriptive Geometry	3	.....	.....	8
or					
M.E. 19	Survey of Manufacturing Processes	3	1	2	.....

* See statement on page 32 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in subfreshman English Composition.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
M.&M. 12	Trigonometry	5	5	.....	.....
Inorg.Chem. 10	General Inorganic Chemistry	5	1	3	5
Engl. 5	Composition	3	3	.....	.....
Draw. 7	Drawing and Descriptive Geometry	3	.....	.....	8
or					
M.E. 19	Survey of Manufacturing Processes	3	1	2	.....
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	.....	.....
Inorg.Chem. 12	Qualitative Analysis	5	2	1	6
Engl. 6	Composition	3	3	.....	.....
Draw. 8	Drawing and Descriptive Geometry	3	.....	.....	8
or					
M.E. 19	Survey of Manufacturing Processes	3	1	2	.....
G.E. 13†	Orientation	0	.....	1	.....
	SOPHOMORE YEAR				
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Inorg.Chem. 13	Qualitative Analysis	5	1	2	8
Phys. 7	General Physics	5	1	4	2
German 24§	Chemical German	3	3	.....	.....
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Anal.Chem. 1	Quantitative Analysis	5	1	1	10
Phys. 8	General Physics	5	1	4	2
German 25§	Chemical German	3	3	.....	.....
	Spring Quarter				
M.&M. 84	Technical Mechanics	5	5	.....	.....
Anal.Chem. 2	Quantitative Analysis	5	1	1	10
Phys. 9	General Physics	5	1	4	2
German 26§	Chemical German	3	3	.....	.....
Chem.E. 80¶	Chemical Engineering Materials	1	.....	2	.....

CHEMISTRY

Four-year course leading to the degree of bachelor of chemistry, B.Chem.

In addition to the prescribed courses, sufficient approved electives must be taken to complete a total of at least 207 credits.

This professional course in Chemistry is designed to provide thoro training in the fundamentals of chemistry and related subjects. It serves as a basis for further specialization and a foundation for graduate work. Its graduates secure positions in practical chemistry, research, and teaching, in chemical industries, the government service, in colleges and laboratories, etc.

For freshman and sophomore years, see page 44 and above.

† Students with more than one year advanced standing are exempted from G.E. 13. Women take one of the following courses in place of G.E. 13, Phys.Ed. 1f, 2w, 3s, 4f, 5w, or 6s.

§ Students who have had two years of high school German or one year of college German take course 27-28-29.

¶ Required of chemical engineers only.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Org.Chem. 51	Organic Chemistry	5	0	5	6
Phys.Chem. 101	Physical Chemistry	3	1	3	.....
Phys.Chem. 104	Physical Chemistry Laboratory	2	1	.....	5
	Electives*				
	Winter Quarter				
Org.Chem. 52	Organic Chemistry	5	0	5	6
Phys.Chem. 102	Physical Chemistry	3	1	3	.....
Phys.Chem. 105	Physical Chemistry Laboratory	2	1	.....	5
	Electives*				
	Spring Quarter				
Org.Chem. 153	Organic Chemistry	5	0	5	6
Phys.Chem. 103	Physical Chemistry	3	1	3	.....
Chem.E. 131	Inorganic Technology	4	1	5	.....
Phys.Chem. 106	Physical Chemistry Laboratory	2	1	.....	5
	Electives*				

SENIOR YEAR (See note below)

	Fall Quarter				
Inorg.Chem. 103	Advanced Inorganic Chemistry	3	.....	3	.....
Anal.Chem. 131	Applications of Indicators	3	.....	2	5
Phys.Chem. 161§	Nuclear Chemistry and Radioactivity	3	.....	3	.....
Chem.E. 132	Inorganic Technology	4	.....	5	.....
	Electives*				
	Winter Quarter				
Inorg.Chem. 104	Advanced Inorganic Chemistry	3	.....	3	.....
Anal.Chem. 132†	Electrometric Measurements and Titrations	3	.....	2	5
Phys.Chem. 162§	Nuclear Chemistry and Radioactivity	3	.....	3	.....
	Electives*				
	Spring Quarter				
Inorg.Chem. 105	Advanced Inorganic Chemistry	3	.....	3	.....
	Electives*				

NOTE.—Near the close of the junior year, each student will choose a major adviser from the following list. In consultation with the adviser he will plan a program of work for the entire senior year, based normally upon concentration of electives around a chosen field of chemistry.

LIST OF ADVISERS FOR SENIORS

Inorganic Chemistry: Professors Sneed, Cohen, Heisig, Barber, Klug, Maynard, Pervier.

Analytical Chemistry: Professors Kolthoff, Geiger, Sandell.

Organic Chemistry: Professors Smith, Lauer, Koelsch.

Physical Chemistry: Professors Lind, MacDougall, Reyerson, Livingston, Hull.

Chemical Engineering: Professors Mann, Montillon, Montonna, Rogers, Stoppel, Grove.

* For list of elective courses in other colleges, see page 74.

† For permissible substitute, see page 75.

§ In place of Phys. Chem. 161-162, students may substitute six credits in physical chemistry courses to which Phys. Chem. 103 is a prerequisite.

¶ Students who are planning on taking graduate work are urged to take French as one of the electives in the senior year.

SPECIALIZATION IN BACTERIOLOGY, BIOCHEMISTRY, AND GEOLOGY

For the benefit of students in chemistry who may desire to specialize in related fields, minor groups of electives have been arranged in bacteriology, biochemistry, and geology which may be taken in the junior and senior years in addition to the required courses of the regular chemistry curriculum shown above. The completion of one of these groups will qualify the chemistry graduate to enter upon graduate work towards the Ph.D. degree in that department, thus providing an exceptionally strong foundation in chemistry for specialization in the chosen field.

Minor in Bacteriology

JUNIOR YEAR

Four credits of botany or zoology are prerequisite to Bacteriology 53. Botany 1f, 4 credits, or Zoology 14f-15w, 6 credits, should be taken in the junior year to satisfy this requirement. By special arrangement it may be possible to take Bacteriology 53, 5 credits, in the winter or spring quarter of the junior year, if desired.

SENIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Bact. 53	General Bacteriology	5	.....	3	6
Bact. 121	Physiology of Bacteria	3	.....	3	.....
	Winter Quarter				
Bact. 122	Physiology of Bacteria	3	.....	3	.....
	Spring Quarter				
Bact. 123	Applied Bacteriology	3	.....	3	.....

Minor in Biochemistry

JUNIOR YEAR

	Fall Quarter				
Zool. 14†	General Zoology	3	.....	2	4
	Winter Quarter				
Zool. 15†	General Zoology	3	.....	2	4

SENIOR YEAR

	Fall Quarter				
Ag.Biochem. 113	Biochemical Laboratory Methods	2	.....	.....	6
Ag.Biochem. 119	Colloids	3	.....	3	.....
Bact. 53	General Bacteriology	5	.....	3	6
	Winter Quarter				
Ag.Biochem. 114	Biochemical Laboratory Methods	2	.....	.....	6
	Spring Quarter				
Ag.Biochem. 115	Biochemical Laboratory Methods	2	.....	.....	6
Ag.Biochem. 123	Enzymes	3	.....	3	.....

† Nine credits in Botany may be substituted for Zoology 14,15.

Minor in Geology

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Min. 23	Elements of Mineralogy	4	1	2	4
	Winter Quarter				
Min. 24	Elements of Mineralogy	4	1	2	4

SENIOR YEAR

	Fall Quarter				
Geol. 1	General Geology	3	1	3	.....
Geol. A	General Geology Laboratory	2	.....	.....	4
Geol. 121	Crystallography	3	.....	3	2
	Winter Quarter				
Geol. 3	General Geology (Dynamic and Economic)	3	1	3	.....
Geol. C	General Geology Laboratory	2	.....	.....	4

CHEMICAL ENGINEERING

Four-year course leading to the degree of bachelor of chemical engineering, B.Ch.E.

In addition to the prescribed courses, sufficient approved electives must be taken to complete a total of 218 credits.§

Chemical engineering deals with the unit operations, such as crushing, grinding, sifting, mixing, fluid flow and heat flow, filtration, evaporation, drying, distillation, extraction, absorption, and crystallization, organic processes that are so vital in making any industry based on a chemical transformation of matter a commercial success. The chemist uses these operations in the laboratory but in order to apply them to large scale industrial processes he must have a thoro understanding of the fundamental physicochemical, chemical, and engineering principles on which they are based. The study of such principles constitutes that branch of engineering known as chemical engineering. For this purpose the chemical engineer must be thoroly trained in the various branches of chemistry, physics, and mathematics and have a good training in the fundamentals of mechanical, electrical, and chemical engineering so he can design, construct, and successfully operate a plant using these unit operations.

The chemical engineer is primarily a producer. It is his province to develop a process from the laboratory stage through semi-works equipment to the production stage which uses engineering materials for the manufacture of unit process equipment in accordance with fundamental chemical engineering principles.

As many industries are based on some chemical operation, the chemical engineer is much in demand. He may be engaged in the manufacture of inorganic products—the mineral acids, alkalies, ammonia, paint pigments, fertilizers; in the organic industries—dyes, explosives, lacquers, solvents, medicinals; in the manufacture of gases—coal gas, carbureted blue gas, hydrogen, acetylene, helium; in the electrochemical industries such as the manufacture of graphite, calcium carbide, carborundum and other abrasives, wet and dry batteries, electroplating; in the metal-

§ Students who are planning to take graduate work are urged to take French as one of the electives in the senior year.

lurgical industries; and even in the food industries such as the manufacture of sugar, flour, salt, and starch. There are many others such as leather, paper, textiles, soaps, petroleum, glass, and cement.

In these industries the chemical engineer does investigational work, development work, design of equipment, and plant operation. Some enter the field of sales engineering and technical writing.

Students taking the five-year combined course in chemical engineering and business administration may substitute business courses for M.&M. 86.

For freshman and sophomore years see pages 44 and 45.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Chem.E. 101	Unit Operations	3	2	2	.....
Chem.E. 105	Fuels and Combustion	4	2	2	4
Org.Chem. 51	Organic Chemistry	5	.....	5	6
M.&M. 86†	Hydraulics with Laboratory	3	2	.....	2
Phys.Chem. 101	Physical Chemistry	3	1	3	.....
	Winter Quarter				
Chem.E. 102	Unit Operations	6	4	2	4
Org.Chem. 52	Organic Chemistry	5	.....	5	6
Phys.Chem. 102	Physical Chemistry	3	1	3	.....
M.E. 38	Heat Engines	3	1	2	.....
M.E. 39¶	Heat Engines Laboratory	1	.....	.....	3
	Spring Quarter				
Chem.E. 103	Unit Operations	6	4	2	4
Org.Chem. 153	Organic Chemistry	5	.....	5	6
Phys.Chem. 103	Physical Chemistry	3	1	3	.....
Chem.E. 131	Inorganic Technology	4	1	4	.....

Summer Session

Summer practice consisting of Chem.E. 151f,su-152w,su, Chemical Manufacture, 6 cred., will be taken by students in Chemical Engineering in the regular Summer Session between their junior and senior years. It is required for the degree of bachelor of chemical engineering.

SENIOR YEAR

	Fall Quarter				
Phys.Chem. 104	Physical Chemistry Laboratory	2	1	.....	5
E.E. 43	Electric Power	3	.....	2	2
Chem.E. 121	Chemical Engineering Economics	3	.....	3	.....
Chem.E. 132	Organic Technology	3	1	4	.....
M.&M. 85†	Strength of Materials	3	3	.....	.....
M.&M. 87†	Materials Laboratory	1	.....	.....	2
Met. 160§	Metallography	3	.....	2	3
	Electives*				
	Winter Quarter				
Phys.Chem. 105	Physical Chemistry Laboratory	2	1	.....	5
E.E. 44	Electric Power	3	.....	2	2
Chem.E. 117	Chemical Engineering Equipment Design	3	2	1	4
Met. 160§	Metallography	3	.....	2	3
	Electives*				

* For list of elective courses in other colleges, see page 74.

† For permissible substitute, see page 75.

§ Met. 160 may be taken fall or winter quarter.

¶ Offered both winter and spring quarters.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
Phys.Chem. 106	Physical Chemistry Laboratory	2	1	.....	5
E.E. 45	Electric Power	3	.....	2	2
Chem.E. 118	Chemical Engineering Equipment Design	3	.....	1	6
Chem.E. 187	Chemical Engineering Trip	2	.....	.....	.....
	Electives*				

CIVIL ENGINEERING

Two four-year courses are offered: Civil Engineering I and Civil Engineering II (Public Service Option).

CIVIL ENGINEERING I

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 207 credits for graduation. This is an average of about 17 credits per quarter.

The principal aim of the curriculum in civil engineering is to present to the student an opportunity to become familiar with the methods of science, so that in his attack upon any professional problem he may employ his abilities with economy and secure dependable conclusions. A secondary but important object of the course is to train the student in technique, so that at graduation he may be an economic asset to his employer.

The technique of surveying and platting, drawing, and certain laboratory procedures is taught throughout the course. Typical problems of railroad, highway, hydraulic, structural, and municipal engineering occupy the greater part of the last two years. In the junior year, there is a course of lectures and conferences on the relations of engineering projects to business and to public affairs. Elective courses are available in each of the three upper years; these offer a wide range of choice to the student who desires to extend his range of interests to those fields of knowledge and action related to civil engineering, but not strictly included therein.

For freshman year, see page 33.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Phys. 7	General Physics	5	1	4	2
Draw. 21	Drafting	2	.....	.....	6
C.E. 11	Surveying	3	1	.....	7
	Electives*				
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Phys. 8	General Physics	5	1	4	2
Draw. 22	Structural Detailing	2	.....	.....	6
C.E. 12	Surveying	3	1	.....	7
	Electives*				
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
Phys. 9	General Physics	5	1	4	2
Draw. 23	Structural Detailing	2	.....	.....	6
C.E. 13	Surveying	3	1	.....	7
	Electives*				

* For list of elective courses in other colleges, see page 74.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 128	Strength of Materials	5	5	.....	.....
M.&M. 141	Materials Laboratory	2	.....	1	2
C.E. 14	Surveying	3	.....	.....	8
C.E. 31	Stresses in Structures	2	.....	2	2
C.E. 51	Highways and Pavements	3	.....	2	3
	Electives*				
	Winter Quarter				
M.&M. 129	Hydraulics	4	3	1	.....
M.&M. 143	Hydraulics Laboratory	1	.....	.....	2
C.E. 15	Surveying	2	.....	4	.....
C.E. 21	Railway Engineering	2	1	.....	4
C.E. 32	Stresses in Structures	3	.....	2	4
C.E. 52	Highways and Pavements	3	.....	1	6
	Electives*				
	Spring Quarter				
M.&M. 127	Technical Mechanics (Dynamics)	5	5	.....	.....
C.E. 16	Surveying	2	.....	4	.....
C.E. 22	Railway Engineering	2	1	.....	4
C.E. 33	Elementary Structural Design	4	.....	2	6
C.E. 53	Civil Engineering Practice	3	1	2	.....
	Electives*				
	Summer Camp				
C.E. 23	Summer camp is held in the vacation preceding the senior year for 6 weeks beginning about the middle of August. Required of all students taking the courses in Civil Engineering. Fee, $25	9			
	Health Service fee, $1.				

SENIOR YEAR

	Fall Quarter				
C.E. 121	Railway Engineering	3	.....	1	6
C.E. 134	Statically Indeterminate Structures	3	2	.....	2
C.E. 161	Power	4	.....	2	6
C.E. 146	Plain Concrete	3	.....	2	4
or					
G.E. 101	Contracts and Specifications	3	.....	3	.....
	Electives*				
	Winter Quarter				
C.E. 131	Bridge Analysis	2	.....	1	3
C.E. 141	Reinforced Concrete	3	2	.....	2
C.E. 162	Water Supply and Sewerage	3	.....	2	4
C.E. 109	Cadastral Surveying	2	.....	2	.....
or					
C.E. 124	Transportation	3	3	.....	.....
or					
C.E. 147	Foundations	2	2	.....	.....
or					
C.E. 156	Highway Transport	3	.....	3	.....
M.E. 42	Power	4	2	2	.....
C.E. 137†	Structural Laboratory	2	.....	1	3
or					
G.E. 101	Contracts and Specifications	3	.....	3	.....
	Electives*				

* For list of elective courses in other colleges, see page 74.

† C.E. 137 limited to 20 students.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
C.E. 132	Bridge Design	2	.....	1	3
C.E. 142	Reinforced Concrete Design	3	2	.....	2
C.E. 163	Water Supply and Sewerage	3	.....	2	5
C.E. 146 or C.E. 137†	Plain Concrete	3	.....	2	4
	Structural Laboratory	2	.....	1	3
E.E. 42	Power	3	3	.....	.....
	Electives*				

CIVIL ENGINEERING II (PUBLIC SERVICE OPTION)

The purpose of this curriculum is to present civil engineering as a part of the larger undertakings of social economy. All technical engineering practice exists in an environment of governmental or industrial control; this option places emphasis on the external relationships of engineering to these controlling forces as well as on its internal techniques. Graduates will be eligible candidates for graduate fellowships offered in public service and public health engineering.

The freshman year is identical with that of other engineering curricula. The mathematics and science courses common to all engineering courses as well as the elements of civil engineering are required subjects. The electives provided permit the student to take advanced work in surveying or structural engineering or highway engineering or advanced work in physical sciences, political science, public health, or business administration.

Applications for admission must be approved by the Department of Civil Engineering.

For freshman year, see page 33.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Phys. 7	General Physics	5	1	4	2
C.E. 11	Surveying	3	1	.....	7
Org.Chem. 54	Elementary Organic Chemistry	3	1	3	.....
Econ. 8	General Economics	3	3	.....	.....
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Phys. 8	General Physics	5	1	4	2
C.E. 12	Surveying	3	1	.....	7
Org.Chem. 55	Elementary Organic Chemistry	3	1	3	.....
Econ. 9	General Economics	3	3	.....	.....
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
Phys. 9	General Physics	5	1	4	2
C.E. 13	Surveying	3	1	.....	7
Anal.Chem. 7	Quantitative Analysis	4	1	1	8
Econ. 28	Business Law	3	3	.....	.....

* For list of elective courses in other colleges, see page 74.

† C.E. 137 limited to 20 students.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 128	Strength of Materials	5	5	.....	.....
M.&M. 141	Materials Laboratory	2	.....	1	2
C.E. 31	Stresses in Structures	2	.....	2	2
C.E. 51	Highways and Pavements	3	.....	2	3
Econ. 29	Principles of Accounting	3	3	.....	.....
Pol.Sci. 1	American Government and Politics	3	3	.....	.....
	Winter Quarter				
M.&M. 129	Hydraulics	4	3	1	.....
M.&M. 143	Hydraulics Laboratory	1	.....	.....	2
C.E. 32	Stresses in Structures	3	.....	2	4
B.A. 58	Elements of Public Finance	3	3	.....	.....
Pol.Sci. 2	American Government and Politics	3	3	.....	.....
Sp. 1	Fundamentals of Speech	3	3	.....	.....
	Spring Quarter				
M.&M. 127	Technical Mechanics (Dynamics)	5	5	.....	.....
C.E. 33	Elementary Structural Design	4	.....	2	6
Econ. 161	Labor Problems and Trade Unionism	3	3	.....	.....
Pol.Sci. 3	American Government and Politics	3	3	.....	.....

SENIOR YEAR

	Fall Quarter				
C.E. 146	Plain Concrete	3	.....	2	4
C.E. 161	Power	4	.....	2	6
Econ. 167	Personnel Administration	3	3	.....	.....
P.M.&P.H. 53	Elements of Preventive Medicine	3	3	.....	.....
G.E. 101	Contracts and Specifications	3	.....	3	.....
	Electives				
	Winter Quarter				
C.E. 141	Reinforced Concrete	3	2	.....	2
C.E. 162	Water Supply and Sewerage	3	.....	2	4
Bact. 53	General Bacteriology	5	.....	4	8
M.E. 42	Power	4	2	2	.....
	Electives				
	Spring Quarter				
C.E. 163	Water Supply and Sewerage	3	.....	2	5
C.E. 165	Public Health Engineering	3	.....	3	.....
E.E. 42	Power	3	3	.....	.....
	Electives				

Three groups of electives are suggested:

A. Sciences and Mathematics
- Chemistry
- Physics
- Geology
- Mathematics

B. Social Sciences and Language
- Economics and Business
- Political Science
- Public Speaking
- English
- Modern Language

C. Engineering
- Surveying
- Highway Engineering
- Railway Engineering
- Structural Engineering
- Metallography

ELECTRICAL ENGINEERING

Four-year course leading to the degree of bachelor of electrical engineering, B.E.E.

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 207 credits for graduation.

The course in Electrical Engineering is designed to fit the student for a position of responsibility in the electrical field. This work is based upon the principles of electricity and magnetism contained in the prescribed courses in general physics and upon the principles of mathematics. In the senior year, specialized courses may be selected in the field of electric power generation, transmission, and utilization, in telephone and radio communication or in illumination.

The main laboratory of the department is well equipped for preliminary training in the operation of electrical machinery and for advanced research problems in this field. The communication laboratories contain, besides the general equipment for the study of circuits, special apparatus for the study of radio and electro-acoustical problems.

Graduate courses in this department, as well as in physics and mathematics, are available for those with exceptional ability who desire training beyond the usual four-year undergraduate curriculum.

Students taking the five-year combined course with business administration may substitute business courses for Draw. 26, M.&M. 141, M.E. 12, 16, and 26, Phys. 144, and E.E. 132, 134, and 136. In addition they are required to take Courses E.E. 141, 142, and 143.

For freshman year, see page 33.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Phys. 7	General Physics	5	1	4	2
M.E. 13	Forging, Heat Treating, and Welding	2	.....	2	3
E.E. 11	Elements of Electrical Engineering	3	2	1	.....
	Electives*				
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Phys. 8	General Physics	5	1	4	2
Draw. 26†	Drafting	2	.....	.....	6
E.E. 13	Elements of Electrical Engineering	3	2	1	.....
E.E. 14	Elements of Electrical Engineering Laboratory	1	.....	.....	2
	Electives*				
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
Phys. 9	General Physics	5	1	4	2
E.E. 15	Elements of Electrical Engineering	3	2	1	.....
E.E. 16	Elements of Electrical Engineering Laboratory	1	.....	.....	2
M.E. 17	Machine Shop Practice	2	.....	2	3
	Electives*				

* For list of elective courses in other colleges, see page 74.

† For permissible substitute, see page 75.

JUNIOR YEAR§

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 129	Hydraulics	4	3	1	.....
M.&M. 143	Hydraulics Laboratory	1	.....	.....	2
E.E. 111	Electrical Engineering	5	5	.....	.....
E.E. 112	Electrical Engineering Laboratory	2	.....	.....	4
Phys. 144	Electrical Measurements	3	1	1	4
	Electives*				
	Winter Quarter				
M.&M. 127	Technical Mechanics (Dynamics)	5	5	.....	.....
E.E. 113	Electrical Engineering	3	3	.....	.....
E.E. 114	Electrical Engineering Laboratory	1	.....	.....	2
E.E. 117	Engineering Electronics	3	2	.....	2
M.E. 26	Mechanism and Kinematics	3	3	.....	.....
	Electives*				
	Spring Quarter				
M.&M. 128	Strength of Materials	5	5	.....	.....
M.&M. 141	Materials Laboratory	2	.....	1	2
E.E. 115	Electrical Engineering	3	3	.....	.....
E.E. 116	Electrical Engineering Laboratory	1	.....	.....	2
E.E. 119	Engineering Electronics	3	2	.....	2
	Electives*				

SENIOR YEAR

POWER OPTION

	Fall Quarter				
E.E. 121	Electrical Engineering	3	3	.....	.....
E.E. 122	Electrical Engineering Laboratory	2	.....	.....	4
E.E. 132†	Electrical Design	2	2	.....	.....
M.E. 40†	Heat Engines	3	2	.....	3
	Electives*				
	Winter Quarter				
E.E. 123	Electrical Engineering	3	3	.....	.....
E.E. 124	Electrical Engineering Laboratory	2	.....	.....	4
E.E. 134†	Electrical Design	2	2	.....	.....
M.E. 41†	Heat Engines	3	2	.....	3
	Electives*				
	Spring Quarter				
E.E. 125	Electrical Engineering	3	3	.....	.....
E.E. 126	Electrical Engineering Laboratory	2	.....	.....	4
E.E. 136†¶	Electrical Design	2	2	.....	.....
M.E. 55†	Internal Combustion Engines	3	2	.....	3
	Electives*				

COMMUNICATION OPTION§

	Fall Quarter				
E.E. 121	Electrical Engineering	3	3	.....	.....
E.E. 122	Electrical Engineering Laboratory	2	.....	.....	4
E.E. 161	Radio Communication	3	.....	2	3
E.E. 164	Electrical Communication	4	.....	2	4
	Electives*				

* For list of elective courses in other colleges, see page 74.

† Students specializing in chemistry, mathematics, or physics may substitute electives in that department for courses E.E. 132, 134, 136 and M.E. 40, 41, and 55. Such specialization requires at least 18 credits of elective work in chemistry, physics, or mathematics.

§ Students expecting to elect the communication option in the senior year must take E.E. 64-65-66, Elements of Communication, in the junior year.

¶ Students specializing in business may substitute an approved elective in that department for Course E.E. 136.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
E.E. 123	Electrical Engineering	3	3	.....	.....
E.E. 124	Electrical Engineering Laboratory	2	.....	.....	4
E.E. 162	Radio Communication	3	.....	2	3
E.E. 165	Electrical Communication	4	.....	2	4
	Electives*				
	Spring Quarter				
E.E. 125	Electrical Engineering	3	3	.....	.....
E.E. 126	Electrical Engineering Laboratory	2	.....	.....	4
E.E. 163	Radio Communication	3	.....	2	3
E.E. 166	Electrical Communication	4	.....	2	4
	Electives*				

SPECIALIZED COURSES IN ELECTRICAL ENGINEERING

The number of electives in the electrical engineering course makes it practicable to obtain either a broad or a specialized education. Further to facilitate such election, certain courses in the senior year may be replaced by substitutes in chemistry, mathematics, or physics, subject to the approval of the head of the department and the Students' Work Committee. By properly choosing prerequisite subjects during the sophomore or junior year, a far-seeing student may prepare for advanced specialized courses in the following undergraduate and graduate years. As examples, one may specialize in business, chemistry, communication, illumination, manufacturing, military science and tactics, naval science and tactics, physics, power generation and distribution, public utilities, railway engineering, or other chosen line. Students are advised to consult with their classifiers, or with the head of the department, concerning desirable sequences of general or special courses.

ENGINEERING AND BUSINESS ADMINISTRATION

For many years engineers have recognized the importance of a knowledge of the principles of economics in connection with their profession. Engineering students are encouraged to elect courses of various kinds in the fields of economics and administration when it is possible for them to find time to do so. This is true in all of the branches of engineering.

With the vast expansion which has taken place in the manufacturing industries in the United States, there has arisen a need for engineers having more training in economics and administration than is usually possible in the four-year engineering courses. To meet this need special groups of elective courses have been arranged. The recent economic stress has further emphasized the importance of a combination of engineering and business training in preparation for the industrial problems of the future.

The *engineering pre-business course* described on page 58 provides a four-year combined curriculum in business administration with a background of the fundamental mathematics, chemistry, English, physics, and drawing, of the engineering courses.

As a further step to provide adequate training in engineering or chemistry, combined with business administration, a plan of *five-year courses leading to two degrees* has been arranged for the capable student who wishes to enter upon a comprehensive professional training in this combined field.

* For list of elective courses in other colleges, see page 74.

Students who desire to elect courses in economics and business administration without undertaking the five-year combined course may well include the economics, business law, accounting, and corporation finance of the first two years in this program and then select such other courses of the sequence as they may prefer. No special optional group of courses is necessary for this purpose.

FIVE-YEAR COMBINED COURSES WITH BUSINESS ADMINISTRATION

The new plan of five-year combined courses in engineering, architecture (six years), or chemistry with business administration enables the student to complete the requirements for the Bachelor's degrees in both fields, as for example, bachelor of electrical engineering and bachelor of business administration. Five years will usually be necessary for the completion of the combined course, but a longer time, perhaps six years, may be required if suitable programs cannot be arranged for the five-year period. This will depend upon the particular curriculum with which the combination with business administration is made.

For this purpose the School of Business Administration will accept the 74 credits in business subjects shown in the following list in conjunction with one of the regular curricula in engineering, architecture, or chemistry as satisfying the requirements for the degree of bachelor of business administration. The student receives his engineering degree upon the completion of his regular course, altho this may not be until the end of the fifth year. He is not eligible for the degree in business administration on this 74-credit basis unless *the work is taken in conjunction with one of the regular curricula in this college.*

The business courses are intended to be spread over four years, beginning the business sequence in the sophomore year by taking economics and business law, 3 credits per quarter, as electives, in addition to the usual engineering program.

Normally, some of the required technical work of the senior year will be postponed to the fifth year to make room for business courses, in order to secure a desirable distribution of the latter rather than to concentrate them in the fifth year. Not more than 28 credits of business should be left for the fifth year.

In certain curricula, special concessions are made to students taking this five-year combined course by permitting them to omit certain required courses or to substitute business courses for them. (See Aeronautical, Agricultural, Chemical, and Electrical Engineering.)

Under this plan the student will be registered in the Institute of Technology and in the School of Business Administration for the entire combined program. His registration for each quarter beginning with the second year is subject to *approval by the adviser representing the School of Business Administration* as well as by the regular classifier.

No student is considered officially registered in the five-year business engineering combination unless he has the approval of the Five-Year Student Work Committee, Room 201 Mechanical Engineering.

The following order and distribution by years are suggested. With the approval of the adviser in the School of Business Administration both may be varied, however, so as to accommodate individual programs.

Students are required to maintain a "C" average in the School of Business Administration courses. If this grade has not been maintained upon the completion of the 74 credits the student will then be held for the full School of Business Administration requirements as provided in the Engineering Pre-Business program.

Course No.	Title	Credits F	W	S
	Second Year			
Econ. 8f,w-9w,s	General Economics	3	3	.....
Econ. 28f,s	Business Law (8, 9)	.....	.....	3
	Third Year			
Econ. 54f-55w*	Principles of Accounting	4	4	.....
B.A. 77f,w,s	Survey of Marketing	.....	.....	3
	Fourth Year			
B.A. 58f,w,s	Elements of Public Finance (8, 9)	.....	3	.....
B.A. 70f	Statistics Survey (8, 9)	3	.....	.....
B.A. 71f,w,s	Transportation: Services and Charges I (8, 9)	.....	.....	3
B.A. 89f,w,s§	Production Management (8, 9)	.....	.....	3
B.A. 112f,w,s	Business Statistics (70)	.....	3	.....
B.A. 130f,s	Cost Accounting Survey (29)	.....	.....	3
B.A. 142f,w,s	Advanced Money and Banking (8, 9)	3	.....	.....
B.A. 167f,w	Personnel Administration (161)	.....	3	.....
Econ. 161f,w,s	Labor Problems and Trade Unionism (8, 9)	3	.....	.....
	Fifth Year			
B.A. 155f,w,s	Corporation Finance (8, 9)	3	.....	.....
B.A. 101f,w,s-102f,w,s	Advanced General Economics (8, 9)	3	3	.....
B.A. 165f,w,s	Economics of Public Utilities (8, 9)	.....	.....	3
B.A. 180-181-182Gf,w,s	Senior Topics: Production Management (89, 130)	3	3	3
Econ. 149f,w,s	Business Cycles (142)	.....	3	.....
One of the following:				
B.A. 133	Cost Accounting Methods	.....	.....	3
B.A. 139f,w,s	Advanced General Accounting (26)	.....	.....	3
B.A. 180-181C	Senior Topics: Marketing	.....	.....	.....
	Total credits			74

ENGINEERING PRE-BUSINESS

(Four-year course in Engineering and Business Administration)

This course has been arranged for students who wish to prepare for positions in industry for which basic technical training is necessary, accompanied by instruction in business administration. Such positions are found in the fields of purchasing, sales and sales promotion, cost accounting, employment and rate setting, and production control.

Upon the completion of two years of prescribed work in the Institute of Technology the student transfers to the School of Business Administration, where the third and fourth years are taken. The combined course leads to the degree of bachelor of business administration.

Students are required to maintain a "C" average in the School of Business Administration courses.

For freshman year, see page 33.

* If Econ. 54-55 cannot be scheduled, Econ. 20, 25, and 26 may be substituted.

§ Mechanical engineering students substitute M.E. 171 for B.A. 89 and replace the latter with an approved business course, preferably B.A. 180C. Credit will not be given for both M.E. 171 and B.A. 89.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 91†	Calculus	4	4	.....	.....
Phys. 7	General Physics	5	1	4	2
Econ. 8	General Economics	3	.....	3	.....
M.E. 16	Machine Shop Practice	2	.....	2	3
M.E. 70	Mechanical Technology	1	.....	2	.....
	Electives*				
	Winter Quarter				
Econ. 3	Elements of Money and Banking	5	3	2	.....
Econ. 9	General Economics	3	3	.....	.....
Econ. 20¶	Elements of Accounting	3	3	.....	.....
Phys. 8	General Physics	5	1	4	2
	Electives*				
	Spring Quarter				
M.&M. 84†	Technical Mechanics	5	5	.....	.....
Phys. 9	General Physics	5	1	4	2
Econ. 5	Elements of Statistics	5	5	.....	.....
Econ. 25	Principles of Accounting	3	3	.....	.....

JUNIOR YEAR§

(In the School of Business Administration)

	Credits
Strength of Materials (M.&M. 85f)†	3
Materials Testing Laboratory (M.&M. 87f)†	1
Principles of Accounting (Econ. 26f,w,s)	3
Business Law (Bus.Adm. 51f-52w-53s)	9
Business Statistics (Bus.Adm. 112f,w,s)	3
Corporation Finance (Bus.Adm. 155f,w,s)	3
Advanced Money and Banking (Bus.Adm. 142f,w,s)	3
Transportation: Services and Charges I (Bus.Adm. 71f,w,s)	3
Survey of Marketing (Bus.Adm. 77f,w,s)	3
Production Management (Bus.Adm. 89f,w,s)	3
Advanced General Accounting (Bus.Adm. 139f,w,s)	3
Tabulating Equipment Laboratory (Bus.Adm. 91f,w,s)	1
Electives (See list, page 60)	4

SENIOR YEAR§

(In the School of Business Administration)

	Credits
Transportation: Services and Charges II (Bus.Adm. 72w,s)	3
Cost Accounting (Bus.Adm. 130f,s)	3
Advanced General Economics (Bus.Adm. 101f,w,s-102f,w,s)	6
Business Cycles (Econ. 149f,w,s)	3
Labor Problems (Econ. 161f,w,s)	3
Personnel Administration (Bus.Adm. 167f,w)	3
Public Finance (Bus.Adm. 58f,w,s)	3
The Economics of Public Utilities (Bus.Adm. 165f,w,s)	3
Senior Topics: Production Management (Bus.Adm. 180-181-182G)	9
Electives (See list, page 60)	12

* For list of elective courses in other colleges, see page 74.

† For permissible substitute, see page 75.

§ In addition to the required courses in the junior and senior years, the student must earn approximately 10 credits per year.

¶ Students who have had a high school course or experience in bookkeeping may be exempt from this course and admitted to Econ. 25 by passing a placement test.

ELECTIVES

Students may divide the time available for electives between Groups A and B.

A. General and Business

	Hours
Economic History (Hist. 80f-81w-82s)	9
Finance Management (Bus.Adm. 156f)	3
Theory of Statistics (Econ. 113w-114s)	3
Geography of Commercial Production (Geog. 41f,w,s)	5
Fire and Marine Insurance (Bus.Adm. 60w)	3
Casualty Insurance (Bus.Adm. 61s)	3
Senior Topics: Marketing (Bus.Adm. 180C)	3

B. Engineering

Auto and Airplane Engines (M.E. 50f,w,s)	3
Gas Manufacture and Distribution (Chem.E. 41s)	3
Civil Engineering Practice (C.E. 53s)	3
Contracts and Specifications (G.E. 101f,w)	3
Estimating (G.E. 81s)	3
Technical Writing (Engl. 36s)	3
Industrial Management Laboratory (M.E. 174f,w,s)	2

GEOPHYSICS

The institute has established a curriculum for students interested in geophysics. It is suggested that any student who desires to enter such a curriculum arrange his programs to include the following courses:

English
Drawing
Chemistry
Mathematics
- Algebra, Trigonometry, and Analytics
- Differential and Integral Calculus
- Differential Equations
- Advanced Calculus
- Technical Mechanics (Statics and Dynamics)

Geology
- General and Historical 1-2, A-B
- Mineralogy 23-24
- Sedimentation 101
- Rock Study 105
- Geology of Petroleum 112
- Structural Geology 124
- Map Interpretation 144-145
- Field Course 85

Elective topics in Mathematical Analysis 144-145-146

Physics
- General Physics 7-8-9
- Theoretical Physics 101-103-105
- Modern Exp. Physics 110-112 (individual work)
- Experimental Optics 134

Geophysics
- Principles of Geophysical Prospecting 161-162

Elective
- Paleontology 51
- Economics 110
- Ore Deposits 111
- Advanced General 151-152-153
- Field Course 85

Mining
- Mining 131

Civil Engineering
- Surveying 11-12-13

MECHANICAL ENGINEERING

Four-year course leading to the degree of bachelor of mechanical engineering, B.M.E.

In addition to the prescribed courses, sufficient electives must be taken to complete a total of at least 207 credits for graduation.

The field of mechanical engineering is very broad. Graduates hold positions in technical or nontechnical work in almost every kind of industry.

The profession includes the following major divisions: design of machinery and apparatus for all purposes; production and manufacturing methods; operation of industrial plants; steam power generation, internal combustion engines; heating, ventilation, refrigeration, and air conditioning; mechanical research and development; sales engineering; and the general field of management.

The course is planned to give broad training rather than highly specialized work. A reasonable amount of time is allowed for nontechnical subjects. A course in speech is required.

It is recommended that students in Mechanical Engineering spend their summer vacations in industry if possible.

For freshman year, see page 33.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Phys. 7	General Physics	5	1	4	2
M.E. 9	Foundry Practice	2	.....	1	4
M.E. 20	Elementary Machine Design	2	.....	.....	6
M.E. 70	Mechanical Technology	1	.....	2	.....
Engl. 37† or	Technical Discussions	3	3	.....	.....
M.E. 50†	Auto and Airplane Engines	3	3	.....	.....
	Electives*§				
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Phys. 8	General Physics	5	1	4	2
M.E. 5	Pattern Practice	2	.....	1	4
Engl. 37† or	Technical Discussions	3	3	.....	.....
M.E. 50†	Auto and Airplane Engines	3	3	.....	.....
	Electives*§				
	Spring Quarter				
M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
Phys. 9	General Physics	5	1	4	2
M.E. 13	Forging, Heat Treating, and Welding	2	.....	1	4
M.E. 21	Kinematics	2	.....	.....	6
Engl. 37† or	Technical Discussions	3	3	.....	.....
M.E. 50†	Auto and Airplane Engines	3	3	.....	.....
	Electives*§				

JUNIOR YEAR

	Fall Quarter				
M.&M. 127	Technical Mechanics (Dynamics)	5	5	.....	.....
M.E. 22	Mechanism	3	3	.....	.....
M.E. 33	Elementary Mechanical Laboratory	2	.....	1	3
M.E. 43	Steam Engineering	3	2	1	.....
M.E. 71	Machine Shop Practice	2	.....	2	3
	Electives*				

* For list of elective courses in other colleges, see page 74.

† Engl. 37 and M.E. 50 are offered each quarter. Both courses must be completed during the year. Enrolment in Engl. 37 is limited to 25 students.

§ Programs are arranged to accommodate C.E. 17f,s Surveying; Chem.E. 1w, Power Plant Chemistry; and other electives. The Power Plant Chemistry section is limited to 20 students.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Winter Quarter				
M.&M. 128	Strength of Materials	5	5	.....	.....
M.&M. 141	Materials Laboratory	2	.....	1	2
M.E. 23	Machine Design	3	.....	1	6
M.E. 34	Mechanical Laboratory	2	.....	1	3
M.E. 72	Machine Shop	2	.....	2	3
M.E. 131	Thermodynamics	3	2	.....	3
	Electives*				
	Spring Quarter				
M.&M. 129	Hydraulics	4	3	1	.....
M.&M. 143	Hydraulics Laboratory	1	.....	.....	2
M.E. 24	Machine Design	3	2	.....	3
M.E. 35	Elementary Steam and Power Laboratory	2	.....	1	3
M.E. 132	Thermodynamics	3	2	.....	3
	Electives*				
	SENIOR YEAR				
	Fall Quarter				
M.E. 121	General Engineering Design	2	.....	.....	6
M.E. 141§	Power Plant Engineering	3	3	.....	.....
M.E. 150§	Internal Combustion Engines	3	3	.....	.....
M.E. 171§	Production Control	3	3	.....	.....
	Senior Laboratory†	2 or 4	.....	.....	4 or 8
M.E. 160	Heating and Ventilation	3	1	2	.....
M.E. 190	Seminar	1	1	.....	.....
E.E. 36	Electric Power	3	2	.....	2
	Electives*				
	Winter Quarter				
M.E. 141§	Power Plant Engineering	3	3	.....	.....
M.E. 150§	Internal Combustion Engines	3	3	.....	.....
M.E. 171§	Production Control	3	3	.....	.....
	Senior Laboratory†	2 or 4	.....	.....	4 or 8
M.E. 191	Seminar	1	1	.....	.....
	Engineering Design¶	2	.....	.....	6
E.E. 37	Electric Power	3	2	.....	2
	Electives*				
	Spring Quarter				
M.E. 192	Seminar	1	.....	1	1
	Engineering Design¶	2	.....	.....	6
E.E. 38	Electric Power	3	2	.....	2
G.E. 193	Engineering Practice	2	.....	2	.....
	Senior Laboratory†	2 or 4	.....	.....	4 or 8
	Electives*				

In addition to the regular four-year course in Mechanical Engineering, those who are qualified are urged to take a fifth year, that is, a year of graduate study. This year's work may lead to the Master's degree in mechanical engineering and

* For list of elective courses in other colleges, see page 74.

† The four laboratory courses, M.E. 149, 159, 169, 174, must be taken in the three quarters and not more than two in any one quarter.

§ Courses M.E. 141, 150, 171 must be taken in the fall and winter quarters. Each course is offered both quarters.

¶ The following courses are accepted for this requirement: M.E. 122w-123s, Mechanical Engineering Design; M.E. 147w, Design of Steam Machinery; M.E. 148s, Design of Power Plant Units; M.E. 156w,157s, Design of Internal Combustion Engines; M.E. 161w,162s, Heating and Ventilation Design; M.E. 170s, Tool Design and Construction; M.E. 172w, Industrial Plant Design; C.E. 37s, Structural Engineering.

also satisfy the requirement of graduate study towards the professional degree of mechanical engineer. (For detailed information as to procedure consult the Graduate School Bulletin.)

GEOLOGICAL, METALLURGICAL, MINING, AND PETROLEUM ENGINEERING

(For students entering with chemistry, higher algebra, and solid geometry and who pass their English test.)

FRESHMAN YEAR*

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 11	College Algebra	5	5	.....	.....
Inorg.Chem. 4	General Inorganic Chemistry	4	1	3	3
Engl. 4	Composition	3	3	.....	.....
Draw. 11	Engineering Drawing	2	.....	.....	6
Geol. 11	Dynamic Geology	2	2	.....	1
	Winter Quarter				
M.&M. 12	Trigonometry	5	5	.....	.....
Inorg.Chem. 5	General Inorganic Chemistry	4	1	3	3
Engl. 5	Composition	3	3	.....	.....
Draw. 12	Engineering Drawing	2	.....	.....	6
Geol. 12	Dynamic and Historical Geology	2	2	.....	.....
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	.....	.....
Inorg.Chem. 16	Qualitative Chemical Analysis	5	.....	3	6
Engl. 6	Composition	3	3	.....	.....
Draw. 13	Topographic Drawing	2	.....	.....	6
Geol. 13	Historical Geology	2	2	.....	.....

GEOLOGICAL, MINING, AND PETROLEUM ENGINEERING

Candidates for either of these degrees need not choose the field of specialization until the beginning of the junior year.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Geol. 23	Mineralogy	4	1	3	4
M.&M. 31	Calculus	3	3	.....	.....
Met. 1	Assaying	2	.....	3	.....
Met. 3	Assaying Laboratory	1	.....	.....	4
Min. 11	Surveying	3	1	3	.....
Phys. 7	General Physics	5	1	4	2
	Winter Quarter				
Anal.Chem. 9	Quantitative Analysis	3	1	1	6
Geol. 24	Mineralogy	4	1	3	4
M.&M. 32	Calculus	3	3	.....	.....
Min. 12	Surveying	3	1	3	.....
Phys. 8	General Physics	5	1	4	2

* See statement on page 32 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in subfreshman English Composition.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
Geol. 105	Rock Study	2	.....	2	2
M.&M. 33	Calculus	3	3	.....	.....
Met. 13	General Ferrous Metallurgy	2	.....	3	.....
Min. 13	Mine Surveying	2	1	2	.....
Min. 14	Surveying Field Work	5	.....	.....	20
Min. 120	First Aid (1 week, 3 hours per day)	0	.....	.....	.....
Phys. 9	General Physics	5	1	4	2
	Summer Field Trips				
Min. 15	Field work in surveying on the iron ranges of Minnesota	8			
Geol. 85	Field work in geology on the iron ranges of Minnesota	3			

Geological Engineering

Four-year course leading to the degree of bachelor of geological engineering, B.Geol.E.

Requirements for graduation cover all prescribed courses including summer field trips and electives, making a total of 233 credits.

The course in geological engineering is designed to prepare students for responsible positions in geological departments of exploration, oil, or mining companies, or to engage in consulting geological practice.

There are in existence many ore deposits which are economically of no particular value at the present time, either because the cost of mining is excessive or because there is no known method of separating minerals in the mineral aggregate forming the ore at a cost which will result in a profit for the operator. In addition to thoro courses in geology, the mining geologist must, therefore, be familiar with the various methods of mining and know something of the possibilities of ore dressing to recover the valuable minerals. A knowledge of the fundamental principles of the smelting and refining of metals is a decided asset in his work.

The basic training must, therefore, include thoro courses in mathematics, drafting, chemistry, and physics. It must also include plane and mine surveying, mapping, both topographic and geological, assaying, ore dressing, and the principles of metallurgy. The technical work in mining includes exploration, development, and mining methods together with the courses in mine administration, economics of mining, and mining law. The general course in geology is given in the freshman year. Then follow the courses in mineralogy, rock study, and petrography. These are followed by advanced general geology, structural and metamorphic geology, index fossils and paleontology, mineralography, sedimentation, ore desposits, oil geology. Advanced courses in petrology and petrography, blowpipe analysis, and map interpretation are also available.

The Department of Geology is well supplied with working collections of minerals, crystal models, rocks, thin sections, ores and economic minerals, fossils, and other illustrative material used in connection with the courses in paleontology, stratigraphy, and historical geology. The department has large, well-lighted, and fully equipped laboratories for the basic courses of mineralogy, rock study, and petrology. Special equipment is available for studies in sedimentation, rock analysis, and X-ray studies of minerals. Courses in geology and mineralogy extend throughout the four years.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Geol. 106	Petrography	2	.....	2	2
Geol. 144	Interpretation of Geologic Maps	4	.....	.....	8
Geol. 151	Advanced General Geology	3	.....	3	.....
M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
Min. 106	Mine Mapping	2	.....	.....	8
Min. 111	Exploration	3	.....	4	.....
	Winter Quarter				
Draw. 14	Descriptive Geometry	4	.....	3	3
Geol. 124	Metamorphic Geology	3	.....	3	.....
Geol. 131	Advanced Petrology	4	1	3	4
Geol. 145	Interpretation of Geologic Maps	2	.....	.....	4
Geol. 152	Advanced General Geology	3	.....	3	.....
Min. 112	Exploration and Development	3	.....	4	.....
	Spring Quarter				
Geol. 125	Structural Geology	3	.....	3	.....
Geol. 132	Advanced Petrology	4	.....	4	4
Geol. 153	Advanced General Geology	3	.....	3	.....
M.&M. 127	Technical Mechanics (Dynamics)	5	5	.....	.....
Min. 113	Development and Exploitation	3	.....	4	.....
	Summer Field Trip				
Geol. 150	Field Geology. Detailed systematic work conforming with standards of official surveys. Preparation of geologic maps, structure sections, reports; paragenesis of ores and their relations to geologic structures. Field, Black Hills, South Dakota	6			

SENIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Geol. 61	Blowpipe Analysis	3	.....	2	4
Geol. 91	Index Fossils of North America	3	.....	1	6
Geol. 101	Sedimentation	3	.....	3	.....
Geol. 110	Economic Geology	3	.....	3	.....
Met. 106	Base Metals	2	.....	3	.....
Met. 110	Ore Dressing	2	.....	3	.....
Min. 141	Reports and Administration	3	.....	4	.....
	Winter Quarter				
Geol. 92	Index Fossils of North America	3	.....	1	6
Geol. 111	Ore Deposits	3	.....	3	.....
Geol. 140	Applied Petrography	3	.....	1	4
Geol. 166	Mineralography	3	.....	.....	6
Met. 107	Base Metals	2	.....	3	.....
Met. 112	Ore Dressing	2	.....	3	.....
Min. 142	Coal Mining	3	.....	4	.....
	Spring Quarter				
Geol. 93	Index Fossils of North America	3	.....	1	6
Geol. 112	Geology of Petroleum	3	.....	3	.....
Geol. 141	Applied Petrography	3	.....	1	4
Geol. 167	Mineralography	3	.....	.....	6
Met. 108	Precious Metals	2	.....	3	.....
Met. 116	Ore Dressing Laboratory	1	.....	.....	4
Min. 143	Mining Law, Quarries, and Placers	3	.....	4	.....

Mining Engineering

Four-year course leading to the degree of bachelor of mining engineering, B.Min.E.

Requirements for graduation cover all prescribed courses including summer field trips and electives, making a total of 235 credits.

The course in mining is designed to prepare the student for responsible positions in the field of mining. In such positions a mining engineer, in addition to meeting the technical problems involved in the development and operation of a mine, must be able to pass upon specifications and problems for structures and for mechanical and electrical equipment. In addition he must be familiar with the fundamental principles of ore dressing and ore testing as in the early stages of development he must be able to determine whether or not separation of the minerals in the mineral aggregate forming the ore may be made at a cost which will leave a profit to the company.

The basic training must, therefore, include thoro courses in mathematics, drafting, chemistry, physics, and geology including the identification of minerals and rocks. It must also include plane and mine surveying, mapping, assaying, ore dressing, and ore testing. The mechanical and electrical features of the various types of machinery used in the industry must be understood. Tho it is not necessary for the mining engineer to concern himself with problems of the design of individual machines, he must be familiar with the essential characteristics in order to consider intelligently proposals and specifications. Essential to his training is a thoro knowledge of mine exploration and development, mining methods as influenced by the type of deposits, as well as the applications of economics to mining. He must have a reasonable familiarity with the basic mining laws of the various states and the laws governing corporations, etc.

The Department of Mining 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, safety and safety regulations and the necessary allied subjects. The courses in mining extend through the sophomore, junior, and senior years.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Geol. 106	Petrography	2	.....	2	2
M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
Met. 106	Base Metals	2	.....	3	.....
Met. 110	Ore Dressing	2	.....	3	.....
Min. 106	Mine Mapping	2	.....	.....	8
Min. 111	Exploration	3	.....	4	.....
Min. 121	Mine Plant	3	.....	5	.....
	Winter Quarter				
Draw. 14	Descriptive Geometry	4	.....	3	3
M.&M. 128	Strength of Materials	5	5	.....	.....
Met. 107	Base Metals	2	.....	3	.....
Met. 112	Ore Dressing	2	.....	3	.....
Min. 112	Exploration and Development	3	.....	4	.....
Min. 122	Mine Plant	3	.....	5	.....

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
E.E. 41	Electric Power	3	.....	2	3
M.&M. 127	Technical Mechanics (Dynamics)	5	5	.....	.....
Met. 108	Precious Metals	2	.....	3	.....
Met. 116	Ore Dressing Laboratory	1	.....	.....	4
Min. 113	Development and Exploitation	3	.....	4	.....
Min. 123	Mine Plant	3	.....	5	.....
Min. 130	Mine Rescue (1 week, 3 hours per day)	0	.....	.....	.....
	Electives	2			
	Summer Field Trip				
Min. 139	Study of mining operations, mine plants, and metallurgical plants in one or more western mining camps	6			
	SENIOR YEAR				
	Fall Quarter				
Geol. 110	Economic Geology	3	.....	3	.....
M.E. 9	Foundry Practice	2	.....	1	4
Met. 121	Ore Testing	2	.....	1	3
Min. 124	Mining Hydraulics	4	.....	5	.....
Min. 126	Engineering Construction	3	.....	.....	8
Min. 141	Reports and Administration	3	.....	4	.....
	Electives	2			
	Winter Quarter				
Geol. 111	Ore Deposits	3	.....	3	.....
M.E. 13	Forging, Heat Treating, and Welding	2	.....	1	4
M.E. 138	General Laboratory	2	.....	.....	4
Met. 156	Metallography	3	.....	2	3
Min. 127	Engineering Construction	3	.....	.....	8
Min. 142	Coal Mining	3	.....	4	.....
Min. 144	Advanced Mining	3	.....	.....	8
	Spring Quarter				
Geol. 112	Petroleum Geology	3	.....	3	.....
Geol. 125	Structural Geology	3	.....	3	.....
M.E. 16	Machine Shop Practice	2	.....	1	4
Met. 126	Special Problems in Metallurgy	3	2	.....	4
Min. 143	Mining Law, Quarries, and Placers	3	.....	4	.....
Min. 145	Advanced Mining	3	.....	.....	8
	Electives	2			

Petroleum Engineering

Four-year course leading to the degree of bachelor of petroleum engineering, B.Pet.E.

Requirements for graduation cover all prescribed courses, including summer field trips and electives, making a total of 235 credits.

The course in Petroleum Engineering is designed to prepare the student for responsible positions in the field of petroleum production. In such a position the petroleum engineer must be familiar with geology and in particular with oil geology. This involves a knowledge of the various geological ages during which oil was formed, of the geological conditions under which the oil was collected in pools, and the methods of interpreting geological data to determine whether or not a given locality may contain such pools. He must know the methods of drilling and the difficulties which must be overcome in this work. He must know the principles

of pumping, with both gas lift and mechanical pumps, and the methods of gasoline recovery to be used in connection with these methods. He must know the causes of the formation of emulsions and methods of breaking them when formed. He must be familiar with the laws of flow of viscous fluids and be able to design pipe lines, pumping stations, and storage basins. In addition, he should know the essential economic principles involved in the industry, and be familiar with the forms, contracts, and other documents usual in the industry.

The basic training must, therefore, include thoro courses in mathematics, drafting, chemistry, physics, and geology, including in particular, a thoro familiarity with sedimentary deposits. It must also include surveying and mapping. The mechanical and electrical features of the various types of machinery used in the industry must be understood. A course in pipe lines gives the necessary preparation in flow formulas, soil corrosion, and methods of prevention. Thoro courses are included in prospecting, oil field mapping, production technology, and petroleum economics. Due emphasis is also placed on problems of administration, including reports, leases, contracts, and specifications.

The department is well supplied with samples of the smaller oil field equipment, well logs, drill cores, models, maps, photographs, lantern slides, and samples of petroleum products. The lectures treat of location, prospecting, development, production, refining methods, distribution, administration, leasing, mineral laws, safety work and safety regulations, and allied subjects affecting oil and gas production. Laboratory work includes special problems in oil and gas production. The courses in petroleum engineering subjects extend through the junior and senior years.

JUNIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Geol. 106	Petrography	2	.....	2	2
Geol. 144	Interpretation of Geologic Maps	3	.....	.....	6
Geol. 151	Advanced General Geology	3	.....	3	.....
M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
Min. 121	Mine Plant	3	.....	5	.....
Pet.E. 111	Oil Field Development	3	.....	4	.....
	Winter Quarter				
Geol. 131	Advanced Petrology	4	1	3	4
Geol. 152	Advanced General Geology	3	.....	3	.....
M.&M. 128	Strength of Materials	5	5	.....	.....
Min. 107	Mine Maps	1	.....	.....	3
Min. 122	Mine Plant	3	.....	5	.....
Pet.E. 112	Oil Field Production	3	.....	4	.....
	Spring Quarter				
Geol. 112	Petroleum Geology	3	.....	3	.....
Geol. 125	Structural Geology	3	.....	3	.....
M.&M. 127	Technical Mechanics (Dynamics)	5	5	.....	.....
Pet.E. 131	Petroleum Refining	2	.....	2	.....
Pet.E. 134	Petroleum Plant	2	.....	3	.....
Pet.E. 138	Oil Field Mapping	2	.....	.....	6
Min. 130	Mine Rescue (1 week, 3 hours per day)	0	.....	.....	.....
	Electives	2			
	Summer Field Trip				
Pet.E. 135	Study of oil well drilling and production methods and refining practice in one or more oil fields	6			

SENIOR YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Geol. 101	Sedimentation	3	.....	3	.....
Geol. 110	Economic Geology	3	.....	3	.....
Min. 124	Mining Hydraulics	4	.....	5	.....
Min. 126	Engineering Construction	3	.....	.....	8
Min. 141	Reports and Administration	3	.....	4	.....
Pet.E. 152	Petroleum Production Technology	3	.....	1	6
	Winter Quarter				
Geol. 111	Ore Deposits	3	.....	3	.....
M.E. 13	Forging	2	.....	1	4
Met. 156	Metallography	3	.....	2	3
Min. 127	Engineering Construction	3	.....	.....	8
Pet.E. 144	Advanced Petroleum Engineering	5	.....	4	6
Pet.E. 153	Petroleum Production Technology	3	.....	1	6
	Spring Quarter				
Geol. 153	Advanced General Geology	3	.....	3	.....
M.E. 16	Machine Shop Practice	2	.....	1	4
Pet.E. 145	Advanced Petroleum Engineering	5	.....	4	6
Pet.E. 154	Petroleum Production Technology	3	.....	1	6
	Electives	6			

METALLURGICAL ENGINEERING

Four-year course leading to the degree of bachelor of metallurgical engineering, B.Met.E.

Requirements for graduation cover all prescribed courses including summer field trips and electives, making a total of 222 credits.

Courses in metallurgy are designed to prepare the student for responsible positions in metallurgical industries. The instruction deals with the production and uses of ferrous, nonferrous, and precious metals. Metallurgists are concerned with the preparation of raw materials for smelting, the design and operation of furnaces to convert ores into metals, and the structure and physical properties of metals and alloys.

Representative ores of all the important metals, models and drawings of furnaces, and samples of furnace products are available. Lectures cover the construction and operation of ore dressing and concentrating machinery, together with typical combinations of ore dressing machines. The sequence of physical and chemical changes occurring during smelting, furnace design, fuels, refractories, methods, and efficiency of heat application and control over quality of product are stressed in courses dealing with metallurgical processes.

Laboratories equipped with various types of furnaces are provided so that the students can become familiar with high temperature equipment and conduct experiments demonstrating important features of metallurgical processes.

Metallography is an important branch of metallurgy dealing with the application of metals and alloys. The work relates to internal structures, as studied by the microscope, and to the physical and chemical properties of metals and alloys. A knowledge of metallography is essential in the design and development of new machines and equipment fabricated from metals.

An elaborate and up-to-date file of references and abstracts is available. A large collection of specimens, photomicrographs, and lantern slides covering all

types of steels, brasses, bronzes, aluminum alloys, and other industrial alloys is available for study and comparison.

Laboratory courses accompany lecture work. The metallographic laboratory is equipped with the most up-to-date microscopes and apparatus for heat treating and physical and mechanical testing. Practice is obtained in taking photomicrographs.

Two options are open to students in metallurgy. Option A is provided for students specializing in ore dressing and the refining and smelting of nonferrous metals. Option B is for students interested in the production of ferrous metals and the application of all metals.

Students will register for either Option A or Option B at the beginning of the junior year.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
Geol. 23	Mineralogy	4	1	3	4
M.&M. 31	Calculus	3	3	.....	.....
Met. 1	Assaying	2	.....	3	.....
Met. 2	Assaying Laboratory	3	.....	.....	8
Phys. 7	General Physics	5	1	4	2
	Winter Quarter				
Anal.Chem. 9	Quantitative Analysis	3	1	1	6
Geol. 24	Mineralogy	4	1	3	4
M.&M. 32	Calculus	3	3	.....	.....
Met. 11	Metallurgy of Pig Iron	3	1	3	.....
Phys. 8	General Physics	5	1	4	2
	Spring Quarter				
Geol. 105	Rock Study	2	.....	2	2
M.&M. 33	Calculus	3	3	.....	.....
Met. 12	Metallurgy of Steel	3	1	3	.....
Phys. 9	General Physics	5	1	4	2
	Elective	5			

JUNIOR YEAR

(Students will register for either Option A or Option B.)

Option	Course No.	Title	Credits	Rec.	Lect.	Lab.
		Fall Quarter				
A&B	M.&M. 26	Technical Mechanics (Statics)	5	5	.....	.....
A&B	Met. 106	Base Metals	2	.....	3	.....
A&B	Met. 110	Ore Dressing	2	.....	3	.....
A&B	Met. 111	Ore Dressing Laboratory	1	.....	.....	4
A&B	Min. 121	Mine Plant	3	.....	5	.....
A	Geol. 106	Petrography	2	.....	2	2
A	Geol. 165	Ore Dressing Microscopy	1	.....	.....	3
A	Min. 111	Exploration	3	.....	4	.....
B	M.E. 9	Foundry Practice	2	.....	2	3
B	Met. 153	Metallography	4	.....	3	4
		Winter Quarter				
A&B	M.&M. 128	Strength of Materials	5	5	.....	.....
A&B	Met. 107	Base Metals	2	.....	3	.....
A&B	Met. 133	Electrometallurgy	3	.....	3	3
A&B	Min. 122	Mine Plant	3	.....	5	.....
A	Met. 112	Ore Dressing	2	.....	3	.....
A	Met. 113	Ore Dressing Laboratory	1	.....	.....	4
A	Min. 112	Exploration and Development	3	.....	4	.....
B	M.E. 13	Forging, Heat Treating, and Welding	2	.....	1	4
B	Met. 154	Metallography	4	.....	3	4

Option	Course No.	Title	Credits	Rec.	Lect.	Lab.
		Spring Quarter				
A&B	E.E. 41	Electric Power	3	.....	2	3
A&B	M.&M. 127	Technical Mechanics (Dynamics)	5	5	.....	.....
A&B	Met. 108	Precious Metals	2	.....	3	.....
A&B		Electives	3			
A	Met. 114	Ore Dressing	2	.....	3	.....
A	Met. 115	Ore Dressing Laboratory	1	.....	.....	4
A	Min. 113	Development and Production	3	.....	4	.....
B	M.E. 16	Machine Shop Practice	2	.....	1	4
B	Met. 155	Metallography	4	.....	3	4
		Summer Field Trips				
A	Met. 139	Study of metallurgical and mining operations in western mining districts	6			
B	Met. 175	Study of metallurgical operations in important iron and steel centers	6			
		SENIOR YEAR				
		Fall Quarter				
A&B	Met. 121	Ore Testing	2	.....	1	3
A&B	Met. 134	Advanced Metallurgy	4	.....	3	4
A	Met. 153	Metallography	4	.....	3	4
A	Min. 125	Metallurgical Hydraulics	3	.....	3	.....
A		Electives	6			
B	Chem.E. 76	Applied Electrochemistry	3	.....	3	.....
B	Met. 141	Problems in Ferrous Metallurgy	3	.....	.....	9
	or					
B	Met. 166	Advanced Metallography Laboratory	3	.....	.....	9
B	Met. 163	Advanced Metallography	3	.....	3	.....
B		Electives	4			
		Winter Quarter				
A&B	Met. 135	Advanced Metallurgy	4	.....	3	4
A	Met. 122	Ore Testing	4	.....	2	8
A	Met. 137	Problems in Nonferrous Metallurgy	4	.....	2	8
A	Met. 154	Metallography	4	.....	3	4
A		Electives	3			
B	Chem.E. 77	Applied Electrochemistry	3	.....	3	.....
B	Met. 142	Problems in Ferrous Metallurgy	3	.....	.....	9
	or					
	Met. 167	Advanced Metallography Laboratory	3	.....	.....	9
B	Met. 164	Advanced Metallography	3	.....	3	.....
B		Electives	6			
		Spring Quarter				
A&B	Met. 136	Advanced Metallurgy	4	.....	3	4
A	Met. 123	Ore Testing	4	.....	2	8
A	Met. 138	Problems in Nonferrous Metallurgy	4	.....	2	8
A	Met. 155	Metallography	4	.....	3	4
A		Electives	3			
B	Chem.E. 31	Chemistry of Engineering Materials	3	.....	3	.....
B	M.&M. 144	Materials Testing Laboratory	2	.....	.....	4
B	Met. 143	Problems in Ferrous Metallurgy	3	.....	.....	9
	or					
B	Met. 168	Advanced Metallography Laboratory	3	.....	.....	9
B	Met. 165	Advanced Metallography	3	.....	3	.....
B		Electives	4			

PHYSICS

Four-year course leading to the degree of bachelor of physics, B.Phys.

The sequence leading to the degree, bachelor of physics, is intended to be sufficiently broad to provide for the needs of those who desire to prepare for the industrial research field or for graduate work in physics as a major. The outline given is only suggestive and is not complete. A total of 207 credits is required.

A student entering this course should consult an adviser in the Department of Physics who will aid him in selecting the sequences best adapted to his needs.

It is clear that a student having the above objectives must attain an adequate background in mathematics and in chemistry. The work in physics is planned so as to give a greater or lesser contact with theoretical physics and experimental physics, depending upon the special aptitude of the applicant. Any special interest of the applicant may be met by a careful choice of elective courses which meets the approval of his adviser. The Department of Physics reserves the right to limit the registration in this course to those who have given evidence of being able to profit by it. Those who are registering in the course should consult the chairman of the department.

General requirements for graduation.—The student must fulfill the requirements in credits earned (207) and standards of work required for graduation by the Institute of Technology. The student must include as a minimum:

A major in physics of 55 credits.
A minor in mathematics of 34 credits.
A minor in chemistry of 39 credits.

The following outline is offered as a guide in planning the details of the four-year course. The student should consult his adviser in the choice of electives.

FRESHMAN YEAR†§

Course No.	Title	Credits	Rec.	Lect.	Lab.
M.&M. 11	College Algebra	5	5	.....	.....
Inorg.Chem. 4	General Inorganic Chemistry	4	1	3	3
Engl. 4	Composition	3	3	.....	.....
Draw. 11	Engineering Drawing	2	.....	.....	6
	Elective*				
	Winter Quarter				
M.&M. 12	Trigonometry	5	5	.....	.....
Inorg.Chem. 5	General Inorganic Chemistry	4	1	3	3
Engl. 5	Composition	3	3	.....	.....
Draw. 12	Engineering Drawing	2	.....	.....	6
	Elective*				
	Spring Quarter				
M.&M. 13	Analytical Geometry	5	5	.....	.....
Inorg.Chem. 11 or 16	Qualitative Chemical Analysis	4 or 5	.....	3	4 or 6
Engl. 6	Composition	3	3	.....	.....
Draw. 3	Descriptive Geometry	3	.....	.....	6
	Elective*				

* For list of elective courses in other colleges, see page 74.

† See statement on page 32 for students entering without chemistry, higher algebra, or solid geometry and those required to take the course in subfreshman English Composition.

§ The course outlined for the freshman year for engineering groups (page 33) or for Chemistry and Chemical Engineering (pages 44 and 45) may be substituted for the freshman program given here.

SOPHOMORE YEAR

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Fall Quarter				
M.&M. 24	Differential Calculus	5	5	.....	.....
Anal.Chem. 7	Quantitative Analysis	4	1	1	8
E.E. 11	Elements of Electrical Engineering	3	2	1	.....
Phys. 7	General Physics	5	1	4	2
	Winter Quarter				
M.&M. 25	Integral Calculus	5	5	.....	.....
Org.Chem. 1	Elementary Organic Chemistry	4	2	3	4
E.E. 13	Elements of Electrical Engineering	3	2	1	.....
E.E. 14	Elements of Electrical Engineering Laboratory	1	.....	.....	2
Phys. 8	General Physics	5	1	4	2
	Spring Quarter				
Org.Chem. 2	Elementary Organic Chemistry	4	2	3	4
E.E. 15	Elements of Electrical Engineering	3	2	1	.....
E.E. 16	Elements of Electrical Engineering Laboratory	1	.....	.....	2
Phys. 9	General Physics	5	1	4	2
Engl. 8	Explorations in Literature	3	4	3	.....

JUNIOR YEAR

	Fall Quarter				
M.&M. 151	Differential Equations	3	3	.....	.....
Phys.Chem. 101	Physical Chemistry	5	2	3	5
Phys. 100	Intermediate Physics	3	3	.....	.....
Phys. 107	Modern Physics	3	.....	3	.....
Phys. 144	Electrical Measurements	3	1	1	4
	Winter Quarter				
M.&M. 152	Advanced Calculus	3	3	.....	.....
Phys.Chem. 102	Physical Chemistry	5	2	3	5
Phys. 102	Intermediate Physics	3	3	.....	.....
Phys. 109	Modern Physics	3	.....	3	.....
	Elective*				
	Spring Quarter				
M.&M. 153	Advanced Calculus	3	3	.....	.....
Phys.Chem. 103	Physical Chemistry	5	2	3	5
Phys. 104	Intermediate Physics	3	3	.....	.....
Phys. 111	Modern Physics	3	.....	3	.....
	Elective*				

SENIOR YEAR

	Fall Quarter				
Phys. 101	Theoretical Physics	5	5	.....	.....
Phys. 134	Modern Experimental Physics	4	.....	.....	8
German 24	Chemical German	3	4	.....	.....
	Elective*				
	Winter Quarter				
Phys. 103	Theoretical Physics	5	5	.....	.....
Phys. 110	Modern Experimental Physics	4	.....	.....	8
Phys. 136	Spectrum Analysis	4	.....	.....	8
German 25	Chemical German	3	4	.....	.....
	Elective*				

* For list of elective courses in other colleges, see page 74.

Course No.	Title	Credits	Rec.	Lect.	Lab.
	Spring Quarter				
Phys. 105	Theoretical Physics	5	5	.....	.....
Phys. 111	Modern Physics	3	.....	3	.....
Phys. 112	Modern Experimental Physics	4	.....	.....	8
or					
Elective					
German 26	Chemical German	3	4	.....	.....
	Elective*				

Recommended Electives for Physics Curriculum

Course No.	Title	Credits
Chem.E. 31s	Engineering Materials	3
Econ. 3f,w,s	Elements of Money and Banking	5
Econ. 8f,w,9w,s	General Economics, per quarter	3
Econ. 28f,s	Business Law	3
E.E. 111f	Junior Electrical Engineering	5
E.E. 113w-115s	Junior Electrical Engineering, per quarter	3
Engl. 21f-22w-23s	Introduction to Literature, per quarter	5
Engl. 37f-38w-39s	Twentieth-Century Literature, per quarter	3
Engl. 52f-53w	The English Novel, per quarter	3
Geol. 1f-2w	General Geology	6
Geol. Af-Bw	General Geology Laboratory	4
Hist. 1f-2w	European Civilization, per quarter	5
Hist. 4f-5w-6s	English History	9
M.&M. 84s	Technical Mechanics	5
M.&M. 154f-155w-156s	Vector Analysis, per quarter	3
M.E. 4f,w,s,su-8f,w,s-12f,w.s,su	Shop Practice, per quarter	2
Orient. 1f-2w-3s	Man in Nature and Society, per quarter	3
Phil. 1f,w,s	Problems of Philosophy	5
Phil. 2f,w,s	Logic	5
Phil. 3f,w,s	Ethics	5
Phil. 50f-51w-52s	General History of Philosophy, per quarter	3
Phil. 154	Logic of Science	3
Phys. 52w,s	Laboratory Arts	3
Phys. 61w	Introduction to Geophysical Prospecting	3
Phys. 113w	Intermediate Acoustics	3
Phys. 114f-116w-118s	Elementary Physical Investigation, per quarter	3
Phys. 124w	Pyrometry	3
Phys. 126s	Advanced Heat	3
Phys. 134f,w	Experimental Optics	3
Phys. 136w,s	Spectrum Analysis	3
Phys. 146w	Advanced Electricity Measurements	3
Phys. 152s	X Rays	3
Phys. 154w	X-Ray Spectroscopy	3
Phys. 161f-162w	Principles of Geophysical Prospecting, per quarter	3
Phys.Chem. 116f-117w-118s	Advanced Physical Chemistry, per quarter	3
Psy. 1f,s-2w,s	General Psychology, per quarter	3
Psy. 3s	Psychology Applied to Daily Life	3
Zool. 1f-2w-3s	General Zoology	10

ADDITIONAL ELECTIVE COURSES

For detailed schedules of classes see the programs of the respective departments in the Combined Class Schedule for 1940-41.

Course No.	Title	Credits	Prerequisites
Ast. 11f,s	Descriptive Astronomy	5	None
French 1f,w,s-2f,w,s	Beginning French	10	None
French 3f,w,s-4f,w,s	Intermediate French	10	None

* For list of elective courses in other colleges, see pages 74-75.

Course No.	Title		Credits
Geog. 11f,w,s	Human Geography	5	3rd qtr. fr., soph., jr., sr.; none
Geog. 41f,w,s	Geography of Commercial Production	5	Soph., jr., sr.; none
Geol. 8f,w,s	Introductory Geology	5	None
Ger. 1f,w,s	Beginning German A	5	None
Ger. 2f,w,s	Beginning German B	5	Ger. 1 or one year high school German
Ger. 3f,w,s	Beginning German C	5	Ger. 2 or two years high school German
Ger. 4f,w,s	Intermediate German	5	Ger. 3 or three years high school German
Hist. 1f,w-2w,s-3f,s	European Civilization	12	None by freshmen
Hist. 4f-5w-6s	English History	9	None
Hist. 11f-12w-13s	Medieval History	9	None (arch. only)
Hist. 20f-21w-22s	American History	9	Soph., jr., sr.; none
Italian-1f-2w	Beginning Italian	10	None
Jour. 5s	The American Newspaper	3	None
Lib.Meth. 1f,w,s	Use of Books and Libraries	2	None (fr. and soph. only)
Phil. 2f,w,s	Logic	5	Soph., jr., sr.; none
Phil. 153w	Philosophy of Science	3	Phil. 2
Phil. 154s	Logic of Science	3	Phil. 153
Pol.Sci. 1f,w-2w,s-3s	American Government and Politics	9	None
P.M.&P.H. 3f,w,s	Personal Health	2	Fr., soph.; none
Psy. 1f,s-2w,s	General Psychology	6	None
Psy. 160f	Psychology in Personnel Work	3	Psy. 1-2, Econ. 8-9
Soc. 1f,w,s	Introduction to Sociology	5	None
Span. 1f,w,s-2f,w,s	Beginning Spanish	10	None
Span. 3f,w,s-4f,w,s	Intermediate Spanish	10	Spanish 1-2 or two years high school Spanish
Sp. 1f,w-2w,s-3f	Fundamentals of Speech	9	Engl. 6
Sp. 5f,w,s-6f,w,s	Fundamentals of Speech	10	Engl. 6
Study 1f,w,s	How To Study	2	Permission of instructor

SUBSTITUTIONS

In order that students whose course of study is irregular may avoid delays on account of program conflicts or other difficulties, the following substitutions will be approved by petition. Additional credits thus earned may be applied as elective credits.

Course		Credits	Substitute Course		Credits
Aero.E.	115	3	M.&M.	180	3
Draw.	7	3	Draw.	1 and 2	6
	8	3		3	3
	11	2		1	3
	12	2		2	3
	26	2		28	2
	28	2		26	2
M.&M.	84	5	M.&M.	26 and 127	10
	85	3		128	5
	86	3		129 and 143	5
	87	1		141	2
	91	4		24 and 25	10
	92	4		26 or 84	5
	93	4		85 or 128	4 or 5
Anal.Chem.	132	3	Anal.Chem.	105	3

DESCRIPTION OF COURSES

AERONAUTICAL ENGINEERING

1f—Aeronautics. History. Nomenclature. Resistance of simple bodies. Theory of flight. The airplane and its parts. Constructional details. Performance. 3 cred.; prereq., M.&M. 12. Messrs. Barlow and Brush.

(1) I MWF; 105A
(2) VII MWF; 105A
(3) III MTS; 105A
(4) VI MThF; 105A
(5) I TThS; 105A
(6) II TThS; 105A

2w—Aircraft and Auto Engines. Principles and types. Electrical systems. Lubrication and cooling. Carburetors. Accessories. (Open only to aeronautical engineers or by petition.) 3 cred.; soph. Messrs. Barlow and Brush.

Lect. (1) I TW; 105A
(2) II TS; 105A
(3) VI TF; 105A
(4) I MF; 105A
(5) II MW; 105A
(6) VI MTh; 105A

Lab. (1) I-II F; A
(2) III-IV W; A
(3) VII-VIII W; A
(4) VII-VIII Th; A
(5) VIII-IX M; A
(6) VII-VIII T; A

Quiz I S; 335EE

3s—Aeronautics. Instruments. Meteorology. Avigation. 3 cred.; prereq., M.&M. 13. Messrs. Barlow, Brush, and Serebreny.

(1) IV MWF; 105A
(2) III TThS; 105A
(3) II MWF; 105A
(4) III W, V Th, IV S; 105A
(5) II TThS; 105A
(6) VII MTh, VI T; 105A

83w,s—Stresses in Simple Structures. Statically determinate trusses and beams. Graphic statics. Space frameworks. Combined stresses. Airplane wing bracing. Short and long struts. 3 cred.; prereq., M.&M. 128. Mr. Wise.

83w I TThS; 215E
83s (1) I TS, VI Th; 215E
(2) III MWF; 22E

100f-101w-102s—Aerodynamics. Atmospheric properties. Fluid mechanics. Stream functions and velocity potential. Motion of body in liquids in three dimensions. Prandtl's wing theory. Dynamic loads, stability, maneuverability, controllability. 3 cred. per qtr.; prereq., 3 and M.&M. 25. Mr. Boehnlein.

100f (1) III TThS; 110Ex
(2) VI MWF; 205E
(3) II TThS; 215Ex

101w (1) I TThS; 104E
(2) II TThS; 205E
(3) II MW, 205E; III S, 215E

102s (1) I MWF; 104E
(2) I TThS; 104E
(3) III TThS; 110Ex

103f-104w-105s—Advanced Aerodynamics. 3 cred. per qtr.; prereq., 102 or special permission. Mr. Boehnlein.

115f—Airplane Stresses. Deflection of structures. Theory of statically indeterminate structures. Analysis of fuselage trusses, landing gear, wing beams. Structural details and connections. 3 cred.; prereq., 83. Mr. Wise.

Lect. II TS; 227E
Lab. (1) VIII-IX F; 229E
(2) VII-VIII T; 229E

116w—Advanced Airplane Stresses. Theory and design of monocoque fuselages. Multispar and unit construction wings. Vibrations. Wing control-surface flutter. Analysis and design of seaplane hulls and floats. 3 cred.; prereq., 115. Mr. Wise.

Lect. II S; 227E
Lab. VII-VIII M; 229E

120f-121w-122s—Airplane Design. Stress analysis of wings, fuselages, chassis, control surfaces, etc. Specifications. Performance and design calculations. Propellers. 120f, 3 cred.; 121w, 4 cred.; 122s, 3 cred.; prereq., 83, 102, M.&M. 128. Messrs. Akerman, Barlow, Brush, and Ruszaj.

120f	Lect.	(1) II M, VI W; 105A	(2) IV TS; 105A
	Lab.	(1) II-IV W; 201E	(2) II-IV F; 225E
121w	Lect.	(1) IV T, III S; 105A	(2) VI W, VII F; 105A
	Lab.	(1) II-IV WF; 229E (2) II-IV WF; 225E	(3) I-III Th, II-IV S; 225E
122s	Lect.	IV T; 105A	
	Lab.	(1) II-IV MF; 225E (2) II-IV MF; 229E	(3) I-III ThS; 1E

123f,w,s-124f,w,s-125f,w,s—Advanced Airplane Design. Problems in airplane design or development. 2 to 5 cred. per qtr.; prereq., 121. Messrs. Akerman, Barlow, and Brush.

126s—Propeller Design. Graphical and analytical methods of investigation. 3 cred.; prereq., 120. Mr. Akerman.

127f,w,s-128f,w,s—Advanced Problems in Airscrew Design. 2 to 5 cred. per qtr.; prereq., 126. Mr. Akerman.

140f,s—Aeronautical Laboratory. Study of airplane parts and their construction. Fittings. Rigging. Inspection and accessories. 2 cred.; prereq., 102. Messrs. Akerman, Barlow, Brush, and Ruszaj.

140f	VII-IX MF; 107A	
140s	(1) VII-IX MF; 107A (2) VII-IX WTh; 107A	(3) II-IV TS; 107A (4) III-V M, VII-IX T; 107A

141f,w,s—Aerodynamics Laboratory. Measurement of air flow. Calibration of Pitot tubes and anemometers. Distribution of air pressure on surfaces. Wind tunnel tests of wings, propellers, and airplane models. 3 cred.; prereq. 101 or registration in 101. Messrs. Boehnlein and Ruszaj.

141f	Lect.	VI Th; 201Ex	
	Lab.	VII-IX TTh; OSL	
141w	Lect.	(1) IV S; 201Ex	(2) III T; 201Ex
	Lab.	(1) VII-IX TF; OSL (2) VII-IX WTh; OSL	(3) VII-IX M, II-IV F; OSL
141s	Lect.	II W; 215Ex	
	Lab.	VII-IX MTh; OSL	

159s—Inspection Trip. Various aircraft and aircraft engine manufacturing plants are visited during the spring vacation period. Written report covering this trip will be submitted. Required of seniors in Aeronautical Engineering. 1 cred.

160s—Lighter-Than-Air Craft. Theory and design. Rigid and non-rigid types. Stresses. Performance. 3 cred.; prereq., 83, 102, M.&M. 128. Messrs. Akerman and Piccard.

Lect.	III T, IV S; 105A	
Lab.	(1) II-IV W; 225E	(2) II-IV W; 229E

164s—Problems Relating to the Stratosphere. 3 cred.; prereq., 102; I TThS; 105A. Mr. Piccard.

165f,w,s—Advanced Aeronautical Laboratory. Research problems in aeronautical engineering requiring laboratory or field research facilities. 2 to 4 cred.; prereq., 140 or 141. Messrs. Akerman and Piccard.

170s—Air Transport. Economics. Airports and airways and their equipment. Air commerce rules and regulations. Communication. 2 cred.; prereq., open to jr. and sr. in Aero.E. Messrs. Brush and Serebreny.

(1) VII T, III Th; 105A (2) VII WF; 105A

173f—Introductory Meteorology. Physics of the air especially as related to meteorological phenomena. Problems of pressure, temperature, and general circulation of the atmosphere. Laboratory work consists of practical applied problems concerning meteorological phenomena. 3 cred.; prereq., jr. or sr.; III TTh; 105A; VII-IX Th; 205A. Messrs. Piccard and Serebreny.

174w—Airways Meteorology. Study of air mass analysis. Application of the air mass analysis methods and polar front theory to construction and interpretation of synoptic charts for forecasting purposes. Use of thermodynamic diagrams and vertical cross-sections. Preparation and analysis of synoptic maps; preparation of working forecasts. Organization and operation of airways meteorological service. Work in observatory for both ground and upper air observations. 4 cred.; prereq., 173; IV M; 105A; II-III M, VII-VIII Th; 205A. Mr. Serebreny.

175s—Advanced Meteorology. Use of the thermodynamic charts. Construction and use of isentropic charts. Isobaric analysis and weather forecasting procedure based on Pettersen's theory of mathematical forecasting. Special application of forecasting to airline operations; general consideration to long range forecasting; continuous map analysis and forecasting work. 4 cred.; prereq., 174; I MW; 105A; VII-IX MTh; 205A. Mr. Serebreny.

190w-191s-192f,w,s—Seminar. Readings, reports, conferences, and discussions. 1 cred. per qtr.; prereq., 101. Messrs. Akerman and Piccard.

190w (1) VII T; 105A (3) VII W; 105A
(2) VII M; 105A

191s (1) VI W; 105A (3) VI M; 105A
(2) VI F; 105A

192f,w,s Ar.

193f,w,s-194f,w,s-195f,w,s—Advanced Problems in Aeronautical Engineering. 2 to 5 cred. per qtr.; prereq., sr. or grad. in Aero.E. Messrs. Akerman, Piccard, Robertson, Wise, Barlow, Boehnlein, Brush, and Serebreny.

201f-202w-203s—Advanced Problems in Aerodynamics. 3 cred. per qtr.; prereq., 102 or special permission. Mr. Boehnlein.

260s—Advanced Airship Stresses. Coplanar and space rigid frameworks. Secondary stresses. Buckling and elastic instability. Framework of dirigibles, gondolas, and cabins. 3 cred.; prereq., 115. Mr. Wise.

272f-273w-274s—Research in Aeronautical Engineering. 2 to 5 cred. per qtr. Messrs. Akerman, Piccard, Robertson, Wise, and Boehnlein.

275f,w,s-276f,w,s-277f,w,s—Advanced Aircraft Engines. An advanced study of aircraft engines and auxiliary equipment, analysis of current developments in aircraft engines, new engine accessories and installations. Theoretical analysis of their effect upon the performance of modern aircraft. 2 to 5 cred. Messrs. Akerman and Robertson.

For additional courses available to aeronautical engineers in:

Internal Combustion Engines see Mechanical Engineering 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 250, and 254.

Aeronautical Communication and Electric Power see Electrical Engineering, 46-47.

Advanced Strength of Materials see Mathematics and Mechanics 180, 181, 182, 184, 185, 186, 294, 295, and 296.

AGRICULTURAL BIOCHEMISTRY

103s—Dairy Chemistry. Lectures and laboratory work on the physical, colloidal, and chemical properties of milk and dairy products, the chemistry of the various constituents of milk and the chemical technology of the manufacture of dairy products. 5 cred.; prereq., Anal. Chem. 1, 2, Org. Chem. 54, 55; VI-IX MWF; 201 SnH(UF). Mr. Palmer.

108s—Chemistry of Wheat and Wheat Products. A lecture course, with collateral library reference work, on the chemical technology of the production and milling of wheat and its conversion into food. 3 cred.; prereq., Org. Chem. 54-55; II MWF; 211SnH(UF). Mr. Geddes.

110s—Flour Laboratory Methods. A laboratory course. Analysis of wheat and its products. Designed to train students for the cereal industry. 3 cred.; prereq., 101-102 or food analysis; VI-IX MWF; 202SnH(UF). Mr. Geddes.

113f,su-114w,su-115s—Biochemical Laboratory Methods. A laboratory course paralleling the lectures in 119-123. 2 cred. per qtr.; prereq., quantitative analysis, reg. in 119-123; VI-VIII T, VII-IX Th; 202, 208SnH(UF). Mr. Sandstrom.

119f—Colloids. Lectures and assigned readings dealing with the colloidal state of matter, the preparation and properties of colloidal systems, and the relation of these to biochemical processes. 3 cred.; prereq., Org. Chem. 153 and one year of either zoology or botany; III MWF; 113SnH(UF). Mr. Gortner.

120w—Proteins. Lectures and assigned readings on composition, structure, chemical and physical properties, and the functions of proteins and amino acids. 3 cred.; prereq., 119; III MWF; 113SnH(UF). Mr. Geddes.

121w—Carbohydrates. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the carbohydrates. 3 cred.; prereq., 119; II MWF; 113SnH(UF). Mr. Gortner.

122s—The Lipids and Fats. Lectures and assigned readings on the composition, structure, chemical and physical properties, and the functions of the fats and fat-like compounds. 3 cred.; prereq., 119; III TThS; 113SnH(UF). Mr. Briggs.

123s—Enzymes. Lectures and assigned readings on enzyme action, including the methods of preparation and investigation of enzymes and their function in biological and industrial processes. 3 cred.; prereq., 119; III MWF; 113SnH(UF). Mr. Sandstrom.

AGRICULTURAL ECONOMICS

102w—Farm Organization. The field of farm management; farming as a business; types of farming; selection and acquisition of a farm; planning the physical layout; selecting the crops and livestock. Special attention given to fundamental principles of organization. 3 cred.; prereq., Agr.Econ. 1, 2 or Econ. 8, 9; II TThS; 210HH(UF). Mr. Pond.

103s—Farm Operation. Budgeting the farm business; factors affecting success in farming; utilization of labor, power, and machinery; use of capital and credit; farm management investigations and services. Special attention to finding and remedying weaknesses in farm organization and operation. 3 cred.; prereq., Agr.Econ. 1, 2 or Econ. 8, 9; and Agr.Econ. 102; II TThS; 100HH (UF). Mr. Pond.

AGRICULTURAL ENGINEERING

FARM STRUCTURES

5f—Farm Structures Laboratory. Laboratory practice and study of farm building construction with different types of materials. (For professional agricultural engineers only.) 3 cred.; no prereq. Mr. Christopherson.
Lect. I TS; 41En(UF)
Lab. II-III TS; 48En(UF)

37s—Rural Sanitation and Water Supply. Wells, pumps, and water supply. Methods of securing sanitary water systems for farmsteads and rural institutions. Sanitary sewage disposal methods for homes, creameries, etc. 3 cred.; prereq., M.&M. 129; I MWF; 101En(UF). Mr. Tyler.

44s—Advanced Drawing. Plans and pictorial drawings, including perspective, charts, graphs, and co-ordinate plotting on various scales. Mapping. Illustrations for publication. 2 cred.; prereq., Draw. 2, or equiv. Mr. Neubauer.
Lect. ar.; 303En(UF)
Lab. ar.; 303En(UF)

53s—Farm Structures. Planning and economics of farm structures. 3 cred.; prereq., 5, Draw. 3 or equiv. Mr. White.
Lect. II TS; 305En(UF)
Lab. III-IV TS; 305En(UF)

67f—Advanced Farm Structures Design. 3 cred.; prereq., 5, 53, M.&M. 128. Messrs. White and Neubauer.
Lect. I TTh; 305En(UF)
Lab. II TTh, I-II S; 305En(UF)

111f-112w-113s—Farm Building Problems. Investigations in building materials; special designs, methods of construction, cost, and efficiency of farm buildings. 2 to 6 cred. per qtr.; prereq., 67; ar.; 305En(UF). Messrs. White, Christopherson, and Neubauer.

211f-212w-213s—Farm Structures Research. Studies in farm structures as related to other factors in the farm business. 2 to 6 cred. per qtr.; prereq., 111; ar. Mr. White.

FARM POWER AND MACHINERY

18s—Agricultural Automotives. Principles of internal combustion engines and tractors including ignition, lubrication, carburetion, cooling, real gas cycles, transmission systems, and drive members. 4 cred.; prereq., Phys. 7. Messrs. Torrance and Strait.
Lect. VI TTh; 216En(UF)
Lab. VII-IX TTh; 37En(UF)

43f—Mechanical Laboratory. Instruction and laboratory practice in mechanical work, embracing cement work; soldering; welding; pipe fitting; electric wiring; harness repair, etc. 3 cred.; no prereq.; I-II TThS; 20, 106En(UF). Messrs. Dent and Strait.

52f—Elements of Farm Machinery. Principles of development, construction, and use of agricultural machines. Drawbar power. 3 cred.; prereq., M.&M. 26. Mr. Schwantes.
Lect. VI TTh; 216En(UF)
Lab. VII-IX Th; 49En(UF)

71f—Design and Economics of Agricultural Machinery. Machine and power costs of farm operations; operating principles and design problems. 3 cred.; prereq., 18, 52, M.E. 27; VI-VII M; 105En(UF); VI-VIII F; 49En(UF). Messrs. Schwantes and Strait.

72s—Applied Electricity. Laboratory work in direct and alternating current machines as used on farms, including generators, motors, storage batteries, transformers, and complete isolated electric and hydroelectric plants. (Offered only in alternate years, 1942-44, etc. Alternate with Ag.E. 73.) 3 cred.; prereq., Phys. 9 or 43, 44. Mr. Hustrulid.
Lect. III MF; 101En(UF)
Lab. VI-IX W; 5EEn(UF)

73s—Steam Boilers and Heat Engines. Steam boilers and heat engines in their applications to agriculture. (Offered only in alternate year, 1941-43, etc. Alternate with Ag.E. 72) 3 cred.; prereq., M.E. 31 and Ag.E. 18. Mr. Strait.
Lect. III MF; 216En(UF)
Lab. VI-IX W; 101En(UF)

121f-122w-123s—Farm Power and Machinery Problems. Special studies of farm machinery and mechanical power for the farm. Tests, design, and adaptability. 2 to 6 cred. per qtr.; prereq., 126; ar. Messrs. Schwantes and Hustrulid.

126w—Selection and Management of Agricultural Machinery. Special problems in economical power and machine combinations and their application to the farm. 3 cred.; prereq., 18, 71, Ag.Econ. 102; III MW; 103En(UF); lab. 3 hrs. ar.; 305En(UF). Mr. Schwantes.

221f-222w-223s—Farm Power and Machinery Research. Studies involving the design or utilization of power machinery used in connection with farm operation. 2 to 6 cred. per qtr.; prereq., 121; ar. Messrs. Schwantes and Hustrulid.

LAND RECLAMATION

21s—Elements of Surveying. Use of tape, level, transit, traverse board in differential and profile leveling, cross sectioning, running tangents, and simple curves, topographic and agricultural surveys. Mapping, calculation of earthwork, and adjustments of instruments. 4 cred.; prereq., Draw. 3, M.&M. 12. Messrs, Roe, Manson, and Park.
Lect. VI F; 105En(UF)
Lab. VI-VIII MW, VII-IX F; 305En(UF)

28w—Land Clearing. Land clearing methods, machinery, and care and use of explosives. (Offered only in alternate years, 1941-42, etc.) 2 cred.; no prereq.; I TTh; 105En(UF). Mr. Schwantes.

51w—Land Reclamation. Principles and practices of irrigation, land drainage, and soil erosion control in relation to plant growth, farm operation, land development, and community interest. (Offered only in alternate years, 1941-42, etc. Alternate with Soils 108.) 5 cred.; prereq., 21 or reg. in 21, Soils 9, M.&M. 129 and 143 or reg. in M.&M. 129 and 143; VI MTWThF; 105En(UF). Messrs. Roe, Manson, and Park.

101f-102w-103s—Advanced Drainage Problems. Special drainage problems including surface run-off, soil permeability, relation of soil and crop type to drainage, shape and regulation of water table in relation to root growth, etc. 2 to 6 cred. per qtr.; prereq., 51; ar.; 105En(UF). Messrs. Roe, Manson, and Park.

201f-202w-203s—Reclamation Research. Studies of design and functioning of reclamation works with special reference to soil types and soil water conditions. 2 to 6 cred. per qtr.; prereq., 101, 102, or 103 and one qtr. Mathematical Theory of Statistics; ar. Mr. Roe.

AGRONOMY AND PLANT GENETICS

1f,s—Farm Crops. Important field crops of the United States with emphasis upon those of local importance, distribution, economic importance, agricultural classification, cultural methods, and principles of improvement and seed selection. 3 cred.; no prereq.; IV MWF; 107En(UF). Mr. Murphy.

ANIMAL AND POULTRY HUSBANDRY

1f,w,s—Livestock Production. Opportunities and problems in livestock production. A survey of practices followed in the production of beef cattle, sheep, swine, and horses. Lectures and laboratory practice in classifying and appraising livestock. 3 cred.; jr., sr.; no prereq.; I, II MWF, CSt(UF) (f,s); I, II TThS, CSt(UF) (w). Mr. Harvey.

ARCHITECTURE

HISTORY AND THEORY

1f-2w-3s—Introduction to Architecture. Discussions and problems to inform prospective students regarding the nature of architecture as an art and a profession. 1 cred. per qtr.; no prereq.; open only to students in architecture and students majoring in architecture; III W; 320E. Mr. Roy Jones.

4f-5w-6s—Graphic Representation. Projections, shades and shadows, perspective and other processes involved in architectural drawing. 2 cred. per qtr.; no prereq.; lect. II S; 320E; III-IV S; 402E. Mr. Heath.

51f-52w-53s—History of Architecture. The more significant architecture of the past, with particular reference to the geographic, social, and technical influences which produced it. 3 cred. per qtr.; prereq., jr. standing; IV MWF; 320E. Mr. Leslie.

57f-58w-59s—Building Materials and Methods. Principles, methods, and materials involved in the standard types of building construction. 2 cred. per qtr.; no prereq.; I TTh; 320E. Mr. Heath.

61f-62w-63s—Tutorial Work in History of Architecture. Same as F.A. 61-62-63. 2 cred. per qtr.; prereq., 53; ar. Mr. Leslie.

101f-102w-103s—Building Materials and Methods (continued). 2 cred. per qtr.; prereq., 59; III TTh; 320E. Mr. Robert Jones.

104f—Housing. Social, economic, political, and technical phases of modern group housing. Intended for mature students in the College of Science, Literature, and the Arts and the Institute of Technology. 3 cred.; prereq., sr. or grad. standing; I MWF; 320E. Messrs. Robert Jones, Anderson, Chapin, Filipetti, Vaile, and Ludwig.

105w—Professional Practice. Relations of the architect to client, contractor, and fellow-practitioners. Procedures of architectural practice. 2 cred.; prereq., sr. standing; III MF; 320E. Mr. Roy Jones.

106s—Housing. Social, economic, political, and technical phases of modern group housing, with special reference to the architects' functions therein. 2 cred.; prereq., sr. standing; III MF; 320E. Mr. Robert Jones.

107f-108w-109s—Furniture and Decoration. Principles, methods, and materials involved in the furnishing and decorating of interiors. 2 cred. per qtr.; prereq., consent of instructor; II TTh; 320E.

For special courses for architects in structural engineering see Mathematics and Mechanics 91, 92, 93 and Civil Engineering 38, 39, 41.

For special courses for architects in building equipment see Civil Engineering 171, Electrical Engineering 40, and Mechanical Engineering 164.

DESIGN

Completion of these courses is dependent on achievement, rather than time. Students will continue their registration until the course is completed and a mark is reported. An acceptable quality of work normally allows a rate of progress as indicated for each course.

Architectural

The object of the courses in architectural design is to develop the individual student's skill in creative effort as applied to the production of architecture. They provide opportunity for the student to exercise himself in all necessary phases of that creative effort, including especially research, composition, construction, and representation as four essential and interrelated parts of one unified process.

The courses consist of a series of problems, classified into three stages of advancement called grades, and culminating in a thesis whose satisfactory completion is a prerequisite for the degree in architecture. Most problems are done under criticism in which critics representing the several phases involved will collaborate. Certain problems are done entirely without criticism, in order to develop and test more fully the student's own power of independent achievement.

Work in all these courses is carried on simultaneously and continuously. A student may enter or leave them at any time he is judged ready to do so. They are administered by a design committee consisting of the major and consulting critics and Mr. Roy Jones, chairman. See also Statement Concerning Courses in Architectural Design as issued by the School of Architecture.

AD-If,w,s‡—Architectural Design, Grade I. 15 cred. (normally 5 cred. per qtr.); no prereq.; hrs. ar., including VI-VIII MTWThF for criticisms; 402E. Major critic, Mr. Cerny (Composition); consulting critics, Mr. Robert Jones (Construction), Mr. Huchthausen (Decoration).

AD-IIf,w,s‡—Architectural Design, Grade II. 18 cred. (normally 6 cred. per qtr.; prereq., AD-I; hrs. ar., including VI-VIII MTWThF for criticisms; 302E and 309E. Major critic, Mr. Robertson (Composition); consulting critics, Mr. Heath (Construction), Mr. Huchthausen (Decoration).

AD-IIIf,w,s‡—Architectural Design, Grade III. 45 cred. (normally 9 cred. per qtr.); prereq., AD-II; hrs. ar., including VI-VIII MTWThF for criticisms; 317E. Major critic, Mr. Arnal (Composition); consulting critic, Mr. Robert Jones (Construction).

AD-IVf,w,s‡‡—Architectural Thesis. 12 cred.; prereq., AD-III; hrs. ar., including VI-VIII M for criticisms; 317E. Major critic, Mr. Roy Jones; consulting critics, Mr. Arnal (Composition), Mr. Robert Jones (Construction).

Interior

Problems dealing with the composition, decoration, and furnishing of interiors.

Arch. ID-If,w,s‡—Interior Design. 24 cred. (normally 8 cred. per qtr.); prereq., AD-II; hrs. ar., including VI-VIII MTWThF for criticisms; 309E. Major critic, Mr. Huchthausen (Composition and Decoration); consulting critic, Mr. Heath (Construction).

Stage

Problems dealing with the design of settings and costumes for dramatic productions.

‡ A fee of $2 per quarter is charged for this course.
‡‡ A fee of $5 is charged for this course.

Arch. SD-If,w—Stage Design. 4 cred. (normally 2 cred. per qtr.); no prereq.; VI-VIII TTh; 405E. Mr. Burton.

DRAWING, PAINTING, AND MODELING

Completion of these courses is dependent on achievement rather than time. Students will continue their registration until the course is completed and a mark is reported. An acceptable quality of work normally allows a rate of progress as indicated for each course.

The object of these courses is to develop student's skill in esthetic expression through the medium of form and color. They consist of studio exercises divided into successive stages of advancement called grades. Work in most of the grades is carried on continuously. A student may enter or leave them at any quarterly interval he is judged ready to do so.

DP-If,w,s‡—Drawing and Painting, Grade I. Studies in graphic expression dealing with simpler composition in form and color. 6 cred. (normally 2 cred. per qtr.); no prereq. Messrs. Young and Huchthausen.

DP-If (1) II-III MF; 417E (for beginners only)
(2) VI-VII TTh; 417E (for beginners only)
(3) VI-VII MF; 417E (for students with at least one quarter's experience)

DP-Iw,s (1) II-III MF; 417E (for students with at least one quarter's experience)
(2) VI-VII TTh; 417E (for students with at least one quarter's experience)
(3) VI-VII MF; 417E (for beginners only)

DP-IIf,w,s‡—Drawing and Painting, Grade II. Studies in graphic expression dealing especially with composition in color. 6 cred. (normally 2 cred. per qtr.); prereq. DP-I. Messrs. Huchthausen and Young.

(1) II-III TTh; 417E
(2) VI-VII TTh; 417E

DP-IIIf,w,s‡—Drawing and Painting, Grade III. Studies in graphic expression dealing especially with composition based on the human figure. 6 cred. (normally 2 cred. per qtr.); prereq., DP-II; II-III MW; 417E. Mr. Burton.

DP-IVf,w,s‡—Drawing and Painting, Grade IV. Studies in graphic expression dealing especially with advanced figure composition and mural decoration. 6 cred. (normally 2 cred. per qtr.); prereq., DP-III; VI-VIII MW; 405E. Mr. Burton.

DP-Vf,w,s—Drawing and Painting, Grade V. For graduate students only. Continuation of DP-IV. 6 cred. (normally 2 cred. per qtr.); prereq., DP-IV or equivalent; hrs. ar.; 417E. Mr. Burton.

M-If,w,s‡—Modeling, Grade I. Studies in plastic expression dealing with simpler compositions. 6 cred. (normally 2 cred. per qtr.); no prereq.; VI-VIII MW; 405E. Mr. Burton.

M-Iaf,w,s—Modeling for Architects. Studies in plastic expression as applied to architectural composition. 2 cred.; prereq., reg. in Arch. Design; II-III TTh; 405E. Mr. Burton.

M-IIf,w,s‡—Modeling, Grade II. Studies in plastic expression dealing especially with the human figure. 6 cred. (normally 2 cred. per qtr.); prereq., M-I; VI-VIII MW; 405E. Mr. Burton.

M-IIIf,w,s—Modeling, Grade III. For graduate students only. Continuation of M-II. 6 cred. (normally 2 cred. per qtr.); prereq., M-II or equivalent; hrs. ar.; 405E. Mr. Burton.

‡ A fee of $1 per quarter is charged for this course.

IHP-If—Illustration. Studies in graphic expression as applied to illustration. 2 cred.; prereq., DP-I; VI-VII MTh; 417E. Mr. Young.

IHP-IIw,s—Hand Print Processes. Studies in graphic expression as applied to engraving, etching, drypoint, and lithograph. 4 cred. (normally 2 cred. per qtr.); prereq., DP-I; VI-VII MTh; 417E. Mr. Young.

ASTRONOMY

51w—General Astronomy. A survey course covering the fundamental facts and principles of astronomy. 3 cred.; prereq., M.&M. 12; IV MWF; 133Ph. Mr. Luyten.

101f*—Celestial Mechanics. 3 cred.; prereq., M.&M. 25; II MWF; ar. Mr. Luyten.

140f*—Method of Least Squares. The combination and adjustment of observations and the discussion of their precision as applied especially to engineering, physics, astronomy, and psychology. 3 cred.; prereq., 51 or 11 and M.&M. 24; ar. Mr. Luyten.

BACTERIOLOGY AND IMMUNOLOGY

53f,w,s,su‡—General Bacterioolgy. Principles and technique of general bacteriology; studies in the morphologic and biologic characters of the common bacteria; culture media; principles of sterilization and disinfection; examination of air, water, milk, food; relation of bacteriology to the industries. Lectures and laboratory. 5 cred.; prereq., 4 cred. of zoology or botany and Inorg. Chem. 10; VII-IX MWF; MH.

103w—Soil Microbiology. Studies of the microscopic inhabitants of the soil. Prereq., 53, and 15 cred. in chemistry; 9 hrs.; 5 cred.; I-III TThS; MH. Dr. Skinner.

104s—Sanitary Bacteriology. Standard and other methods for the bacteriological products. Preparation of standard culture media, technique and evaluating of results. Primarily for major in bacteriology. Limited to 15 students. 4 cred.; prereq., 53 and 15 cred. in chemistry; VII-VIII TTh; MH. Dr. Skinner.

114s—Molds, Yeasts, and Actinomycetes. 4 cred.; prereq., Bact. 53; 6 hrs.; VII-VIII TTh, III-IV S; MH. Dr. Henrici.

121f-122w§—Physiology of Bacteria. Effect of environment on growth; enzymes; food requirements; carbohydrates, protein, and fat metabolism; products of growth; dormancy; death. 6 cred.; prereq., 53 and 8 cred. of organic chemistry or biochemistry; III TThS; MH. Dr. Halvorson.

123s—Applied Bacteriology. Industrial fermentations; bacteriology of water and sewage; interpretation of bacteriological data. 3 cred.; prereq., 121-122; III TThS; MH. Dr. Halvorson.

203f,w,s—Seminar in Bacteriology. 1 hr.; 1 cred.; IX W; MH. Staff.

* Courses 101 and 140 are usually offered in alternate years, and only one will be given in each year, depending on the demand.

‡ Microscope required. Students (except medical) may obtain use of microscope by purchasing $1.50 microscope card from bursar.

§ To receive credit for any part of this course, a student must complete both quarters.

BOTANY

1f,w,s—General Botany. Structure, physiology, life histories, and evolution of plants. Lectures and quizzes. 4 cred.; all; no prereq. Mr. Huff.

1f Lect. Bot. Aud. (1) III TThS (2) VI W, VI-VII F
Quiz Bot. Aud. (1) I TTh (5) V TTh
(2) II TTh (6) VI-VII M
(3) III MW (7) VII-VIII W
(4) IV TS

1w,s Lect. III TThS; Bot. Aud.
Quiz Bot. Aud. (1) I TTh (4) IV TS
(2) II TTh (5) IV MW
(3) III MW

CHEMISTRY

INORGANIC CHEMISTRY

(A fee of $2 per quarter is charged for Courses 1 to 16, inclusive.)

1f,su-2w—General Inorganic Chemistry (Agr., arch., predent., premed.) I. Study of the general laws of chemistry and of the nonmetals and metals and their compounds. 4 cred. per qtr.; no prereq. Messrs. Barber and Pervier.

1f-2w (Predent. and premed.)
Lect. VI MWThF; 225C
Quiz VI T; ar. C
Lab. VII-IX T; 290C

1f (Agr. and arch.)
Lect. VI MWF; 100C
Quiz VII F; ar. C
Lab. VII-IX M; 210C

2w (Agr. and arch.)
Lect. VI MWF; 100C
Quiz VII M; ar. C
Lab. VII-IX F; 210C

3s—Semimicro Qualitative Chemical Analysis. (Agr.) Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation and reduction, etc. 4 cred.; prereq., 2. Mr. Barber.

Lect. VII MWF; 325C
Lab. VIII-IX MW; 210C

4f,su-5w—General Inorganic Chemistry. Study of the general laws of chemistry and of the nonmetals and their compounds. More intensive than Course 1f-2w-3s. 4 cred. per qtr.; prereq., high school chemistry. Messrs. Reyerson, Heisig, and Maynard.

4f (Engrs. and miners)
Lect. IV TS, III Th; 100C Quiz VIII F; 100C, 305E
Lab. (1) I-III T; 110C (3) II-IV F; 110C
(2) II-IV W; 110C

Students doing unsatisfactory work in this course will be required to take 2 additional hours; IX TF; 225C.

(Premed.)
Lect. VII MWF; 325C Quiz VI T; 100C
Lab. VII-IX T; 210C

(Predent., med. tech.)
Lect. VII MWF; 225C Quiz VI Th; 100C
Lab. VII-IX Th; 210C

5w (Engrs. and miners)
Lect. IV TS, III Th; 100C Quiz IX T; 100C, 325C
Lab. (1) I-III T; 110C (3) II-IV F; 110C
(2) II-IV W; 110C

(Premed.)
Lect. VII MWF; 325C — Quiz VI T; 100C
Lab. VII-IX T; 210C
(Predent., med. tech.)
Lect. VII MWF; 225C — Quiz VI Th; 100C
Lab. VII-IX Th; 210C

6f,su-7w—General Inorganic Chemistry. Study of the general laws of chemistry and of nonmetals, metals and their compounds. 5 cred. per qtr.; no prereq. Miss Cohen.

Lect. II MWF; 325C(f), 225C(w); I Th; 410C
Lab.§ (1) I-III T, II-III Th; 210C (2) I-II TS, II Th; 210C

9f,w,*su-10w,s—General Inorganic Chemistry. Course 9. Study of general laws of chemistry and of nonmetals and their compounds. More intensive than Courses 6 and 7. Course 10. The metals and their compounds. 5 cred. per qtr.; prereq., one year of high school chemistry. Mr. Sneed, Miss Cohen, and Messrs. Klug and Taylor.

9f-10w Lect. (1) II MWF; 100C (Chem., S.L.A.)
(2) VII MWF; 100C (Agr.)
9f Lab. (1) I-III ThS; 290C (Chem., S.L.A.)
(2) I-II TThS; 290C (Chem., S.L.A.)
(3) VIII-IX MWF; 110C (Agr.)
10w Lab. (1) I-III ThS; 290C (Chem., S.L.A.)
(2) I-II TThS; 290C (Chem., S.L.A.)
(3) I-III TTh; 290C (Chem., S.L.A.)
(4) VIII-IX MWF; 110C (Agr.)
9w*-10s Lect. (1) III MWF; 325C (2) III MWF; 410C(w), 225C(s)
Lab. (1) VI-VII MWF; 210C, 290C (2) VI-VII MWF; 290C

11f,s,su†—Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation and reduction, etc. 4 cred.; prereq., 2, 5, 7, 10, or 15. Mr. Reyerson, Miss Cohen, and Mr. Pervier.

11f Lect. IV MWF; 225C — Lab. VI-IX F; 210C
11s (Premed., predent., med. tech. who entered without high school chem.)
Lect. VI MWF; 225C
Lab. VI-IX T; 290C
(Premed., predent., med. tech. who entered with high school chem.)
Lect. VII MWF; 100C
Lab. (1) VI-IX T; 210C (premed.)
(2) VI-IX Th; 210C (predent., med. tech.)

12f,s,su†-13f,w—Qualitative Chemical Analysis. Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation, reduction, etc. 5 cred. per qtr.; prereq., 7 or 10. Mr. Sneed, Miss Cohen and Messrs. Heisig and Taylor.

12f Lect. I TThS; 225C
Lab. I-III MW; 290C
12s (Chem., S.L.A. who took Inorg. Chem. 10)
Lect. II MWF; 100C
Lab. (1) I-III TThS; 290C (2) I-III TTh; 290C
(Pharm. and others)
Lect. II MWF; 100C
Lab. (1) I-III TTh; 210C (2) I-II TThS; 210C
13f Lect. VI MW; 325C — Quiz VI F; 410C
Lab. VII-VIII M, VII-IX WF; 290C
13w Lect. VI WF; 325C — Quiz VI M; 410C
Lab. VII-VIII M, VII-IX WF; 290C

* Students who have failed in 1f, 4f, 6f, 9f, or 14f, may register in section 2 for this course without further prerequisite.

† In place of 16s, Course 11f,su or 12f,su may be taken by students registered in the College of Engineering and Architecture and the School of Mines and Metallurgy

§ Freshmen entering the School of Chemistry without credit in high school chemistry must register in this section and for two additional hours; I-II S in both 6 and 7.

14f,su-15w—General Inorganic Chemistry. (Engrs. and miners without high school chem.) General laws of chemistry; the nonmetals, the metals, and their compounds. 4 cred. per qtr.; no prereq. Mr. Maynard.

Lect. IV TS, III Th; 225C
Quiz III T; 100C
Lab. 14f VI-VII T, VI-VIII Th; 110C
15w VII-IX T, VI-VII Th; 110C

16s—Qualitative Chemical Analysis. (Engrs. and miners) Laboratory work in systematic qualitative analysis with lectures on solutions, ionization, chemical and physical equilibria, oxidation and reduction, and other subjects pertinent to qualitative analysis. 5 cred.; prereq., 5 or 15. Messrs. Heisig and Maynard.

(Engrs. and miners who entered without high school chem.)
Lect. IV TS, VI Th; 100C
Lab. (1) I-III T, VII-IX Th; 110C (3) III-IV M, I-IV F; 110C
(2) II-IV W, I-III S; 110C (4) VII-IX T, VI-VIII W; 110C
(Engrs. and miners who entered without high school chem.)
Lect. IV TS, VI Th; 225C
Lab. (5) VII-IX T, VI-VIII W; 110C

96f-97w-98s‡—Senior Thesis. 5 cred. per qtr.; sr.

101s—History of Chemistry. Historical development of the theories of chemistry from the period of the ancients to the present time is covered by this course, particular emphasis being given to modern theories and laws. 2 cred.; prereq., Org. Chem. 52 or permission of instructor; IV T, V Th; ar.; C. Miss Cohen.

102s‡—Semi-micro Qualitative Analysis. A course designed to acquaint the student with the universally applicable method and underlying principles in the identification of the more common cations by use of drop reactions on spot plate and filter paper, and separation by use of the centrifuge. 3 cred.; prereq., Anal. Chem. 1, 2. Mr. Barber.

103f-104w-105s—Advanced Inorganic Chemistry. A discussion of selected topics in theoretical inorganic chemistry. Fall—The Chemistry of the Solid State. Winter—Atomic Structure and the Chemical Bond. Spring—Co-ordination Compounds. 3 cred. per qtr.; prereq., Anal. Chem. 1, 2, Org. Chem. 52; II TThS; 115C. Messrs. Klug, Maynard, and Taylor.

109w-110s‡—Synthetic Inorganic Chemistry. Methods of preparation and purification of inorganic compounds of special interest. Current literature. 3 to 5 cred. per qtr.; prereq., 13; 2 lect., with lab.; ar. Mr. Heisig.

115su‡—Commercial Products and Their Analysis. Study of current commercial products, their composition and methods of analysis. 5 cred.; prereq., Anal. Chem. 1 and 2; lect. and lab. Mr. Barber.

117s‡—Glassblowing. Exercises in the more important operations in building chemical apparatus. 1 cred.; jr., sr., grad.; no prereq.; ar. Mr. Taylor.

120f—Crystal Analysis. Discussion of the theory and methods of crystal analysis. Crystal geometry; nature and production of X-rays; interaction of X-rays and crystals; methods of crystal analysis. 3 cred.; prereq., Phys. Chem. 103; III MWF; 215C. Mr. Klug.

121w-122s—Crystal Chemistry. Discussion of the relation between crystal structure and the chemical and physical properties of solids. The elements; alloys, solid solutions, intermetallic compounds; inorganic compounds, hydrates, ammoniates, silicates, glasses; ionic and atomic radii; the chemical bond in crystals; lattice energies; molecular rotation in crystals; fiber structure; applications to qualitative and quantitative analysis and to colloidal phenomena. 3 cred. per qtr.; prereq., 120; III MWF; 115C(w), 215C(s). Mr. Klug.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

134f-135w-136s—Seminar: Modern Problems in Inorganic Chemistry. 1 cred.; prereq., Anal. Chem. 1 and 2 and Phys. Chem. 103. Mr. Sneed.

301f,su-302w-303s—Research in Inorganic Chemistry. Cred. ar. Messrs. Sneed, Reyerson, Miss Cohen, and Messrs. Heisig, Barber, Klug, Maynard, and Taylor.

ANALYTICAL CHEMISTRY

Credits obtained in courses 144f, Applied Spectroscopy in Biology and 145w, Advanced Spectroscopy in Biology offered in the Department of Botany, are accepted for a major and a minor in analytical chemistry.

(A fee of $2 per quarter is charged for Courses 1 to 9, inclusive.)

1w,su-2s—Quantitative Analysis. Introductory courses covering the general principles and methods of quantitative analysis. Typical problems are assigned and attention given to proper laboratory practice. Course 1, Gravimetric Analysis. Course 2, Volumetric Analysis. 5 cred. per qtr.; prereq., Inorg. Chem. 13. Mr. Geiger.

Lect.	VI M; 325C	
Quiz	VI F; 410C	
Rec.	(1) VI W; 111C	(3) VII W; 111C
	(2) VIII W; 111C	
Lab.	(1, 2) any 9 hrs. on MWF afternoons	(3)w I-IV T, I-III Th, I-II S; 310C
		(3)s I-IV T, VII-IX T, I-II S; 310C

7f,s,su—Quantitative Analysis. (Premed.) Introductory courses covering the general principles and methods of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention is given to proper laboratory practice. 4 cred.; prereq., Inorg. Chem. 8, 11, 12, or 16. Messrs. Geiger and Meehan.

7f	Lect.	(1, 2) VI F; 325C	(3) VI T; 325C
	Quiz	(1, 2) VI M; 410C	
	Rec.	(1) VI W; 111C (Limit 35)	(3) VI Th; 325C
		(2) VII W; 111C (Limit 35)	
	Lab.	(1, 2) any (other) 8 hrs. on MWF afternoons; 310C	(3) VII-IX TTh, I-III or II-IV S; 310C
7s	Lect.	VI T; 325C	
	Rec.	VI Th; 325C	
	Lab.	VII-IX TTh, I-III or II-IV S; 310C	

9w—Quantitative Analysis. (Dentists, engineers, miners.) Short introductory course covering general principles of quantitative analysis, both gravimetric and volumetric. Typical problems are assigned and attention given to proper laboratory practice. 3 cred.; prereq., Inorg. Chem. 8, 11, or 16. Mr. Meehan.

Lect.	VI Th; 325C
Rec.	VI T; 325C
Lab.	VII-IX TTh; 310C

96f,su-97w-98s‡—Senior Thesis. 5 cred. per qtr.; sr. Messrs. Kolthoff, Geiger, Sandell, and Meehan.

101w-102s‡—Quantitative Analysis. General principles, methods, and procedure of quantitative analysis, both gravimetric and volumetric. Typical problems assigned and attention given to proper laboratory practice. 5 cred. per qtr.; prereq., Inorg. Chem. 13; VI-IX MWF; 325, 310C. Mr. Geiger.

103f‡—Quantitative Inorganic Microanalysis. Representative methods of micro- and semi-microgravimetric, volumetric, and colorimetric analysis. 3 cred.; prereq., 1, 2; 1 lect., 6 hrs. of lab. ar. Class limited to 16 students. Mr. Sandell.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

104s‡—Qualitative Microchemistry. Use of microscope. Technique of handling small amounts of materials, inorganic qualitative analysis by means of crystal reactions and modern spot reactions. 3 cred.; prereq., 1, 2; 1 lect., 6 hrs. of lab.; ar. Mr. Sandell.

105w‡—Polarizing Microscope. Its use and application to chemistry. Identification of substances. 3 cred.; prereq., Phys. Chem. 101. Mr. Sandell.

Lect. VI F; 215C
Lab. ar.

106f-107w-108s‡—General Technical Analysis. Analysis of commercially important materials such as iron, steel, paper, and glass, also analysis of food materials. Use of microscope in technical problems. Quantitative analysis of heterogeneous mixtures, particle size determinations. 2 or 3 cred.; prereq., 1, 2; 1 lect. and 1 lab. hr. ar. Mr. Sandell.

109f,w,s,‡§—Rock Analysis. Laboratory course covering the technique of rock analysis. 3 cred.; prereq., 1, 2; 8 lab. hrs. per week ar.; 214P. Mr. Ellestad.

122f‡—Advanced Analytical Chemistry. Condensed review of modern fundamentals of gravimetric and volumetric analysis. 1-2 cred.; 1 lect. ar.; 1 rec. ar.; 3-6 hrs. lab. ar. Mr. Geiger.

123f,su‡—Advanced Analytical Chemistry. Analysis of complex materials by modern methods. 3 cred.; prereq., 1, 2, or by permission; 1 lect. ar.; 6 hrs. of lab. ar. Mr. Meehan.

127s‡—Optical Methods in Analytical Chemistry. 2 to 3 cred.; prereq., Phys. Chem. 103; 2 lect. and lab. hrs. ar. Mr. Meehan.

131f‡—Applications of Indicators in Neutralization Reactions and $_pH$ Determinations. 3 cred.; prereq., 1, 2, and Phys. Chem. 103; VI MW; 315C; lab. hrs. ar. Mr. Kolthoff.

132w*‡—Electrometric Measurements and Titrations. Application of potentiometric and conductometric methods in analytical work. 3 cred.; prereq., 1, 2, and Phys. Chem. 103. Mr. Kolthoff.

Lect. VI MW; 315C
Lab. ar.

133s‡—Voltammetry and Amperometric Titrations. A discussion of the use of the dropping mercury electrode (polarograph) and the platinum microelectrode in pure and applied chemistry. 2 to 4 cred.; prereq., Phys. Chem. 103; 2 lect. and lab. hrs. ar. Mr. Kolthoff.

134f-135w-136s—Seminar: Modern Problems in Analytical Chemistry. 1 cred. per qtr.; prereq., 1, 2, and Phys. Chem. 103; III T; 315C. Mr. Kolthoff.

137s‡—Advanced Volumetric Analysis. 3 cred.; prereq., 131; 2 lect. and lab. hrs. ar. Mr. Kolthoff.

140w‡—Water Analysis. Analysis of potable water with interpretation of results. 2 cred.; prereq., 1, 2. Mr. Sandell.

201f-202w-203s—Selected Topics in Analytical Chemistry. 3 cred. per qtr.; prereq., 1, 2, and 123. Mr. Kolthoff.

301f,su-302w-303s—Research in Quantitative Analysis. Cred. ar. Messrs. Kolthoff, Geiger, Sandell, and Meehan.

* For permissible substitute see page 75.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

§ Registration limited. Permission of instructor must be obtained.

ORGANIC CHEMISTRY

1f,w,su-2w,s,su†‡—Elementary Organic Chemistry. (Premed., predent., pharm.) Discussion of important classes of organic compounds, both aliphatic and aromatic. Laboratory work includes the preparation of typical substances. 4 cred. per qtr.; prereq., Inorg. Chem. 11. Messrs. Koelsch and Arnold.

1f-2w Lect. I MWF; 100C
Lab. conference II T; 225C(f), 325C(w)
Quiz I T; ar
Lab. (1) VI-IX T; 390C (3) I-IV S; 390C
(2) VI-IX W; 390C

1w-2s Lect. IV MWF; 100C
Lab. conference V T; 100C, 325C, 410C
Quiz IV T; 410C, and ar
Lab. (1) VI-IX W; 390C (3) I-IV S; 390C
(2) VI-IX Th; 390C

51f*-52w*†-153s‡—Elementary Organic Chemistry. (All except premed., predent., pharm.) Discussion of the important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. Laboratory work includes the preparation of typical substances. Course 153 is a prereq. to all other advanced courses in organic chemistry. 5 cred. per qtr.; prereq., 15 cred. in chem. Messrs. Smith, Lauer, and Arnold.

Lect. III MWF; 100C
Lab. conference III S; 100C
Quiz III Th, 325C, 410C
Lab. (1) II-IV, VI-VIII T; 390C (3) VII-IX WF; 390C
(2) VI-VIII TTh; 390C

54f-55w†-156s—Elementary Organic Chemistry (without laboratory). (All except premed., predent., pharm., and chem. majors.) Discussion of the important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. General discussion of organic laboratory practice. 3 cred. per qtr.; prereq., 15 cred. chem.; III MWThF; 100C. Messrs. Smith and Lauer.

96f-97w-98s‡—Senior Thesis. 5 cred. per qtr.; sr. May be taken with any member of the Organic Chemistry Division staff.

105f-106w-107s—Advanced Organic Chemistry. Advanced descriptive course covering the field of organic chemistry, together with an introduction to the literature of organic chemistry. Lectures and outside reading. Ability to read German is assumed. 3 cred. per qtr.; prereq., 153 or equiv.; I MWF; 225C. Mr. Smith.

110f‡‡—Organic Qualitative Analysis. Reactions of typical functional groups, identification of pure organic compounds, separation and identification of constituents of mixtures. 5 cred.; prereq., 153 or equiv.; lect. IV T and 1 hr. ar.; 315C; 9 hrs. of lab. work ar. Mr. Koelsch.

130s‡—Organic Quantitative Analysis. Methods of proximate and ultimate analysis of organic compounds, with special attention to semimicro methods. 2 or 3 cred.; prereq., 153 and Anal. Chem. 1 and 2; ar. One lecture and 3 or 6 hrs. lab. work per week. Mr. Lauer.

* Students registering in M.S. 151f-152w will take their laboratory on VI-VIII Th, VII-IX F. This laboratory section is not open to any other students.

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

‡‡ A charge of $10 is made to cover special chemicals in this course.

139f,w,s‡—Advanced Organic Chemistry Laboratory Work. Selected laboratory problems of an advanced nature, including some original work. Ability to read German is assumed. Students are advised to take this course during the winter quarter. Permission of instructor is required to take it at any other time. 2 to 5 cred.; prereq., 153. Mr. Arnold.

140f—Aromatic Compounds. Discussion of the chemistry of typical aromatic compounds, including derivatives of benzene, naphthalene, anthracene, phenanthrene, and other polynuclear hydrocarbons, together with a consideration of certain heterocyclic compounds which show aromatic character. The properties of these compounds will be illustrated by example chosen from the sterols and the alkaloids. 3 cred.; prereq., 153; IV MWF; 315C. Mr. Koelsch. (Not offered in 1940-41.)

141f—Reagents in Organic Chemistry. Discussion of typical reagents used in organic reactions; their limits of applicability, methods of use, and types of substances with which they react. 3 cred.; prereq., 153; IV MWF; 315C. Mr. Koelsch.

142w-143s—The Chemistry of Natural Products. Discussion of the organic chemistry of important classes of natural products. 3 cred. per qtr.; prereq., 153; 142, I MWF; 315C; 143s, I MWF; 215C. Messrs. Lauer and Arnold. (Not offered in 1940-41.)

153s—See 51f-52w-153s.

156s—See 54f-55w-156s.

201f-202w-203s—Organic Chemistry Seminar. 1 hr. per week. 1 cred. per qtr. Required of all graduate students taking major work in organic chemistry. Messrs. Smith, Koelsch, Lauer, and Arnold.

205f-206w—Theoretical Organic Chemistry. Structure, reaction mechanisms, relation of physical properties to constitution, and other topics of a theoretical nature. 3 cred. per qtr.; prereq. 107; I MWF; 315C. Mr. Lauer.

212s—Physico-Organic Chemistry. Contributions made to organic chemistry by kinetic and equilibrium studies of organic reactions, including mechanisms of catalytic and ionotropic reactions; and an introduction to the current electronic formulations of organic reactions. Lectures, outside reading, and a term paper are required. 4 cred.; prereq., 107, Phys. Chem. 103, and calc., or permission of instructor; I MWF; 215C. Mr. Arnold.

301f-302w-303s—Research in Organic Chemistry. Cred. ar.; prereq., 110. Messrs. Smith, Lauer, Koelsch, and Arnold.

PHYSICAL CHEMISTRY

96f-97w-98s‡—Senior Thesis. 5 cred per qtr.; ar.

101f-102w-103s*—Physical Chemistry. General survey of the subject. 3 cred. per qtr.; prereq., two years of college chem., one year of college phys. Knowledge of calculus is advisable. Messrs. MacDougall, Livingston, and Hull.

Lect. IV MWF; 325C
Rec. (1-4) IV S; 325C, 410C, 166Ph, 315M(f)

104f-105w-106s*‡—Physical Chemistry Laboratory. 1 or 2 cred. per qtr. To accompany or follow 101-102-103. Messrs. Livingston and Hull.

* Physical Chemistry 101-102-103, 104-105-106, 107-108, 141-142 will be acceptable in partial or complete fulfillment of the course requirements for a minor in physical chemistry, for students who are not majoring in chemistry.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

Lab. conf. (for students registered for 2 cred.)
(1) VI W; 410C
(2) VI T; 410C
Lab. (1) VI-VIII M, VII-VIII W; 190C (3) VI-VIII F; 190C
(2) VII-VIII T, VI-VIII Th; 190C

107f,su-108w,su*‡—Elementary Physical Chemistry (Premed.) 4 cred. per qtr.; prereq., two years of college chem., one year of college phys. Messrs. ——— and Hull.
Lect. III MWF; 225C
Rec. VIII T; ar.
Lab. (1) I-III T; 190C
(2) I-III Th; 190C

113f—Fundamentals of Reaction Kinetics. Order of reaction, collision theory, activation, chain reactions especially in gaseous systems. 3 cred.; prereq., 103. Mr. Livingston.

114w—Kinetics of Reactions in Liquid Solutions and in Heterogeneous Systems. Effect of solvents and electrolytes on reaction velocity. Homogeneous and heterogeneous catalysis. 3 cred.; prereq., 113. Mr. Livingston.

116f—Advanced Physical Chemistry. Modern theory of the atom and the molecule on the principles of wave mechanics with an introduction based on Bohr theory. 3 cred.; prereq., 103 and calculus; II TThS; 215C.

117w—Advanced Physical Chemistry. Application of thermodynamics to chemical problems, free energy calculations by classical methods and by the use of spectroscopic data. (3 cred.; prereq., 103 and calculus; II TThS; 215C.

118s—Advanced Physical Chemistry. Physical chemistry of the solid state on the basis of modern concepts. 3 cred.; prereq., 103 and calculus; II TThS; 215C.

128f-129w-130s—Colloid Chemistry. General survey of surface chemistry, adsorption, catalysis, electrokinetic phenomena, lyophilic and lyophobic colloids. 2 cred. per qtr.; prereq., 103. Mr. Reyerson.

131f-132w-133s‡—Colloid Chemistry Laboratory. Cred. and hrs. ar. Must be preceded or accompanied by 128, 129, or 130. Mr. Reyerson.

141su-142su*—Special Topics in Physical Chemistry. 2 cred., acceptable towards minor for students not majoring in chemistry; prereq., two years of college chem., one year of college phys.; lect. ar. Mr. Livingston.

161f-162w—Nuclear Chemistry and Radioactivity. The properties of atomic nuclei; radioactive disintegration; properties of radioactive elements and of their radiations; transmutation and artificial radioactivity; modern theories of nuclear structure. 3 cred. per qtr.; prereq., 103; IV MWF; 115C. Mr. Hull.

175s—Photochemistry. General survey, including a discussion of spectroscopy, with particular reference to the visible and ultraviolet absorption spectra of molecular gases. 3 cred.; prereq., 103 and Phys. 9. Mr. Livingston.

180f—General Survey of Colloid Chemistry. 3 cred.; prereq., 103; IV MWF; 215C. Mr. Freundlich.

181w—Colloids in Industry. 3 cred.; prereq., 180 or 128-129; IV MWF; 215C. Mr. Freundlich.

182s—Colloids in Biology and Medicine. 3 cred.; prereq., 180; IV MWF; 215C. Mr. Freundlich.

* Physical Chemistry 101-102-103, 104-105-106, 107-108, 141-142 will be acceptable in partial or complete fulfillment of the course requirements for a minor in physical chemistry, for students who are not majoring in chemistry.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

201f-202w-203s—Thermodynamics and Chemistry. A detailed study of the principles of thermodynamics and their application to physical and chemical phenomena. 4 cred. per qtr.; prereq., 103 and calculus. (Not offered in 1940-41.)

204f-205w-206s—Kinetic Theory and Atomistics. Kinetic theory of gases and liquids, crystal structure of atom, quantum theory. 4 cred. per qtr.; prereq., 103 and calculus; II MWF; 215C. Mr. MacDougall.

207s—Modern Theories of Acidity and Basicity. 2 cred.; prereq., 103; ar. Mr. Kolthoff.

211f-212w-213s—Advanced Physical Chemistry Laboratory. To accompany or follow any of the advanced courses in physical chemistry. Cred. ar.; prereq., 103. Mr. MacDougall and staff.

221f-222w-223s—Colloid Seminar. 1 cred. per qtr. Messrs. Freundlich and Reyerson.

251f-252w-253s—Physical Chemistry Seminar. For students taking advanced courses in physical chemistry. 1 cred. per qtr.; IV T; 215C. Mr. MacDougall and staff.

264f,w,s—Radioactivity Laboratory. Use and standardization of electroscopes, radioactive measurements, and quantitative determination of radium in ores, minerals, waters, and plant products. 1 or 2 cred. Must be preceded or accompanied by 161. Mr. Hull.

301f,su-302w-303s—Research in Physical Chemistry, including work in electrochemistry, photo- and radio-chemistry, colloids, and crystal structure. Cred. ar. Messrs. MacDougall, Freundlich, Kolthoff, Lind, Reyerson, Livingston, Klug, and Hull.

CHEMICAL ENGINEERING

1w‡—Power Plant Chemistry. (M.E. and Min.E.) Proximate analysis of coal, determination of calorific power; technical analysis of flue gases and furnace gases. 3 cred.; prereq., Inorg. Chem. 16. Mr. Stoppel.

1w Lect. III T; 215C
Rec. III Th; 215C
Lab. II-IV MF; 10C

31s—Chemistry of Engineering Materials. Application of general chemistry in engineering practice. Technology and properties of wood, alloys, fuels, water, cements, coating materials, plastics, etc. 3 cred.; prereq., Inorg. Chem. 16; IV MWF; 115C. (Not open to chem. engrs.) Mr. Montonna.

76f-77w‡—Applied Electrochemistry. Application of the electric current to chemical processes. Laws and phenomena of electrochemistry, batteries, electroplating, electric furnace construction and operation, and electrochemical products. Engineers with one year of chem. and one year of phys. 3 cred. per qtr. Messrs. Montillon and Grove.

Lect. III TTh; 111C
Lab. VI-IX W

80s—Chemical Engineering Materials. The technology, physical and chemical properties, and economic considerations of materials used in the construction of chemical engineering equipment and plants. Ferrous and nonferrous metals and alloys; woods, cements, ceramic, and plastic materials; textiles; rubber; protective materials, etc. 1 cred.; prereq., Inorg. Chem. 13; II TS; 225C. Mr. Piret.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

96f-97w-98s‡—Senior Thesis. 5 cred. per qtr.; ar.

101f—Unit Operations. Unit operations, and materials of construction, performance, and uses of equipment. Crushing, grinding, size separation, fluid flow, and problems in chemical stoichiometry. Lectures and recitations. 3 cred.; prereq., 80, Anal. Chem. 1, 2. Messrs. Mann, Rogers, Stoppel, Grove, and Piret.

Lect. I TS; 325C
Rec. (1) I MTh; 115C
(2) I MTh; 111C
(3) II WS; 315C
(4) II WS; 111C

102w‡—Unit Operations. Continuation of 101f with discussions on filtration, heat transfer, evaporation, humidification, and air conditioning and drying. Their applications including economic balance and the solution of problems. Lectures, recitations, and laboratory. 6 cred.; prereq., 101. Messrs. Mann, Rogers, Stoppel, Grove, and Piret.

Lect. I TS; 325C
Rec. (1) I MWThF; 111C
(2) I MWThF; 115C
(3) I MTWThF; 315C
(4) I MWF; 410C, I Th; 410bC
Lab. (1) VI-IX M; 90C
(2) VI-IX T; 90C
(3) VI-IX W; 90C
(4) VI-IX Th; 90C
(5) VI-IX F; 90C

103s‡—Unit Operations. Continuation of 101 and 102. Discussions and problems on distillation, absorption, extraction, and crystallization. Lectures, recitations, and laboratory. 6 cred.; prereq., 102. Messrs. Mann, Rogers, Stoppel, Grove, and Piret.

Lect. I ThS; 325C
Rec. (1) I MTWF; 115C
(2) I MTWF; 315C
(3) I MTWF; 410C
(4) I MTWF; 111C
Lab. (1) VI-IX M; 90C
(2) VI-IX T; 90C
(3) VI-IX W; 90C
(4) VI-IX Th; 90C
(5) VI-IX F; 90C

105f*‡—Fuels and Combustion. The technology of solid liquid and gaseous fuels, analysis, combustion characteristics, calculation of heat and material balance, specific uses, and furnaces. Lectures, recitations, laboratory. 4 cred.; prereq., Anal. Chem. 1, 2. Messrs. Rogers, Stoppel, Grove, and Piret.

Lect. I WF; 410C
Rec. (1) II W; 115C; II S; 325C
(2) II W; 410C; II S; 225C
(3) I M; 410C; I Th; 315C
(4) I MTh; 410bC
Lab. (1) VI-IX M; 10, 90C
(2) VI-IX T; 10, 90C
(3) VI-IX W; 10, 90C
(4) VI-IX Th; 10, 90C
(5) VI-IX F; 10, 90C

106f‡—Petroleum and Petroleum Products. Technology and testing of petroleum products, principally gasoline, lubricating oils, and fuel oils. Lectures and laboratory. 3 cred.; prereq., Org. Chem. 51. Mr. Stoppel.

Lect. III MWF; 325C
Lab. VI-IX F; 10C

107w—Petroleum Refinery Engineering. Unit operations and chemical engineering design principles and calculations involved in the manufacture of the principal petroleum products. Lectures and recitations. 3 cred.; prereq., 103 or permission of instructor; III MWF; 215C. Mr. Rogers.

108w—Unit Operations Problems. Advanced problems in distillation, absorption, extraction, crystallization. Discussion and equipment used. 3 cred.; prereq., 103. (Not offered in 1940-41.)

* Each laboratory section is limited to 16 students.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

109s—Unit Operations Problems. Advanced problems in unit operations and economic balance. Lectures and recitations. 3 cred.; prereq., 103; III MWF; 111C. Mr. Rogers.

110s‡—Special Analytical Apparatus. The use of special apparatus for chemical and physical testing of chemical products including gas apparatus, calorimeters for gases, liquids and solids, optical apparatus, viscosimeters, turbidimeters, etc. Lectures and laboratory. 3 cred.; prereq., Anal. Chem. 1, 2. Mr. Stoppel.
Lect. II Th; 315C
Lab. VI-VIII MW; 10C

111f-112w-113s—Chemical Engineering Plant Design. Planning of plants and design of equipment based on collected data for the same. Classroom and drawing room work. 2 cred. per qtr.; prereq., 104; VI-IX T and 2 hrs. ar. Messrs. Montillon and Piret.

117w-118s—Chemical Engineering Equipment Design. Fundamental principles in the design of simple chemical engineering equipment. Recitation and drawing room. 3 cred.; prereq., 103. Messrs. Montillon and Grove.
Rec. II MWF; 325(w); II MWTh; 410C(s)
Dr.R. (1) VI-IX T; 410bC (2) VI-IX Th; 443C

120f—Chemical Engineering Thermodynamics. A study of the principles of the three fundamental laws of energy as applied to chemical engineering problems. Lectures and recitations. 3 cred.; prereq., 103; III MWF; 315C. Mr. Grove.

121f—Chemical Engineering Economics. The economic and business considerations controlling chemical engineering industries. Statistical analysis of these industries. Raw and finished products. Principles of plant location, layout, and design. Unit operation costs. Principles of management, operation, and control. Lectures. 3 cred.; prereq., 131; II MWF; 225C. Mr. Montonna.

131s—Industrial Inorganic Chemistry. Applications of unit operations common to chemical industries, chemistry involved, equipment used, marketing of products, utilization of by-products, use of trade journals. Topics: industrial water, acids and alkalies, salts, chlorine, ammonia, glass, pigments, etc. Lectures and recitations. 4 cred.; prereq., (for chem. engrs.) 102; (for chem.) Anal. Chem. 1, 2; II MTWFS; 325C. Mr. Mann.

132f—Industrial Organic Chemistry. Similar to 131 but covering organic field. Destructive distillation of coal and wood, petroleum oils, paper, organic processes, synthetic products, vegetable and animal oils, fats, waxes, soap, sugar, starch, etc. 3 cred.; prereq., (for chem. engrs.) 103 and 131; (for chem.) Org. Chem. 52; I MWThF, IV S; 325C. Mr. Mann.

133f—Chemistry of Explosives. History and technology of modern explosives, their manufacture and uses, war gases. Lectures, required reading, and reports. 3 cred.; prereq., Org. Chem. 153. (Not offered in 1940-41.)

134f—Intermediates and Dyestuffs. Their technical chemistry and manufacture. Processes, purification, uses, etc. Lectures and recitations. 3 cred.; prereq., Org. Chem. 153; (may be accompanied by laboratory work in 160) I MWF; 215C. Mr. Montonna.

136w—Chemistry and Technology of Cellulose. Processes and industries based on the use of cellulosic materials including the chemical and technological considerations. Pulp and paper, plastics, esters, rayon, etc. 3 cred.; prereq., Org. Chem 153; I MWF; 215C. Mr. Montonna.

‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

140s—Sanitary Chemistry. Discussion of the chemistry of sewage and potable waters. Purification of water supplies, and the treatment of municipal and industrial wastes. Lectures and recitations. 3 cred.; ar.; prereq., jr., sr. Mr. Stoppel.

141s—Gas Manufacture and Distribution. Fundamental principles of manufacture, purification, and distribution of coal gas, carbureted water gas, and other industrial fuel gases, and the equipment for manufacture. Problems and reports on recent developments. 3 cred. Open to junior and senior chemists and chemical engineers; others by permission. Mr. Montillon.

151f,su*‡—Chemical Manufacture (Inorganic.) Manufacture of technical products on a scale large enough to afford data for the determination of operating conditions and costs of manufacture. Use of semi-plant scale equipment. Technical trade journals used. Laboratory. 3 or more cred.; prereq., 103, 131. Messrs. Montonna and Grove.

152w,su*‡—Chemical Manufacture (Organic). Similar to 151 but covering the unit organic processes. Laboratory. 3 or more cred.; prereq., 103, 131. Messrs. Montonna and Grove.

153f-154w-155s-156su‡—Special Laboratory Problems. Investigations on chemical engineering equipment and its use in the manufacture of special chemical products on a semi-works scale. 3 or more cred. per qtr. Messrs. Montonna and Grove.

160f‡—Intermediates and Dyestuffs Laboratory. Manufacture of intermediates and dyestuffs using semi-works equipment. Operations on sulphonation, hydroxylation, nitration, reduction, alkylation, diazotization, coupling, etc. Laboratory. 3 or more cred.; prereq., 131, 152 and preceded or accompanied by 134. Mr. Montonna.

165f,w‡—Fuel and Gas Analysis. (For engineers—except chemical.) Chemical analysis of solid and gaseous fuels with determination of calorific values and an interpretation of results. 3 cred.; prereq., analytical chemistry. Mr. Stoppel.

165f Lect. I T; 111C
Rec. IV F; 111C
Lab. VI-IX M
165w Lect. II T; 111C
Rec. II Th; 111C
Lab. VI-IX M

168f‡—Petroleum and Petroleum Products. (Miners.) Technology and testing of petroleum and petroleum products. 3 cred.; prereq., Anal. Chem. 9. Mr. Stoppel.

Lect. III MWF; 325C
Lab. VI-IX F; 10C

176f-177w‡—Applied Electrochemistry. Application of the electric current to chemical processes. Laws and phenomena of electrochemistry, batteries, electroplating, electric furnace construction and operation, and electrochemical products. 4 cred. per qtr.; prereq., Phys. Chem. 103, or taken simultaneously. Messrs. Montillon and Grove.

Lect. III MWF; 115C
Lab. VI-IX Th or F; 25C

179s‡—Applied Electro-Organic Chemistry. Theory and practice of the electrochemistry of organic compounds. Lect. and rec., 3 cred.; lab. 1 or 2 cred. optional; prereq., 176-177; III MWF; 115C. Mr. Mann.

* Required for chemical engineers during Summer Session.
‡ This course carries a laboratory fee of $2 per quarter for undergraduate students.

187s—Inspection Trip. Various industrial plants in the Middle West are visited by the class on a trip which lasts about ten days, during the spring vacation period. Written reports covering the plants must be submitted. Required of seniors in chemical engineering. 2 cred.; prereq., 131, 132. Mr. Mann.

201f-202w-203s—Seminar. Presentation and discussion of papers concerning the newer developments in chemical engineering. 1 cred. per qtr.; IV W; 111C. Mr. Mann.

205f-206w-207s—Advanced Problems in Unit Operations. A study of new developments in the unit operations. Theory and practical applications to equipment and plant process design including economic balance problems. 2 cred. per qtr.; prereq., 103. Open to graduate students only. I TTh; 215C. Mr. Montillon.

208f-209w-210s—Advanced Chemical Engineering. An extended study of the principles of chemical engineering and their applications to industrial problems, together with surveys of the literature. 2 cred. per qtr.; prereq., 104. Open to graduate students only. (Not offered in 1940-41.)

301f,su-302w-303s—Research in Chemical Engineering. Unit operations, applied electrochemistry and electric furnace work, and chemical manufacture. Cred. ar. Messrs. Mann, Montillon, Montonna, Rogers, and Stoppel.

CIVIL ENGINEERING

SURVEYING

11f—Surveying. Lectures and field problems; use of steel tape and transit. Computation and platting of field notes, determination of areas. 3 cred.; prereq., M.&M. 12, Dr. 2. Mr. Boon.

Lect. (1) III Th; 21E (2) I Th; 21E
Lab. (1) VI-IX M, VI-VIII Th; 1E (3) I-III T, VI-IX T; 1E
(2) VI-IX F, I-III S; 1E

12w—Surveying. Lectures and drafting room. Platting of profiles and mass diagrams, computation of earthwork volume and overhaul. Public land survey. Mapping and conventional signs. 3 cred.; prereq., 11. Messrs. Cutler, Zelner, and Boon.

Lect. (1) III Th; 21E (2) I Th; 21E
Lab. (1) VI-IX M, VI-VIII Th; 217E (3) I-III, VI-IX T; 217E
(2) VI-IX F, I-III S; 217E

13s—Surveying. Lectures and field problems; differential and profile leveling; cross-sections, circular curves, and adjustment of instruments. 3 cred.; prereq., 12. Messrs. Cutler and Boon.

Lect. (1) I Th; 21E (2) III Th; 21E
Lab. (1) I-IV T, 21E; I-III S, 7E (3) II-IV T, I-IV S; 21E
(2) VII-IX M, VI-IX W; 21E

14f—Surveying. Complete topographical survey, stadia method, is made and platted. 3 cred.; prereq., 13. Mr. Zelner.

(1) VI-IX WTh; 21, 217E (3) VI-IX TF; 21, 217E
(2) VI-IX M, I-IV S; 217E

15w—Surveying. Purpose and theory of triangulation, meridian determination, base line measurements, computations. Theory and use of the sextant. Hydrographic surveying. Aerial mapping. Applied problems. 2 cred.; prereq., 14. Mr. Zelner.

(1) II-III T, I W, III F; 21E (2) II MWThF; 21E

16s—Surveying. Classroom and field. Field problems with the sextant. Triangulation reading and computations. Plane table theory. Various field solu-

tions of the "three point" problem. Plane table survey based on triangulation control. Topographic map. 2 cred.; prereq., 15. Mr. Zelner.

(1) VI-IX M, II-III S; 21E (2) I-IV T; 5E; II-III F; 21E

17f,s—Surveying. Short course including problems in chaining, transit and tape surveys; differential, trigonometric and profile leveling, computations and platting of notes, etc. Open to students other than civil engineers. 3 cred.; prereq., M.&M. 12. Messrs. Cutler, Zelner, and Boon.

17f I-IV MW; 217E
17s (1) VI-IX ThF; 21E (3) VI-IX TW; 21E
(2) I-IV MW; 21E (4) I-IV M, 217E; I-IV F, 21E

23su—Summer Camp. Six weeks immediately preceding the beginning of the senior year. Extended railroad, topographic, hydrographic, and triangulation surveys. 9 cred.; prereq., 16, 22. Fee, $25 tuition, $1 health fee, total $26. Messrs. Cutler, Zelner, and Boon.

109w,s—Cadastral Surveying. Study of the newer methods of accurate surveys of property with geodetic control and with co-ordinates of property monuments. 2 cred.; prereq., 16. Mr. Boon.

109w I M, 106E; I F, 136E
109s V MF; 206E

110f,w—Errors in Surveying. Study of the sources, importance, and reduction of errors in surveying. 2 cred.; prereq., 23. Mr. Boon.

110f IV TS; 7E
110w IV MF; ar.

111w,s—Methods of Computation. Study of the methods used in various problems in precise and geodetic surveys and distribution of errors. 2 cred.; prereq., 110; ar. Mr. Boon.

RAILWAY ENGINEERING

21w—Railway Engineering. General survey of the problems of railway location, including grades, curvature, rise and fall, etc. 2 cred.; prereq., 13. Mr. Boon.

Lect. III W; 227E
Lab. (1) I-IV S; 229E (3) VI-IX W; 229E
(2) I-IV T; 229E

22s—Railway Engineering. Study of the construction and maintenance of railway track and structures. Simple, compound, and spiral curves, and turnouts. 2 cred.; prereq., 21. Messrs. Cutler and Boon.

Lect. II Th; 227E
Lab. (1) VII-IX F; 229E (2) VI-VIII Th; 229E

121f—Railway Engineering. Train resistance, ruling and momentum grades, curvature, distance, rise and fall as factors in location and operation of railroads. Train loading, acceleration, retardation; locomotives and equipment. Operating costs governing grade revision. 3 cred.; prereq., 22. Mr. Cutler.

Lect. II F; 227E
Lab. (1) VII-IX WTh; 229E (2) I-III TTh; 229E

122w—Railway Engineering. Lectures, office work, and field inspection. Design and operation of various types of yards and terminals, and terminal facilities, including the hump, engine house, coal and water station. Signaling and interlocking. 3 cred.; prereq., 22. Mr. Cutler.

123s—Railway Engineering. Design and construction of railroad buildings and structures; culverts, wooden trestles, switches, cross-overs, crossing frogs, etc. Earthwork computation, estimates and reports. Distribution of material by mass diagram. 3 cred.; prereq., 22. Mr. Cutler.

124w—Transportation. Development of railway and inland waterway transport, railway regulation and control with special reference to the 1920 Railway Transportation Act, geographical, financial, and rate grouping of railways. Interstate Commerce Commission method of accounting, cost and value of service, present systems, and organization. 3 cred.; prereq., 22; II MWF; 227E. Mr. Cutler.

125s—Transportation. Specific illustrative problems: Twin City and Mississippi Valley traffic situation, Mississippi River experiment, New York Barge Canal, Great Lakes traffic, Panama Canal status. 3 cred.; prereq., 121. Mr. Cutler.

221f-222w-223s—Railway Administration. Analysis of railway organization and methods of management and operation. Special problems. 3 cred. per qtr.; prereq., 122. Mr. Cutler.

224f—Railway Terminals and Yards. Continuation of Course 123. 3 cred.; prereq., 122. Mr. Cutler.

STRUCTURAL ENGINEERING

31f—Stresses in Structures. Algebraic and graphic analysis of various types of bridge trusses for fixed and moving loads. 2 cred.; prereq., M.&M. 26. Mr. Wise.

Lect. I TTh; 107E
Lab. (1) VIII-IX M; 229E (2) VI-VII F; 229E

32w—Stresses in Structures. Analysis of simple span bridge trusses. Standard engine loadings and equivalent uniform loads. 3 cred.; prereq., 31. Mr. Wise.

Lect. III M, VI F; 227E
Lab. (1) II-III Th; 229E (2) VI-VII T; 229E

33s—Elementary Structural Design. Designing principles and methods. Complete designs and detail drawings of typical simple structures. 4 cred.; prereq., 32, M.&M. 128, Dr. 23. Mr. Wise.

Lect. II M, III Th; 227E
Lab. (1) VI-VIII TW; 229E (2) VI-VIII M, II-IV S; 229E

37s—Structural Engineering. (Ag.E., M.E., E.E.) Analysis of stresses in simple structural frames. Design of roof trusses, crane girders, mill building bent. 3 cred.; prereq., M.&M. 26 or 84. Mr. Andersen.

Lect. VI MT; 227E
Lab. VI-IX Th; 217E

38f-39w-41s—Structural Analysis and Design. (Arch.) Analysis and design of structures of steel, timber, and reinforced concrete. 3 cred.; prereq., M.&M. 26, 84, or 93; I MWF; 201Ex(f), 320E(w,s). Mr. Andersen.

131w-132s—Bridge Analysis and Design. Stresses in cantilevers, arches, and continuous bridges. Design and detail of typical bridge structure. 2 cred. per qtr.; prereq., 134. Mr. Wise.

131w VI Th, 227E; VII-IX Th, 225E
132s II W, 227E; VII-IX Th, 225E

134f—Statically Indeterminate Structures. Theory of deflections and statically indeterminate stresses and their application to continuous girders, frames, swing bridges, and redundant members. 3 cred.; prereq., 33, M.&M. 128. Mr. C. A. Hughes.

Lect. VI TF; 227E
Lab. VIII-IX M; 225, 227E

135w—Advanced Structural Design. Analysis of structures as rigid frames. Wind stress analysis. Effect of temperature, and settlement of foundations. Applications to steel and concrete frames. 3 cred.; prereq., 134. Mr. Andersen.

137w,s—Structural Laboratory. Theoretical and experimental analysis of structural members and models. 2 cred.; prereq., 134, 141. (Limited to 15 students each section.) Mr. C. A. Hughes.

137w	Lect. VI F; 201Ex	
	Lab. (1) VII-IX W; Ex	(2) VII-IX F; Ex
137s	Lect. II M; 215Ex	
	Lab. (1) VII-IX M; Ex	(2) I-III S; Ex

141w—Reinforced Concrete. Principles of reinforced concrete. Theory of beams, slabs, and columns and the application to ordinary structures. 3 cred.; prereq., 134; VI M, III F, 227E; VI-VII T, 225, 227E. Mr. C. A. Hughes.

142s—Reinforced Concrete Design. Continuation of 141 with special emphasis on the practical features of the design of buildings, bridges, retaining walls, etc. 3 cred.; prereq., 141; IV T, II F, 227E; VI-VII W, 225E. Mr. C. A. Hughes.

143s—Reinforced Concrete Arches. Analysis and design of reinforced concrete arches and rigid frame bridges. 3 cred.; prereq., 134, 142. Mr. C. A. Hughes.

146f,s—Plain Concrete. Theory of design and control of concrete mixtures. Practice in control tests of concrete and concrete materials. Lectures and laboratory work. 3 cred.; prereq., M.&M. 141. Mr. Andersen.

146f	Lect. IV MW; 215Ex	Lab. VI-IX W; Ex
146s	Lect. I TTh; 227E	Lab. VI-IX F; Ex

147w—Foundations. Design and construction of footings, cofferdams, and caissons for bridges and buildings. Piers and abutments. Underpinning of buildings. Exploration and testing of foundation sites. Excavation and removal of materials from foundation site. 2 cred.; prereq., 33, 141, M.&M. 128; III TS; 227E. Mr. Andersen.

148f-149w-150s—Advanced Concrete. Short research problems in concrete. 2 cred. per qtr.; prereq., 146; ar. Mr. C. A. Hughes.

180f-181w-182s—Advanced Structural Laboratory. Special problems. 3 to 5 cred. per qtr.; prereq., 137. Mr. C. A. Hughes.

234f-235w—Advanced Theory of Structures. Application of the theory of indeterminate stresses to the more complex problems of structural analysis. Continuous and swing bridges, simple and multiple arch and suspension systems, wind stresses in tall building frames, secondary stresses. 3 to 5 cred. per qtr.; prereq., 132, 142. Mr. Wise.

236s—Advanced Structural Design. Effect of shrinkage and plastic flow. Eccentrically loaded concrete sections. Nonsymmetrical bending. Lateral earth pressure theories. Design of sheet piling, bearing piles, and cofferdams. 3 to 5 cred.; prereq., 134, 147; IX T, IV S; 206E. Mr. Andersen.

245f-246w-247s—Seminar. Special topics in the higher theory of structures. 3 to 6 cred. per qtr.; prereq., 134, 142. Messrs. C. A. Hughes, Wise, and Andersen.

HIGHWAY ENGINEERING

51f-52w—Highways and Pavements. Elementary course with field inspection, relating to the economics, location, construction, and maintenance of highways and pavements. 3 cred. per qtr.; prereq., 12. (Laboratory sections limited to 12 students.) Mr. Lang.

51f	Lect. (1) VI MTh; 215Ex	(3) VII M, IV S; 215Ex
	(2) VI TW; 215Ex	
	Lab. (1) II-IV T; 210Ex	(4) VII-IX W; 210Ex
	(2) VII-IX F; 210Ex	(5) VII-IX Th; 210Ex
	(3) VII-IX T; 210Ex	(6) I-III S; 210Ex

52w Lect. VII F; 110Ex
Rec. (1) II F; 215Ex (3) III F; 215Ex
(2) III Th; 215Ex
Lab. (1) VI-IX T; 210Ex (4) I-IV S; 210Ex
(2) VI-IX Th; 210Ex (5) VI-IX M; 210Ex
(3) VI-IX W; 210Ex (6) I-IV T; 210Ex

55f—Public Highways. Historical development, administration and legislation pertaining to highways, also general economic problems of highway improvements. 3 cred.; no prereq.; I MWF; 215Ex. Mr. Lang.

151f,s—Highway Laboratory. Investigation in co-operation with State Highway Department. 3 to 5 cred.; prereq., 52. Mr. Lang.

152s—Highway Design. Preparing of a plan and specifications for short sections of highways and city streets, also making estimates of materials and cost. 3 to 5 cred.; prereq., 52. Mr. Lang.

153w,s—Engineering Properties of Soils. Origin and composition, characteristics, structural properties, and practical design and construction. 3 cred.; prereq., jr. or sr. Mr. Lang.

154w,s—Soils Laboratory. Laboratory study of properties of soils which pertain to their stability. 1 cred.; prereq., jr. or sr.; ar. Mr. Lang.

155s—Field Soil Studies. Soil classification and mapping, analysis of soil conditions where road failures have occurred. 2 cred.; prereq., 52. Mr. Kersten.

156w—Highway Transport. Development, economic field, relation to other forms of transportation. Highway transport surveys, economics of location, economics of selection of type of surface, effect of vehicle on road and road on vehicle. 3 cred.; prereq., 51; I MWF; 215Ex. Mr. Lang.

HYDRAULIC ENGINEERING

161f—Power. Elementary hydrology; precipitation, evaporation, transportation, runoff, storage and lake levels, types of water power development; dams, waterways, penstock, turbines, and accessory equipment. 4 cred.; prereq., M.&M. 129. Mr. Bass.
Lect. II MW; 227E
Lab. (1) I-III TTh; 225E (2) VII-IX TTh; 229E

164f—Water Conservation. Weather variations and cycles, variable stream flow and water levels with respect to control in problems of public water supply, sewage disposal, water power, navigation, floods, and low water. National and state water conservation policies with discussion of typical problems. 3 cred.; prereq., M.&M. 129. Mr. Bass.

263s—Hydraulic Engineering Problems. Special hydraulic problems in laboratory, drafting room, and field. 3 to 5 cred.; prereq., 164.

MUNICIPAL AND SANITARY ENGINEERING

162w-163s—Water Supply and Sewerage. Sources of water supply; quality of water. Methods of testing, collection, distribution, and purification of water. Selection of pumping machinery and motive power. Sewer systems and sewage disposal works. 3 cred. per qtr.; prereq., 161, M.&M. 129. Mr. Bass.
162w Lect. IV TS; 136E Lab. VII-VIII M, VIII-IX T; 225E
163s Lect. II T, IV F; 227E Lab. VI-VIII T, II-III Th; 225E

165s—Public Health Engineering. Sanitary problems associated with the location, construction, and operation of water supplies, purification works, and distribution systems, with the treatment and disposal of sewage, excreta, and waste,

and with the production, pasteurization, and distribution of milk. Public health engineering methods as applied to sanitary problems in urban and rural communities including schools, institutions, camps, bathing places, dwellings, etc. Lectures, field and laboratory demonstrations. 3 cred.; prereq., P.M.&P.H. 53. Messrs. Whittaker, Pierce, associates, and guest lecturers.

167—Industrial Hygiene Engineering. Field and laboratory methods used by the industrial hygiene engineer in the study and control of occupational health hazards. Lectures, field and laboratory demonstrations. 3 cred.; open to sr. Mr. Pierce.

171w—Building Sanitation. Location and orientation of buildings; lighting, ventilation, water supply, plumbing, sewerage, and refuse disposal. 2 cred.; prereq., sr. arch. only; II TTh; 227E. Messrs. Bass and Martenis.

261f-262w—Water and Sewage Purification. Design of water purification and sewage disposal works. 3 to 5 cred. per qtr.; prereq., 163. Mr. Bass.

GENERAL

53s—Civil Engineering Practice. Greater problems of engineering. Interrelations of various branches of engineering in practice. Legal, financial, and business functions of the engineer. Relations of the engineer to government and public affairs. 3 cred.; open to jr. and sr. Mr. Bass.

Lect. III MW; 227E
Rec. (1) III F; 227E (2) VI F; 227E

172s—City Planning. Physical elements of the city; topography, drainage, geology. Public works and structures. Internal and external transportation. Zoning. Subsurface structures. Esthetic features of the city. 3 to 5 cred.; prereq., 52; I MWF; 7E. Messrs. Bass and R. C. Jones.

280f-281w-282s—Civil Engineering Research. Original work in concrete, structural steel, hydraulics, municipal or transportation problems. Investigations, reports, tests, designs. 5 cred. per qtr.; by permission. Messrs. Bass, Cutler, Lang, and Wise.

DAIRY HUSBANDRY

52s—The Dairy Industry. Composition of milk; milk constituents and their uses in dairy manufacturing and as food; Babcock test; sanitary handling of milk and dairy products on the farm and in the plant; breeds of dairy cattle, housing and management. (Offered in alternate years, 1941-42, etc. Alternate with Fundamentals of Livestock Production.) (3 cred.; no prereq.; I TThS; 210HH(UF). (For agr. eng. only.) Messrs. Fitch, Combs, and Macy.

DRAWING AND DESCRIPTIVE GEOMETRY

1f,w,su-2w,s,su—Engineering Drawing. Elements of drafting including an introductory course in methods of representation, and constructive geometry. Graphs and formulas. Sketching, lettering, working drawings, conventions, standards, tracing, and blueprinting. 3 cred. per qtr.; prereq., solid geometry. Messrs. Potter, Schuck, Williams, Cruzen, Quaid, and von Eschen.

1f (1) VI-VII MWThF; 455C
(2) VI-VII MWThF; 443C
(3) VI-VII MWThF; 445C
(4) VIII-IX MW, VI-VII T, I-II F; 201E
(5) VIII-IX MW, VI-VII T, I-II F; 445C
(6) I-II MTWS; 101E
(7) I-II MTWS; 417C
(8) I-II MTWS; 443C
(9) III-IV MWF, I-II Th; 443C
(10) III-IV MWF, I-II Th; 415C

1w (1) VI-VII MTWF; 415C
(2) VI-VII MTWF; 417C
(3) VIII-IX MWF, VI-VII Th; 1E
(4) I-II MWThS; 455C
(5) III-IV MF, I-II TS; 417C

2w (1) VI-VII MTWF; 1E
(2) VI-VII MTWF; 445C
(3) VI-VII MTWF; 455C
(4) VIII-IX MWF, VI-VII Th; 417C
(5) VIII-IX MWF, VI-VII Th; 445C
(6) VIII-IX MWF, VI-VII Th; 455C
(7) I-II MWThS; 443C
(8) I-II MWThS; 101E
(9) III-IV MF, I-II TS; 445C
(10) III-IV MF, I-II TS; 1E

2s (1) VI-VII MWF, VIII-IX Th; 455C
(2) VI-VII MWF, VIII-IX Th; 417C
(3) VI-VII MTWF; 415C
(4) I-II MWThS; 445C
(5) I-II MWThS; 417C

3f,s,su—Descriptive Geometry. Elementary course in the methods of representation, correlated in part with analytical geometry. Graphical and algebraic solutions. Lectures, demonstrations, and drafting. 3 cred.; prereq., 2, M.&M. 11.

3f (1) VI-VII MTWTh; 101E
(2) VI-VII MTWTh; 415C
(3) VIII-IX MWF, III-IV S; 101E

3s (1) VI-VII MWF, VIII-IX Th; 1E
(2) VI-VII MWF, VIII-IX Th; 445C
(3) III-IV MWF, VI-VII T; 1E
(4) III-IV MWF, VI-VII T; 455C
(5) VIII-IX MTThF; 415C
(6) VIII-IX MTThF; 201E
(7) I-II MWThF; 415C
(8) I-II MWThF; 201E
(9) I-II MWThF; 443C
(10) I-II MWThF; 455C

7f,w,su-8s,su*—Engineering Drawing and Descriptive Geometry. (Chem. and chem. engr.) 3 cred. per qtr.; prereq., solid geometry. Messrs. Myers, Schuck, and Cruzen.

7f (1) III-IV T, VIII-IX TThF; 445C
(2) III-IV T, VIII-IX TThF; 455C
(3) III-IV T, VIII-IX TThF; 417C

7w (1) III-IV MWF, VIII-IX Th; 201E
(2) III-IV MWF, VIII-IX Th; 455C
(3) III-IV TW, VIII-IX TTh; 417C
(4) III-IV TW, VIII-IX TTh; 415C

8w III-IV TW, VIII-IX TTh; 445C

8s (1) III-IV MTWF; 415C
(2) III-IV MTWF; 417C
(3) III-IV MWF, I-II S; 443C
(4) III-IV MWF, III-IV S; 445C

9s,su—Topographic Drawing. (Mines.) Same as Drawing 13 with one additional credit in elementary drawing. Open to mining students who took solid geometry in the fall quarter. 3 cred.; prereq., 1 or 7; III-IV MWF, I-II S; 201E. Messrs. Levens and Potter.

10f,su—Solid Geometry. Lines and planes in space, dihedral and polyhedral angles, polyhedrons, surfaces, cylinders, cones, spheres. Numerical exercises in areas, volumes, weights. No cred.; no prereq.

(1) VI MTWF; 136E
(2) VII MTWF; 227E
(3) I MTWS; 136E
(4) II MTWF; 215E
(5) III MWF, V Th; 206E
(6) III MWF; 215E; V Th; 227E

11f—Engineering Drawing (Mines, Phys.). 2 cred.; prereq., solid geometry; III-IV MWF; 101E. Mr. Potter.

12w—Engineering Drawing (Mines, Phys.). 2 cred.; prereq., 11; III-IV MWF; 101E. Mr. Potter.

13s—Topographic Drawing (Mines). 2 cred.; prereq., 12; III-IV MWF; 201E Messrs. Levens and Potter.

14w—Descriptive Geometry (Mines). Not an engineering elective. 4 cred.; prereq., 13, M.&M. 13. Messrs. Eggers, Myers, and Levens.

Lect. I TThS; 107E
Lab. VII-IX M; 201E

* For permissible substitute, see page 75.

21f,w,su—Drafting (C.E.). The application of descriptive geometry to drafting room problems including working drawings. 2 cred.; prereq., 3. Messrs. French, Myers, and Levens.

21f (1) I-II TThS; 201E (2) VI-VII MWTh; 201E
21w III-IV MWF; 217E

22w,s,su—Structural Detailing (C.E.). Detail, assembly, and construction drawings of steel members and simple structures. Standards and conventions. 2 cred.; prereq., 21. Messrs. French, Myers, and Levens.

22w (1) I-II TThS; 201E (2) VI-VII MWTh; 101E
22s I-II MWF; 1E

23f,s,su—Structural Detailing (C.E.). Drafting problems in general construction work including earthwork, wood, steel, and concrete. 2 cred.; prereq., 22 or reg. in 22. Messrs. French, Myers, and Levens.

23f I-II MWF; 217E
23s (1) III-IV MWF; 101E (2) VI-VII TThF; 201E

26w,s,su*—Drafting (E.E.). Applications of descriptive geometry to drafting room problems. Working drawings and tracing. 2 cred.; prereq., 3. Messrs. Eggers and Quaid.

26w (1) VIII-IX MWF; 101E (2) III-IV MF, I-II S; 415C
26s VIII-IX MWF; 1E

28f,w,su*—Drafting (Aero.E.). Application of descriptive geometry to drafting room problems. Working drawings and tracing. 2 cred.; prereq. 3.

28f (1) VI-VII MWF; 417C (3) VIII-IX TWF; 415C
(2) III-IV MWF; 1E
28w VI-VII TThF; 201E

29w,s,su—Drafting (Aero.E.). Application of elementary formulas in the proportioning of simple machine parts. Detail and assembly drawings. Machine and structural drafting and graphical methods. 2 cred.; prereq., 28.

29w III-IV MFS; 443C
29s (1) VI-VII MTW; 101E (3) VIII-IX MThF; 101E
(2) I-II TThS; 101E

34f,w,s—Lettering. Study and analysis of single stroke lettering with particular emphasis on the application to engineering drawing. 1 cred.; prereq., 1.

34f (1) IV T; 104E (2) II Th; 215E
34w (1) IV T; 104E (2) II Th; 104E
34s (1) IV T; 104E (2) II Th; 21E

37f,w,s—Lettering for Engineers. Analysis of the alphabets. Exercises in roman and gothic lettering. Design and composition of the paragraph and the title. 2 cred.; prereq., 2; I WF; 1E(f), 201E(w), 217E(s). Mr. Schuck.

38w,s—Reading Drawings. Calculations and estimates of areas, volumes, and weights, and the tabulation of quantities from working drawings. Problems concerned with fabrication, manufacture, and construction. 2 cred.; prereq., 2; VI TF; 206E. Mr. Potter.

41f,w,s-42f,w,s-43f,w,s—Technical Drawing. (a) General course in the theory and practice of freehand drawing. Principles of perspective, sketching, renderings, conventions, lettering, and industrial drawing. (b) Modification of the above course of particular interest to dental, medical, and scientific students. 2 cred. per qtr.; no prereq. Mr. Doseff.

(1) I-II MWF; 411C (3) VIII-IX MWF; 411C
(2) VI-VII MWF; 411C

* For permissible substitute, see page 75.

44f,w,s—Lettering. Practical course in plain lettering. Not an engineering or architecture elective. 1 cred.; no prereq.

44f	(1) IV T; 21E	(2) II Th; 227E
44w	(1) IV T; 21E	(2) II Th; 206E
44s	(1) IV T; 107E	(2) II Th; 205E

45f,w,s—Alphabets. Construction and analysis of various types of letters and their arrangement. Exercises and reference work. Not an engineering or architecture elective. 2 cred.; soph., jr., sr.; no prereq.; III TS; 7E. Messrs. Schuck and Teske.

50w,s—Diagrams and Charts. Elementary course dealing with the construction of simple diagrams and charts. 2 cred.; no prereq.; I TTh; 7E. Messrs. Eggers and Cruzen.

51f,w—Graphic Representation and Computation. Types of charts and applications to the solution of problems and equations. 3 cred.; prereq., 2, M.&M. 12; III MWF; 139EE(f), 7E(w). Messrs. Eggers and Levens.

52w,s—Alignment Charts. Functional scales. Application of geometry to the development of straight line alignment charts for equations of three or more variables. 3 cred.; prereq., 2, M.&M. 12; IV MWF; 138EE(w), 215E(s). Mr. Levens.

64w—Graphic Arts. Introduction. Field, development, and application in art and industry. Design and composition. Discussion of materials, style, and technique. 3 cred.; jr., sr.; prereq., 15 cred. in econ.; IV MWF; 206E. Mr. Doseff.

65f—Graphic Arts. Processes. Study of graphic reproduction, including engraving and printing, as it relates to present-day advertising, news illustration, and printing. Emphasis is given to technical information on line engravings, halftones, four-color plates, electrotypes, stereotypes, and the relief, offset, and intaglio methods of printing. 3 cred.; jr., sr.; prereq., permission of adviser in School of Business Administration or in Department of Journalism; IV MWF; 206P. Mr. Barnhart.

194s—Advanced Advertising Procedure. An advanced course conducted by means of laboratory work on problems and cases in (1) market research and (2) preparation of copy and layout. 3 cred.; sr., grad.; prereq., B.A. 88, Draw. 64, 65, Jour. 55, or permission of instructor; IV MWF; 206P. Mr. Vaile.

81f,w,s-82f,w,s-83f,w,s—Advanced Drawing. Principles of design—traditional and modern. Layouts, composition, and illustration. Black and white and color. Scientific modeling. 3 cred. per qtr.; prereq., 43 or equiv. Mr. Doseff.

86f,w,s-87f,w,s—Anatomical Drawing. 3 cred. per qtr.; prereq., 43 or equiv. Mr. Doseff.

111f-112w-113s—Advanced Descriptive Geometry. Parallel and central projections. Curves and surfaces. Intersections and tangencies. Shades and shadows. Warped surfaces. The figure plan. 3 cred. per qtr.; prereq., 3, calculus. Messrs. Eggers and Levens.

115f-116w-117s—Curve Fitting. Finite differences and their application to curve fitting; graduation of experimental data; interpolation; fitting of data to type forms of curves. 3 cred. per qtr.; prereq., M.&M. 25; ar. Mr. Eggers.

118f,s—Short Course in Curve Fitting. Derivation of formulae to fit experimental data. Combination of graphical and analytic methods. 3 cred.; prereq., 3, M.&M. 25, or permission; IV MWF; 206E(f), 22E(s). Mr. Eggers.

152f-153w-154s—Nomography. Application of geometry to the development of alignment charts involving curved and straight line scales. Networks; combination of networks and alignment charts. Line co-ordinates. Use of de-

terminants for the construction of alignment charts. Special rules. 3 cred.; prereq., 52 or equiv., M.&M. 25. Mr. Levens.

152f IV TS; 5E; VI Th; 206E
153w-154s IV TS, VI Th; 7E

157f-158w-159s—Graphical Mathematics. Graphical calculus. Polar diagram method of stress analysis. 2 cred. per qtr.; prereq., M.&M. 26. Messrs. French, Eggers, and Levens.

157f IV MW; 205E
158w IV MF; 21E
159s I TS; 107E

ECONOMICS AND BUSINESS ADMINISTRATION

ECONOMICS

3f,w,s—Elements of Money and Banking. Basic principles of money and a description of the various types of financial institutions, their functions and relations to the whole economic organization. 5 cred.; no prereq. Mr. Stehman and others.

3f Lect. II TTh; JAud
Rec. (1) I MWF; 205VH
(2) II MWF; 211VH
(3) III MWF; 2VH
(4) III TThS; 113VH
(5) V MWF; 2VH
(6) VII MWF; 113VH

3w Lect. III TTh; BuAud
Rec. (1) I MWF; 211VH
(2) I MWF; 105VH
(3) I TThS; 307VH
(4) II MWF; 221VH
(5) II MWF; 110F
(6) II TThS; 211VH
(7) III MWF; 113VH
(8) III MWF; 205VH
(9) IV MWF; 1VH
(10) IV MWF; 301VH
(11) V MWF; 221VH
(12) V MWF; 211VH
(13) VI MWF; 210VH
(14) VI MWF; 205VH
(15) VII MWF; 207VH

3s Lect. IV MW; 150Ph
Rec. (1) I MWF; 2VH
(2) III MWF; 211VH
(3) III TThS; 6VH
(4) VI MWF; 205VH
(5) VII MWF; 205VH

5f,w,s†—Elements of Statistics. Elementary concepts in statistical method; averages, ratios, errors, sampling, index numbers, graphic representation, collection of material. 5 cred.; no prereq. Mr. Kozelka and others.

5f Lect. III M; JAud
Rec. (1) I MWThF; 301VH
(2) II MTWF; 105VH
(3) IV MTWF; 205VH
(4) V MTWF; 205VH
(5) VI MWThF; 210VH

5w Lect. III M; JAud
Rec. (1) I MWThF; 221VH
(2) IV MTWF; 2VH
(3) VI MWThF; 113VH

5s Lect. III T; BuAud
Rec. (1) I MWThF; 115VH
(2) I MWThF; 211VH
(3) II MWThF; 211VH
(4) II MWThF; 221VH
(5) III MWThF; 115VH
(6) III MWThF; 112VH
(7) III MWThF; 113VH
(8) IV MTWF; 6VH
(9) IV MTWF; 113VH
(10) V MTWF; 211VH
(11) V MTWF; 115VH
(12) VI MWThF; 210VH
(13) VI MWThF; 112VH
(14) VII MWThF; 211VH

8f,w-9w,s—General Economics. (Eng., arch., chem.) Principles of economics with special emphasis upon their application to current problems such as money,

† Not open to students who have received credit in Soc. 45 or B.A. 70.

banking, conservation, insurance, international commerce, monopolies, transportation, labor, socialism and public ownership, and finance. 3 cred. per qtr.; no prereq. Mr. Filipetti and others.

8f-9w (1) I MWF; 2VH
(2) I MWF; 211VH (fall only)
(3) II MWF; 210VH
(4) III MWF; 211VH
(5) IV MWF; 211VH
8w-9s III TThS; 210VH

20f,w,s—Elements of Accounting. Fundamental principles underlying bookkeeping and accounting. Sufficient practice in technical processes will be given to serve as a background for more advanced work. Preparation and analysis of statements. Open only to engineering prebusiness students. Other engineering students register in 29 or B.A. 54. 3 cred.; no prereq. Mr. Heilman and others.

20f (1) I MWF; 210VH
(2) I TThS; 221VH
(3) II MWF; 307VH
(4) II MWF; 301VH
(5) II TThS; 301VH
(6) III MWF; 301VH
(7) III MWF; 210VH
(8) III TThS; 301VH
(9) IV MWF; 307VH
(10) IV MWF; 301VH
(11) V MWF; 221VH
(12) VI MWF; 221VH
(13) VII MWF; 221VH

20w (1) I MWF; 210VH
(2) II MWF; 307VH
(3) III MWF; 307VH
(4) III TThS; 221VH
(5) V MWF; 307VH
(6) VII MWF; 307VH

20s (1) I MWF; 221VH
(2) II MWF; 307VH
(3) III MWF; 205VH
(4) III TThS; 205VH
(5) IV MWF; 115VH
(6) VII MWF; 307VH

25f,w,s-26f,w,s—Principles of Accounting. Course following Econ. 20 presenting the principles underlying the accounting statements, the accounts, principles of valuation, depreciation, preparation and analysis of statements. 3 cred. per qtr.; prereq., 20. Mr. Heilman and others.

25f-26w (1) II TThS; 307VH
(2) III TThS; 205VH
(3) V MWF; 211VH (fall only)
(4) VII MWF; 211VH

25w-26s (1) I MWF; 301VH
(2) II MWF; 301VH
(3) II TThS; 301VH
(4) III MWF; 301VH
(5) III TThS; 301VH
(6) IV MWF; 307VH (winter only)
(7) VI MWF; 307VH
(8) VII MWF; 1VH (winter only)

25s (1) I MWF; 210VH
(2) II TThS; 210VH
(3) III MWF; 307VH
(4) IV MWF; 307VH

26f (1) II TThS; 211VH
(2) III TThS; 221VH
(3) VII MWF; 307VH

28f,s—Business Law. Business law arranged for engineers, including the law of contracts, real estate agency, partnership, corporations, negotiable instruments. 3 cred.; 3rd qtr. soph., jr., sr.; I MWF; 135E(f), 335EE(s). Mr. Palmer.

29f,s—Principles of Accounting. (Eng., arch., chem.) Purpose and principles of account classification; capital and revenue; accruals; valuation; depreciation; preparation and interpretation of balance sheets, income accounts, and other statements. 3 hrs. of lect. a week. 3 cred.; no prereq. Mr. Lund.

29f IV MWF; 112VH
29s I MWF; 307VH

149f,w,s—Business Cycles. Analysis of factors involved in business fluctuations. Comparison of theories of the cause of prosperity and depression. Introduction to the statistical data and methods of business forecasting. 3 cred.; sr., grad.; prereq., 141 or B.A. 142. Mr. Marget and others.

149f III TThS; 1VH
149w (1) I MWF; 1VH
(2) VI MWF; 6VH
149s (1) II TThS; 6VH
(2) VI MWF; 105VH

161f,w,s—Labor Problems and Trade Unionism. Discussion of employment; hours; wages; extent and strongholds of unionism; open and closed shops; collective bargaining; industrial unrest; government regulation of labor disputes. 3 cred.; prereq., 8, 9. Messrs. Yoder and Schmidt.

161f	(1) III MWF; 4VH	(2) IV MWF; 4VH
161w	(1) I TThS; 207VH	(2) II MWF; 4VH
161s	(1) I TThS; 207VH	(2) IV MWF; 1VH

BUSINESS ADMINISTRATION

51f-52w-53s—Business Law.* 51. Contracts. 52. Agency, Partnership, Corporations. 53. Sales and Negotiable Instruments. 3 cred. per qtr.; jr., sr.; prereq.; for 51, Econ. 8 and 9, for 52 and 53, B.A. 51. Messrs. Gray and Wattson.

Lect. IV T; BuAud

Rec.	(1) I ThS; 4VH	(4) II ThS; 105VH(f), 2VH(w,s)
	(2) I ThS; 2VH	(5) III ThS; 4VH
	(3) II ThS; 4VH	

54f-55w—Elementary Accounting. Combined course. Covers the same material as Econ. 20, 25, and 26, or Econ. 29 and 26. Recommended for five-year engineering business students. Messrs. Lund and Miller.

54f	(1) I MTThS; 307VH	(2) V MTWF 207VH
55w	V MTWF; 207VH	

58f,w,s§—Elements of Public Finance. Public expenditures, revenues, and debts. Special attention is given to tax principles, practices, and burdens. Condensed course given especially for business administration students. 3 cred.; jr., sr.; prereq., Econ. 8, 9. Messrs. Blakey and Borak.

58f	(1) IV MWF; 207VH	(2) VI MWF; 207VH
58w	(1) IV MWF; 207VH	(2) VI MWF; 207VH
58s	(1) IV MWF; 207VH	(2) VI MWF; 207VH

70f†—Statistics Survey Course. Tools and devices which facilitate the use of business data. Statistical information is collected by questionnaires, consolidated into tables, summarized in averages, and illustrated by graphic devices. Current index numbers are compared in form and application. Interpretation and limitations of statistical data. 3 cred.; prereq., Econ. 8, 9. Mr. Graves.

(1) I MWF; 6VH	(2) VII MWF; 6VH

71f,w,s—Transportation: Services and Charges I. Survey of rail, highway, and water transportation facilities, services, and rates. Current transportation problems. 3 cred.; prereq., Econ. 8, 9. Mr. Nightingale.

71f	(1) I MWF; 1VH	(3) IV MWF; 1VH
	(2) II MWF; 1VH	
71w	(1) III TThS; 1VH	(2) VI MWF; 1VH
71s	(1) III MWF; 1VH	(2) VI MWF; 113VH

72w,s—Transportation: Services and Charges II. Principles, construction, interpretation, and use of rail, highway, and water classifications, rates, and tariffs for handling freight, express, and mail shipments. Audit of transportation charges. Adjustment of rates, rules, and regulations. 3 cred.; prereq., 71. Mr. Nightingale.

72w	VIII MWF; 1VH
72s	I MWF; 112VH

* No credit will be given for 51, 52, or 53 until all three are completed.

† Not open to students who have received credit in Econ. 5.

§ Credit may not be received for both Econ. 191-192 and B.A. 58.

77f,w,s—Survey in Marketing. (An introductory course.) The principles of production economics and of price as illustrated in marketing. Commodity classifications, market functions, description of market organizations. 3 cred.; jr., sr.; no prereq. Messrs. Vaile, Chute, Pickett, and Miss Canoyer.

77f,w,s	Lect.	I T, 1VH (f,s); IV S, 1VH(w)	
77f	Rec.	(1) I ThS; 1VH (2) I ThS; 6VH	(3) VII TTh; 1VH
77w	Rec.	(1) I TTh; 1VH (2) VI TTh; 2VH	(3) VII TTh; 1VH
77s	Rec.	(1) I ThS; 1VH (2) I ThS; 112VH	(3) VII TTh; 1VH

89f,w,s—Production Management. Analysis of the procedure and methods of production in industrial plants, the factors involved in production management, the means of effecting control. 3 cred.; prereq., Econ. 8, 9. Messrs. Filipetti and Cummins.

89f	(1) II MWF; 4VH	(2) III TThS; 207VH
89w	(1) II MWF; 6VH	(2) III MWF; 1VH
89s	(1) I MWF; 1VH (2) II MWF; 1VH	(3) II MWF; 2VH

91f,w,s—Tabulating Equipment Laboratory. Use of tabulating equipment in preparation of sales analyses and the laying out of production programs, in the keeping of perpetual inventory records and in making distributions of labor and overhead costs in cost accounting. 1 cred.; jr., sr.; prereq., Econ. 26 and either 5 or B.A. 70. Mr. Gaumnitz.

91f	(1) IV-V T; 2VH	(2) VIII-IX F; 2VH
91w	IV-V T; 6VH	
91s	(1) IV-V T; 2VH	(2) VIII-IX M; 2VH

101f,w,s-102f,w,s§—Advanced General Economics. A study of some of the more important theoretical problems of economics; competitive and monopoly prices; equilibrium prices and costs; theories of valuation of producers' goods; capital earnings and interest rates; profits. 3 cred. per qtr.; sr.; prereq., Econ. 8, 9. Messrs. Mudgett, Stigler, and Boddy.

101f-102w	(1) I TThS; 105VH (2) II MWF; 2VH (3) II TThS; 6VH	(4) III MWF; 105VH (5) IV MWF; 113VH (6) VII MWF; 105VH
101w-102s	(1) I TThS; 6VH	(2) VII MWF; 6VH

112f,w,s‡—Business Statistics. Survey and criticism of methods used in analyzing time series, with special applications to the study of cyclical fluctuations of economic phenomena. 3 cred.; jr., sr., grad.; prereq., Econ. 5 or B.A. 70. Messrs. Mudgett, Kozelka, and others.

112f	(1) I TThS; 207VH (2) IV MWF; 105VH	(3) VI MWF; 6VH
112w	(1) I TThS; 205VH (2) II MWF; 205VH	(3) III TThS; 6VH
112s	(1) II MWF; 6VH (2) II TThS; 205VH	(3) VI MWF; 2VH

130f,s—Cost Accounting Survey. (General survey.) 3 cred.; prereq., Econ. 26, 29 or 55. Mr. Ostlund.

130f	I MWF; 105VH
130s	I TThS; 105VH

‡ A fee of $1 per quarter is charged for this course.

§ The entire course must be completed before credit is received for any quarter.

133s—Cost Accounting Methods. Standard costs. The establishment of standards and their results as reflected in the cost accounts. The application of standards in distribution. 3 cred.; jr., sr., grad.; prereq., B.A. 130 or 152, 153; II TThS; 307VH. Mr. Ostlund.

139f,w,s‡—Advanced General Accounting. A course intended particularly for the general student of business. Interpretation of accounts and statements, statement preparation, and analysis. Utilization of the statements by the executive. The use of budgets in business. Accounting methods and statements in a number of business fields. 3 cred.; jr., sr., grad.; prereq., Econ. 25, 26. Mr. Heilman and others.

139f	(1) IV MWF; 2VH	(2) VI MWF; 4VH
139w	(1) I MWF; 4VH	(2) VI MWF; 105VH
139s	(1) III TThS; 1VH	(2) VII MWF 105VH

142f,w,s—Advanced Money and Banking. 3 cred.; jr., sr., grad.; prereq., Econ. 8, 9. Messrs. Marget, Upgren, and Langum.

142f	(1) II MWF; 6VH (2) II TThS; 2VH	(3) VI MWF; 2VH
142w	(1) II TThS; 105VH	(2) IV MWF; 6VH
142s	(1) I MWF; 105VH (2) III TThS; 105VH	(3) VI MWF; 6VH

155f,w,s—Corporation Finance. 3 cred.; prereq., Econ. 8, 9. Messrs. Stehman and Upgren.

155f	(1) III MWF; 1VH	(2) VII MWF; 207VH
155w	(1) III MWF; 4VH	(2) VI MWF; 4VH
155s	(1) II TThS; 207VH	(2) VII MWF; 1VH

165f,w,s—Economics of Public Utilities. Economic and legal bases of classification. Relative advantages of public ownership and regulation. Central and municipal regulation. Basis of rates; relative rates; rates and service. Theories of valuation. 3 cred.; prereq., 8, 9. Messrs. Garver and Schmidt.

165f	(1) I TThS; 211VH	(2) III TThS; 6VH
165w	(1) I TThS; 211VH	(2) III TThS; 207VH
165s	(1) I MWF; 4VH	(2) II MWF; 207VH

167f,w—Personnel Administration. Managerial policy for various types of organization of labor. Job analysis, employment, incentives, and regulation of employment. 3 cred.; prereq., Econ. 161. Mr. Yoder.

167f	II MWF; 205VH
167w	III TThS; 105VH

180f-181wC—Senior Topics: Marketing. Selected topics in industrial marketing industry. (1) Market research; (2) marketing of installations; (3) product design as an aid in marketing; (4) market prices and price policies. 3 cred. per qtr.; prereq., consent of adviser; VI½-VII TTh; 205VH. Mr. Vaile.

180f-181w§-182sG—Senior Topics: Production Management. Selected problems in management; technique of executive control in manufacturing enterprises; field research and surveys in organization and management of Northwest industrial concerns. 9 cred.; prereq., B.A. 89, 130; VII MWF; 1VH(f), 115VH(w,s). Mr. Filipetti.

184f§—Scientific Management in Industry. 3 cred.; prereq., 8, 9; VI MWF; 301VH. Mr. Filipetti.

(For other courses see Combined Class Schedule for 1940-41, School of Business Administration section.)

‡ A fee of $1 per quarter is charged for this course.

§ Credit may not be received for both B.A. 181G and B.A. 184.

ELECTRICAL ENGINEERING†

11f-13w-15s—Elements of Electrical Engineering. Introduction to the development, principles, materials, safety, and general applications of electrical engineering. 3 cred. per qtr.; prereq., reg. in Phys., and M.&M. 24 for 11; reg. in M.&M. 25 for 13.

11f	Lect.	(1) III TThS; 138EE	(3) I TThS; 138EE
		(2) I TThS; 238EE	
13w	Lect.	(1) I TThS; 238EE	(3) III TThS; 138EE
		(2) I TThS; 36EE	
15s	Lect.	(1) III TThS; 237EE	(3) I TThS; 36EE
		(2) I TThS; 238EE	

14w-16s—Elements of Electrical Engineering Laboratory. Taken with courses E.E. 13, 15. 1 cred.; prereq., for 14, 13 or reg. in 13; for 16, 14 or reg. in 15.

14w	(1) VI-VII M; 21EE	(4) VIII-IX T; 21EE
	(2) VIII-IX Th; 21EE	(5) VI-VII Th; 21EE
	(3) V-VI T; 21EE	(6) VIII-IX F; 21EE
16s	(1) VIII-IX M; 21EE	(4) VIII-IX Th; 21E
	(2) VI-VII W; 21EE	(5) VI-VII M; 21E
	(3) VIII-IX T; 21EE	(6) VI-VII T; 21E

111f—Junior Electrical Engineering. Alternating-current circuits and machinery. 5 cred.; prereq., 15.

(1) I MTWFS; 237EE (2) II MTWFS; 237EE

112f—Junior Electrical Engineering Laboratory. Taken with Course 111. Experimental study of alternating-current circuits and machinery. 2 cred.; prereq., reg. in 111.

(1) VI-IX M; 107EE (4) VI-IX Th; 107EE
(2) VI-IX T; 107EE (5) VI-IX F; 107EE
(3) VI-IX W; 107EE

113w-115s*—Junior Electrical Engineering. Alternating-current circuits and machinery. 3 cred. per qtr.; prereq., 111, 112 for 113; and 113, 114 for 115.

(1) I MWF; 237EE (2) II MWF; 237EE

114w-116s—Junior Electrical Engineering Laboratory. Taken with Courses 113, 115. Experimental study of alternating-current circuits and machinery. 1 cred. per qtr.; prereq., reg. in 113, 115. Lab. given alternate weeks.

(1) VI-IX M; 107EE (4) VI-IX Th; 107EE
(2) VI-IX T; 107EE (5) VI-IX F; 107EE
(3) VI-IX W; 107EE

117w-119s*—Engineering Electronics. Fundamental theory of electronic devices. 3 cred. per qtr.; prereq., 111, 112 for 117, and 117 for 119. Lab. given in alternate weeks.

Lect.	(1) I TTh; 237EE	(2) II TTh; 237EE
Lab.	(1) VI-IX M; 227EE	(4) VI-IX Th; 227EE
	(2) VI-IX T; 227EE	(5) VI-IX F; 227EE
	(3) VI-IX W; 227EE	

121f-123w-125s—Senior Electrical Engineering. Theory of alternating and direct current machinery. 3 cred. per qtr.; prereq., 115, 116, 119.

(1) III MWF; 237EE (2) IV MWF; 237EE

* Students registering in E.E. 113w and 117w and E.E. 115s and 119s must take both courses at the same hour of the day. The laboratory part of 117w and 119s must be taken on the same day that the student registers for E.E. 113w and 115s. These laboratory courses are given in alternate weeks.

† In courses continuing through three quarters, the work of each quarter is prerequisite for the following quarters.

122f-124w-126s—Senior Electrical Engineering Laboratory. Operating characteristics of alternating- and direct-current machinery. 2 cred. per qtr.; prereq., 116 and reg. in 121, 123, 125.

(1) VI-IX T; 107EE
(2) VI-IX W; 107EE
(3) VI-IX Th; 107EE
(4) VI-IX F; 107EE

127f-128w-129s—Transient Electrical Phenomena. Mathematical study of electric circuits during sudden changes of conditions. Classical and operational methods of analysis applied to electric circuits and machines, and use of the oscillograph in the analysis of these problems. 3 cred. per qtr.; prereq., reg. in 121, 123, 125; I TTh, 139EE; VI-VIII W, 129EE. Messrs. Bryant and Johnson.

227f-228w-229s—Transients in Electrical Machinery and Transmission Lines. Theoretical and laboratory study of transients in electrical power machinery and of lightning surges and lightning protection. 3 cred. per qtr.; prereq., 127, 128, and 129. Mr. Bryant.

255f-256w-257s—Electrical Engineering Applications. Investigation of electrical engineering applications. Laboratory study, library study, research both in residence and in the field, followed by complete written reports with oral presentation and discussion. 1 to 3 cred. per qtr.; prereq., graduate students only. Messrs. Bryant and Johnson.

DESIGN

130s—Electric Control. Study of methods of control and control devices for direct and alternating current motors and generators. Open to aeronautical, chemical, electrical, and mechanical engineers. 2 cred.; prereq., 37, 44, 46 or 123. Mr. Kuhlmann.

132f-134w-136s—Electrical Design. The design of direct current generators and motors, alternating current transformers, generators and synchronous motors. 2 cred. per qtr.; prereq., for 132, reg. in 121; 134, reg. in 123; 136, reg. in 125; II TTh; 335EE. Mr. Kuhlmann.

137s—Power Transmission Line Design. Preparation of detailed plans and specifications for construction of high voltage transmission lines and distributing systems. 3 cred.; prereq., 134, 142. Mr. Johnson.

197f-198w-199s—Electrical Design. Special problems. 2 cred. per qtr.; prereq., 132, 134, 136. Mr. Kuhlmann.

ELECTRIC POWER

36f-37w-38s—Electric Power. Similar to 43-44-45. 3 cred. per qtr.; sr. M.E.; prereq., Phys. 9 or 43, 44.

36f	Lect.	(1) III MF; 335EE	(2) III MF; 138EE
	Lab.	(1) VI-VII M; 107EE	(4) VIII-IX M; 107EE
		(2) III-IV S; 107EE	(5) I-II T; 107EE
		(3) I-II S; 107EE	
37w	Lect.	(1) III MF; 335EE	(2) III MF; 138EE
	Lab.	(1) II-III W; 107EE	(4) II-III Th; 107EE
		(2) III-IV S; 107EE	(5) III-IV T; 107EE
		(3) I-II S; 107EE	
38s	Lect.	(1) II MF; 238EE	(2) II MF; 138EE
	Lab.	(1) II-III W; 107EE	(4) III-IV S; 107EE
		(2) III-IV F; 107EE	(5) III-IV T; 107EE
		(3) I-II Th; 107EE	

40f—Electric Wiring and Equipment. Elements of direct and alternating current circuits. Interior wiring and electrical equipment of buildings. Elements of illumination. 2 cred.; sr. arch.; no prereq.; I MW; 139EE.

41s—Electric Power. Elementary principles of continuous and alternating currents, generators, and motors, transmission and distribution. Measurement of power. 3 cred.; jr. mines; prereq., Phys. 9 or 43.

Lect. I TTh; 138EE
Lab. VII-IX F; 107EE

42s—Electric Power. Similar to 41. 3 cred.; sr. C.E.; prereq., Phys. 9 or 43, 44; III MWF; 138EE.

43f-44w-45s—Electric Power. Elementary study of the generation, distribution, measurement, and utilization of electric power. 3 cred. per qtr.; sr. Chem.E.; prereq., Phys. 9 or 43, 44.

	Lect.	(1) III TTh; 335EE	(2) III TTh; 238EE
43f	Lab.	(1) III-IV W; 107EE	(3) III-IV M; 107EE
		(2) IV-V T; 107EE	(4) IV-V F; 107EE
44w	Lab.	(1) III-IV M; 107EE	(3) I-II T; 107EE
		(2) III-IV F; 107EE	(4) IV-V W; 107EE
45s	Lab.	(1) III-IV M; 107EE	(3) I-II T; 107EE
		(2) I-II F; 107EE	(4) I-II S; 107EE

46f-47w—Aeronautical Communication and Electric Power. Fundamentals of direct and alternating current circuits. Elementary principles of radio reception and transmission. Radio beacons, radio navigation, approach systems. 3 cred. per qtr.; prereq., sr. Aero.E., Phys. 9 or 43, 44.

Lect. VI TTh; 335EE

46f	Lab.	(1) I-II F; 107EE	(3) I-II W; 107EE
		(2) I-II Th; 107EE	(4) I-II M; 107EE
47w	Lab.	(1) III-IV M; 227EE	(3) III-IV W; 227EE
		(2) II-III Th; 227EE	(4) III-IV F; 227EE

138f-139w-140s—Power Systems. Short-circuit currents in power networks; unbalanced loads in polyphase circuits, transformers and motors; harmonics; stability of power systems under steady state conditions. Application of relay, oil circuit breakers, and lightning arresters to power systems for protection of apparatus and service. 3 cred. per qtr.; prereq., reg. in 121, 123, or 125; II MWF; 339EE. Messrs. Bryant, Johnson, and Caverley.

141f—Central Stations. Electric power generating stations and distribution systems. Economic considerations. Costs, load curves, plant location, selection of prime movers, station equipment. 3 cred.; prereq., reg. in 121; III TThS; 237EE. Mr. Johnson.

142w—Electrical Transmission. Considerations involved in the designing and building of transmission lines. Mechanical, electrical, and economic considerations. Lightning protection, underground lines, high-voltage d.c. transmission. 3 cred.; prereq., reg. in 123; III TThS; 237EE. Mr. Johnson.

143s—Valuation of Public Utility Properties. Factors affecting value, depreciation, taxation, and regulation of public utility properties. Elements of engineering economics; cost analysis, economic investigations, rate making. 3 cred.; sr. and grad. only; III TThS; 339EE. Messrs. Bryant and Johnson.

144w—Railway Electrical Engineering. Principles of mechanics applied to electric train movements. 2 cred.; prereq., 42 or 45 or 48 or 115; IV TS; 237EE. Mr. Johnson.

145s—Railroad Electrification. Reasons for electrification. Study of European and American systems. Results of electrification. 2 cred.; prereq., 144; IV TS; 339EE. Mr. Johnson.

ILLUMINATING ENGINEERING

151f—Illuminating Engineering. Nature of light. Laws of vision. Principles of illumination. Photometry. Sources of light and their characteristics. Lighting equipment. Illumination requirements and calculation for various fields of use. 2 cred.; prereq., Phys. 9 or 43; IV TS; 237EE. Mr. Johnson.

152f—Photometric Laboratory. Photometer practice. Distribution curves of lamps and reflectors. Measurement of lighting installations. 1 cred.; prereq., reg. in 151; VI-VII Th; ar. Mr. Johnson.

153w-154s—Illumination Problems. Illumination design and specifications applied to problems in street, residence, industrial, commercial, and other kinds of lighting. 1 to 3 cred. per qtr.; prereq., 151. Mr. Johnson.

251w-253s—Illuminating Engineering. Lectures and laboratory work. Methods of determining locations, kind and quality of lights for obtaining desired illumination. 2 cred. per qtr.; prereq., 151. Mr. Johnson.

TELEPHONE AND TELEGRAPH ENGINEERING

64f-65w-66s—Elements of Communication. Theoretical and laboratory study of communication circuits and apparatus. Simplex, duplex, multiplex telegraph systems. Speed of transmission. Magneto, common battery, manual, automatic telephone systems. 2 cred. per qtr.; prereq., reg. in 111, 113, 115. Mr. Melloh.

Lect. III M; 238EE
Lab. (1) VI-VII T; 307EE (3) VI-VII W; 307EE
(2) VIII-IX T; 307EE (4) VIII-IX W; 307EE

164f-165w-166s—Electric Communication. Telephone circuits at audio and carrier frequencies. Theoretical and laboratory study of circuits having distributed constants. Use of hyperbolic functions. Wave filters, balancing networks, equalizers, repeaters. 4 cred. per qtr.; prereq., 66. Mr. Hartig.

Lect. I MW; 138EE
Lab. (1) VI-IX Th; 307EE (2) VI-IX F; 307EE

267f-268w-269s—Telephone Transmission. Advanced transmission theory at communication frequencies. Class and laboratory. 2 or 3 cred.; reg. by permission. Mr. Hartig.

272f-273w-274s—Electromechanical Vibrating Systems and Engineering Acoustics. Theoretical discussion of the production of sound by electrically driven vibrating systems, sound transmission, reflection, absorption. Laboratory study of vibrating systems, pipes, horns, absorbing materials, sound pressure, articulation, reverberation, resonance, sound filters. 3 cred.; open to grad. and sr. by permission; prereq., M.&M. 151. Mr. Hartig.

287f-288w-289s—Advanced Communication Laboratory and Seminar. Special problems in communication. Study and discussion of current articles on communication. 2 or 3 cred.; reg. by permission. Mr. Hartig.

RADIO ENGINEERING

161f-162w-163s—Radio Communication. Theoretical and laboratory study of radio transmitting and receiving circuits and apparatus. Amplifiers, detectors, oscillators. Electromagnetic waves in free space and on antenna systems. 3 cred. per qtr.; prereq., reg. in 121, 123, 125. Mr. Webb.

Lect. II MW; 335EE
Lab. (1) VI-VII M; 308EE (3) VI-VII T; 308EE
(2) VIII-IX M; 308EE (4) VIII-IX T; 308EE

167f—Radio Transmission. Design and operation of modern transmitting equipment, with special emphasis on broadcast transmission. Registration by permission of instructor. 3 cred. Mr. Webb.
Lect. II TTh; 339EE
Lab. (1) VI-VIII W; 308EE (2) VI-VIII Th; 308EE

168w-169s—Radio Receiver Design. Detailed study of the problems arising in broadcast receiver design. Registration by permission of instructor. 3 cred. per qtr. Mr. Webb.
Lect. II TTh; 339EE
Lab. (1) VI-VIII W; 308EE (2) VI-VIII Th; 308EE

176f-177w-178s—Electronics. Theoretical and laboratory study of the following subjects with aspects of their engineering applications. Electron emission from hot bodies, Richardson's equation, Langmuir-Childs equation, secondary electron emission, ionization and resonance potentials, external and internal photoelectric effect, positive ion emission, shot effect, discharge of electricity through gases, "getter" action, vacuum gages, vacuum technic, etc. 2 cred. per qtr.; graduate course, open to seniors by permission of instructor. Mr. Webb.

261f-263w-265s—Advanced Radio Communication. Theoretical study of the transmission of electromagnetic waves. Design and testing of radio transmitting and receiving apparatus. Theory of electron tubes and their use in radio circuits. High frequency measurements. Taken with 262-264-266. 2 cred. per qtr.; reg. by permission. Mr. Webb.

262f-264w-266s—Advanced Radio Laboratory. Special problems in radio laboratory and station, usually taken in connection with Course 261-263-265. For students specializing in electrical communication. 1 or more cred. per qtr.; reg. by permission. Mr. Webb.

RESEARCH

171w-172s—Undergraduate Thesis. Investigation of some approved problem in electrical engineering. 3 to 6 cred. per qtr.; prereq., 121.

275f-276w-277s—Electrical Engineering Research. Investigation of special problems in laboratory or library. 2 to 6 cred. per qtr.; grad.

MEASUREMENT

81w—Electrical Engineering Measurements. Principles of electrical measuring instruments, construction, limitations, sources of error, methods of calibration. Methods of measuring voltage, current, watts, watt hours, resistance inductance, mutual inductance, capacity. 3 cred.; prereq., 111. Mr. Todd.
Lect. IV MW; 339EE
Lab. VI-VII M; 107EE

173f-174w-175s—High Voltage Engineering. Study of insulation and generating equipment for high voltage; measurements of electrical quantities at high voltage; surges, and surge proof equipment. Lecture and laboratory. 2 or 3 cred.; sr. or grad. Mr. Caverley.

181s—Communication Frequency Measurements. Vector treatment of network. Bridge circuits for measuring of resistance, inductance, and capacity of audio and radio frequencies. 2 cred.; prereq., 126.

183f-184w-185s—Special Electrical Laboratory. Efficiency tests and special problems. 1 to 3 cred. per qtr.; prereq., jr., sr., grad. by permission.

187f-188w-189s—Special Communication Laboratory. Special problems in electrical communication. Includes a weekly seminar meeting. 1 to 3 cred. per qtr.; jr., sr., grad. by permission.

281w-282s—Advanced High Frequency Measurements. Vector treatment of circuit networks. Bridge circuits for the measurement of resistance, inductance, and capacity of audio and radio frequencies. 2 cred. per qtr.; prereq., 126.

284f-285w-286s—Precise Electrical Engineering Measurements. Measurements of resistance, voltage, current, energy, self-induction, and capacity; standardization of measuring instruments. 2 cred. per qtr.; prereq., 122.

GENERAL

93s—Seminar. Weekly discussion of current engineering periodicals and reports on assigned topics. 1 cred.; no prereq., jr. E.E. (Not offered in 1940-41.)

100—Inspection Trip. Inspection of selected industrial plants made in the spring vacation period. 2 cred.; required of senior E.E.

156s—Vacuum Tube and Control Devices. Two, three, four, and five electrode vacuum tubes. Thyratron, kenotron, grid glow, photoelectric tubes, etc. Theoretical study of apparatus and circuits with demonstrations. 2 cred.; sr. only; not open to students having credit in 161; IV MW; 139EE. Mr. Webb.

191f-192w-193s—Seminar. Weekly discussion of current electrical periodicals. 1 or 2 cred. per qtr.; prereq., 111.

194f-195w-196s—Vacuum Tube Applications. Study of commercial thermionic vacuum, vapor, and gas discharge tubes including an extensive survey and detailed study of their scientific and industrial applications. 3 cred. per qtr.; open to grad. and sr. in E.E. by permission of instructor.

211f-212w-213s—Advanced Circuit Analysis. Circuit analysis using Heaviside's *Operational Calculus*. 2 cred. per qtr.; grad.; prereq., M.&M. 151.

291f-292w-293s—Graduate Seminar. Discussion problems and results of research work. 1 cred. per qtr.

294f-295w-296s—Vacuum Tube Circuit Analysis. Continuation of 196. Mathematical and experimental analysis of circuits associated commonly with vacuum tubes. 3 cred. per qtr.; grad. only; prereq., 196.

ENGLISH (ENGINEERING)

4f,w-5w,s-6f,s—Composition. Review of grammar; principles of composition; constant practice in elementary technical exposition. Reading. 3 cred. per qtr.; no prereq. Messrs. Richardson, Becklund, Fitch, Guthrie, Haga, and Lefevre.

4f	(1) IV MWF; 107E	(10) VI MWF; 107E
	(2) IV MWF; 22E	(11) VI MWF; 104E
	(3) IV MWF; 104E	(12) I MWF; 7E
	(4) III MTF; 107E	(13) I MWF; 21E
	(5) III MTF; 5E	(14) I MWF; 5E
	(6) III MTF; 4E	(15) VII MWF; 107E
	(7) III MTF; 135E	(16) VII MWF; 215E
	(8) VIII MWTh; 107E	(17) VII MWF; 206E
	(9) VIII MWTh; 203E	(18) II MThS; 107E
4w	(1) I MWF; 5E	(4) VIII MWF; 104E
	(2) V MWF; 107E	(5) VIII MWF; 205E
	(3) V MWF; 206E	
5w	(1) IV MWF; 107E	(9) VIII MWTh; 106E
	(2) IV MWF; 215E	(10) VI MWF; 107E
	(3) IV MWF; 135E	(11) VI MWF; 203E
	(4) IV MWF; 104E	(12) VI MWF; 215E
	(5) III MTF; 4E	(13) I MWF; 107E
	(6) III MTF; 107E	(14) I MWF; 135E
	(7) III MTF; 203E	(15) VII MWF; 107E
	(8) VIII MWTh; 107E	(16) VII MWF; 203E

5s (1) VIII MWF; 203E
(2) VIII MWF; 205E
(3) V MWF; 107E
(4) V MWF; 106E
(5) II TThF; 107E

6f (1) I MWF; 107E
(2) V MWF; 107E

6s (1) III MThF; 107E
(2) III MThF; 215E
(3) III MThF; 7E
(4) I MWF; 107E
(5) I MWF; 135E
(6) VI MWF; 107E
(7) VI MWF; 215E
(8) IV MWF; 107E
(9) IV MWF; 104E
(10) IV MWF; 135E
(11) III TThS; 135E
(12) VII MWF; 107E
(13) VII MWF; 215E
(14) VII MWF; 206E
(15) VIII MWF; 107E
(16) VIII MWF; 215E

7w—Explorations in Literature. Epics and modern plays. 3 cred.; prereq., 6; IV MWF; 22E. Mr. Richardson.

8s—Explorations in Literature. Novels. Some individual selection permitted. 3 cred.; prereq., 6; I MWF; 139EE. Mr. Richardson.

36s—The Technical Article. Practice in writing technical articles for both professional and lay readers. 3 cred.; prereq., 6; IV MWF; 206E. Mr. Haga.

37f,w,s—Technical Discussions. (M.E.) Oral presentation of technical and non-technical material for the purpose of developing speaking ability. Class criticism. Extemporaneous discussion. Limited to twenty-five students. 3 cred.; prereq., 6. Mr. Richardson.

37f II MWF; 135E
37w (1) II MWF; 135E
(2) III TThS; 135E
37s (1) III MWF; 135E
(2) I TThS; 135E

FORESTRY

10w—Farm Woodlots and Windbreaks. Trees and their relation to the farm. Planning and planting farm windbreaks and shelter belts. Utilization and marketing of farm grove or woodlot products. 3 cred.; no prereq.; VI MWF; 201GH(UF). Mr. Cheyney.

GENERAL ENGINEERING

11f—Orientation. A series of lectures designed to orient the student who has just begun his university course. No cred.; no prereq.; required of all freshmen in the College of Engineering and Architecture except architects; IX Th; 100C. Mr. Zelner.

12w—Orientation. A series of lectures covering the various branches of engineering given by the heads of departments and other selected speakers. No cred.; no prereq.; required of all freshmen in the College of Engineering and Architecture except architects; IX Th; 100C. Mr. Zelner.

13s—Hygiene. Lectures on hygiene and first aid given by physicians and dentists on the university staff and others. No cred.; no prereq.; required of all male freshmen in the School of Chemistry and the College of Engineering and Architecture except architects; IX W; Bu.Aud. Mr. Zelner.

70f,w,s—The Slide Rule. Theory, construction, and use. Computation practice. Design of special scales. 1 cred.; prereq., M.&M. 12 or reg. in M.&M. 12. Mr. French.

70f I F; 104E
70w I W; 203E
70s I W; 205E

81s—Estimating. Plan reading and quantity surveying. Study of costs of concrete, brick, timber, and steel construction. Analysis of material and labor costs. 3 cred.; jr., sr., only. I MWF; 238EE. (Limited to 20 students.) Mr. French.

101f,w—Contracts and Specifications. Engineering contracts. Specification essentials; approved methods of handling construction projects; trade practices. Powers and duties of engineer executive. 3 cred.; jr. and sr. only; IV MWF; 238EE. Mr. Fixen.

112f-113w-114s—Rates for Public Utility Properties. Determination of the rate base and depreciation amount for transportation, gas, water, electric power, and telephone utilities operating expenses, the rate structure for particular utilities, service and discrimination. 3 cred. per qtr.; sr. and grad. in engineering, economics, and business administration. Mr. Bryant.

193s—Engineering Practice. Engineering relations, personal and ethical; business relations, letters and employment; legal relations and interpretation; patents, rights of invention; engineering specifications and salesmanship. Engineering reports and discussions. 2 cred.; sr. only. Mr. Martenis.

(1) VI M, III Th; 254ME (2) III Th, I S; 254ME

GENERAL SCIENCE

50w—Elementary Logic. 3 cred.; prereq., soph. standing; IV MWF; 6F. Mr. Castell.

GEOLOGY AND MINERALOGY

1f,w,s,su-2f,w,s—General Geology (Dynamic and Historical). A synoptical treatment of the materials of the earth and of geologic processes, together with a study of the history of the earth and its inhabitants as recorded in the rocks. 3 cred. per qtr.; no prereq. Messrs. Thiel and Hanley.

1f	Lect. II TThS; 210P	Rec. II F; 210P
1w	Lect. IV MWF; 110P	Rec. IV T; 110P
1s	Lect. (1) III MWF; 110P (2) VII MWF; 110P	Rec. (1) III Th; 110P (2) VIII M; 110P
2f	Lect. III MWF; 208P	Rec. III Th; 208P
2w	Lect. II TThS; 210P	Rec. II F; 210P
2s	Lect. IV MWF; 110P	Rec. IV T; 110P

Af,w,s‡-Bf,w,s‡—General Geology Laboratory (General and Historical). 2 cred. per qtr.; no prereq.

Af	(1) I-II MW; 22P	(2) VI-VIII MW; 22P
Aw	VI-VII WF; 22P	
As	(1) III-IV TS; 22P	(2) VIII-IX WF; 22P
Bf	III-IV TS; 20P	
Bw	(1) I-II MW; 22P	(2) VI-VII TTh; 22P
Bs	VI-VII WF; 22P	

1f,w,s,su-3w,s—General Geology (Dynamic and Economic). A synoptical treatment of the materials of the earth and the origin, distribution, and occurrence of metals, nonmetals, coal, and petroleum. 3 cred. per qtr.; no prereq. Mr. Emmons.

1f	Lect. III TThS; 110P	Rec. III F; 110P
1w	Lect. III MWF; 218P	Rec. III S; 218P
1s	Lect. (1) III MWF; 218P (2) VII MWF; 110P	Rec. (1) III Th; 218P (2) VIII M; 110P
3w	Lect. III TThS; 110P	Rec. III F; 110P
3s	Lect. III MWF; 110P	Rec. III S; 110P

‡ A fee of $1 per quarter is charged for this course.

Af,w,s‡-Cw,s‡—General Geology Laboratory (General and Economic). 2 cred. per qtr.; no prereq.

Af	(1) III-IV MW; 22P	(2) VI-VIII TTh; 22P
Aw	I-II TTh; 22P	
As	(1) III-IV TS; 22P	(2) VIII-IX WF; 22P
Cw	III-IV MW; 20P	
Cs	I-II TTh; 20P	

5f-6w—Engineering Geology. Materials of the earth and geologic processes. Applications of geology to engineering problems. Brief survey of occurrence, properties, production, and uses of building stones, cements, clays, fuels, and road material. Lectures and reference work. 3 cred. per qtr.; no prereq.; I MWF; 110P. Mr. Schwartz.

11f-12w-13s—General Geology (Dynamic and Historical). Materials of the earth and geological processes. Physiographic, dynamic, and structural geology. The sequence of events in geologic history. Must be completed for credit. Primarily for students in the School of Mines and Metallurgy. 2 cred. per qtr.; no prereq. Mr. Hanley.

11f	Lect. II MW; 110P
	Lab. II F; 110P
12w-13s	II MW; 210P

23f‡-24w‡—Elements of Mineralogy. The crystal systems; morphological, physical, and chemical characters of minerals; occurrence, genesis, and use of minerals; classification and description of common minerals, rock minerals, and common rocks. Determinative work in laboratory, blowpipe analysis, sight identification. 4 cred. per qtr.; prereq., Inorg. Chem. 10 or equiv. Mr. Gruner.

23f	Lect. I TTh; 210P	Rec. IV W; 210P
	Lab. (1) III-IV TS; 100P	(2) VI-VII TTh; 100P
24w	Lect. I TTh; 210P	Rec. VIII M; 210P
	Lab. (1) III-IV TS; 100P	(2) VI-VII MW; 100P

61f—Blowpipe Analysis. The determination of minerals by systematic blowpipe analysis. 3 cred.; prereq., 24; II TThS, VIII Th, VII-VIII F. Mr. Gruner.

85su—Field Work. About two weeks, approximately July 15 to 30, are spent in geologic mapping of selected areas in the iron district of Minnesota. Involves preparation of geologic maps and written reports. 3 cred.; prereq., 105. Messrs. Gruner and Thiel.

91f-92w-93s—Index Fossils of North America. A study of fossil forms with special reference to those of geologic importance; faunas and their correlation. 3 cred. per qtr.; prereq., 12 or 13. Mr. Stauffer.

91f	Lect. VI F; 105P
	Lab. VI-VII MW; 105P
92w-93s	Lect. I F; 105P
	Lab. VI-VII MW; 105P

101f-102w—Sedimentation. Origin and structure of sedimentary deposits; the interpretation of these in relation to paleogeography. Lectures, assigned readings, and laboratory work. 3 cred. per qtr.; prereq., 24. Mr. Thiel.

101f	VIII MW, IX F; 210P
102w	VI T, VII-VIII TTh; 208P

103w-104s—Micropaleontology. A study and classification of Foraminifera, diatoms, and other small fossil organisms, and their use for purposes of correlation. 3 cred. per qtr.; prereq., 51 or 91; II-III TThS; 103P. Mr. Stauffer.

‡ A fee of $1 per quarter is charged for this course.

105s—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. 2 cred.; prereq., 1 or 7 or 13 and 24. Mr. Grout.
Lect. I TS; 210P
Lab. (Sec. A) III-IV T; 200P (Sec. B) III-IV S; 200P

106f—Petrography. The identification and study of minerals and rocks by optical methods; the study of igneous rocks, crystalline schists, and metamorphic rocks. The origin and classification of rocks. 2 cred.; prereq., 105. Mr. Grout.
(1) VI-VII WF; 200P (2) VI-VII M, I-II Th; 200P

110f—Economic Geology. Study of nonmetallic minerals of economic value, and discussions of geologic guides to prospecting for these deposits. 3 cred.; prereq., 105; I TThS; 110P. Mr. Schwartz.

111w—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. 3 cred.; prereq. 105; I TThS; 110P. Mr. Emmons.

112s—Geology of Petroleum. The nature, origin, and accumulation of petroleum, discussion of the various oil fields of the world. 3 cred.; prereq., 105; I TThS; 110P. Mr. Emmons.

118w—Principles of Geomorphology. Principles of physiography of the lands, or geomorphology. A study of the form and structure of plains, plateaus, volcanoes, and the different types of mountains. The normal or fluvial, glacial, marine, and arid cycles of erosion and the resulting land forms. Geology 145 is recommended as a desirable companion course. 3 cred.; prereq., 2 or 3 or 13; III MWF; 220P. Mr. Hanley.

119s—Geomorphology of the United States. A regional study of the United States by geomorphic or physiographic units. The development of the surface features as affected by rock structure and geologic history. Discussion of the principal problems presented by each area. 3 cred.; prereq., 2 or 3 or 13; II MWF; 220P. Mr. Hanley.

120s—Glacial Geology. Nature and process of glacial action. Landforms resulting from alpine and continental glaciers. Character and distribution of Pleistocene and earlier glacial deposits. 3 cred.; prereq., 2 or 3 or 13; I TThS; 220P. Mr. Hanley.

121f—Crystallography. Study of crystal models and space groups. Crystal drawings and measurements. Projections and mathematical calculations. 3 cred.; prereq., M.&M. 12 and Inorg. Chem. 10 or equiv. Mr. Gruner.

124w—Metamorphic Geology. The conditions, processes, and results of weathering and metamorphism. 3 cred.; prereq., 105; II MWF; 218P. Mr. Schwartz.

125s—Structural Geology. A study of the principles and applications of geologic structures. 3 cred.; prereq., 105; II MWF; 210P. Mr. Schwartz.

131w-132s—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. 4 cred. per qtr.; prereq., 106. Mr. Grout.
131w Lect. III TThS; 210P
Rec. VI M; 210P
Lab. VI-VII ThF; 200P
132s Lect. III TThS; 210P
Rec. VI M; 210P
Lab. VI-VII ThF; 200P

140w-141s—Applied Petrography. Determination of ores and gangue minerals. Microscopic studies of paragenesis of ores and other mineral associations. Practical problems in mining and geology settled by microscopic and optical examinations. 3 cred. per qtr.; prereq., 131. Mr. Grout.

Lect. II F; 200P
Lab. I-II MW; ar

144f—Interpretation of Geologic Maps. Study and problems in construction and interpretation of various types of geologic maps. Recognition of structural and stratigraphic relations. 4 cred.; prereq., 105; VI-IX WF; 220P. Mr. Hanley.

145w—Interpretation of Topographic Maps. Application of the principles of geomorphology to the interpretation of topographic maps. Practice in the recognition of land forms. Determination of underground structures and evolution of topography from surface contours. Geology 118 is a desirable companion course. 2 cred.; prereq., 2 or 3 or 13; VI-IX W; 220P. Mr. Hanley.

150su—Field Geology. Detailed, systematic work conforming with standards of official surveys. Preparation of geologic maps, structure sections, reports; paragenesis of ores and their relation to geologic structures. Field, Black Hills, South Dakota. 6 cred.; prereq., 124. 4 weeks. First term, Summer Session. Approximately June 15 to July 15. Mr. Schwartz.

151f-152w-153s—Advanced General Geology. Geologic processes and their results; development of the North American continent. 3 cred. per qtr.; prereq., 2 or 3 or 13; III MWF; 210P. Mr. Stauffer.

161w—Crystal Structure. Study of point groups and space groups. Diffraction of X-rays by crystals. Interpretation of powder and Laue diagrams. 3 cred.; prereq., 121, Phys. 7, 9 or 23, 43, M.&M. 13. Mr. Gruner.

165f—Ore Dressing Microscopy. Methods of studying opaque ore minerals and the application of metallurgical problems. 1 cred.; prereq., 106; VI-VIII Th. Mr. Schwartz.

166w-167s—Mineralography. Methods of studying opaque minerals and the application of the methods to problems in ore genesis and history. 3 cred. per qtr.; prereq., 111 or reg. in 111, 131. Mr. Schwartz.

166w VI-VII TThF; 207P
167s VI-VIII TF; 207P

170f,w,s—Geologic Problems. Special problems adapted to the needs of the student. 3 cred.; ar.

GERMAN

24f-25w-26s—Chemical German. Pronunciation, reading, sentence analysis, and translation. 3 cred. per qtr.; for students who have had no German previously. IV MWF; 113F.

27f-28w-29s—Chemical German. Representative chemical prose. 3 cred. per qtr.; prereq., two years high school German or one year college German; IV MWF; 209F.

HISTORY

84a—The History of Engineering and Technology. 3 cred.; jr., sr.; no prereq.; ar. (To be offered beginning 1941-42.) Mr. Heaton.

HORTICULTURE

6f—Fruit Growing. Fundamental principles of fruit growing. Sites, soils, nursery stock, planting and planting plans, tillage, fertilization, cover crops, pollination, frost avoidance, pruning and thinning. Lectures, references. 3 cred.; no prereq.; II MWF; 102Hr(UF). Mr. Brierley.

MATHEMATICS AND MECHANICS

MATHEMATICS

3w-4s—Freshman Mathematics for Architects. A short course in algebra, trigonometry, and analytical geometry. Open to architects only. 5 cred. per qtr.; prereq., for 3, M.&M. 9 or equiv., for 4, 3; IV MTWFS; 3E.

9f—Higher Algebra. (High School.) Fundamental rules, fractions, linear simultaneous equations, graphs, theory of exponents, surds, complex quantities, quadratic equations, numerical exercises. No cred.; no prereq.

(1) I MWThFS; 106E
(2) VII MWF, VIII T, III S; 106E
(3) V MTWF, IV S; 205E

11f,w,su—College Algebra. Review of fundamental operations, factoring, fractions, linear simultaneous equations, exponents, surds, complex numbers, and quadratic equations. Theory of quadratic equations, ratio, proportion, variation, determinants, binominal theorem, progressions, theory of equations, higher numerical equations, partial fractions, and infinite series. 5 cred.; prereq..; M.&M. 9 or equiv.

11f (1) II MWThFS; 3E
(2) II MWThFS; 4E
(3) II MWThFS; 5E
(4) I MTWThS; 4E
(5) I MTWThS; 104E
(6) I MTWThS; 227E
(7) I MWThFS; 111M
(8) VII MTWThF; 136E
(9) VII MTWThF; 203E
(10) VII MTWThF; 205E
(11) VIII MTWF, III S; 136E
(12) VIII MTWF, III S; 206E
(13) VI MTWThF; 3E
(14) VI MTWThF; 4E
(15) VI MTWThF; 106E
(16) VI MTWThF; 203E
(17) VI MTWThF; 5E
(18) VI MTWThF; 7E

11w (1) II MWThFS; 3E
(2) II MWThFS; 22E
(3) I MTWThS; 3E
(4) VIII MWThF, III S; 3E
(5) V MTWThF; 3E
(6) V MTWThF; 4E

12w,s,su—Trigonometry. Graphical representation of functions, computation by logarithms and slide rule. Trigonometric functions, plane right triangles, reduction formulas, fundamental relations, addition formulas, double angles, half angles, identities and equations, inverse functions, oblique triangles, De Moivre's theorem, spherical right triangles. 5 cred.; prereq., 11.

12w (1) II MWThFS; 4E
(2) II MWThFS; 7E
(3) II MWThFS; 107E
(4) I MTWThS; 4E
(5) I MTWThS; 136E
(6) I MTWThS; 206E
(7) I MTWThS; 111M
(8) VII MTWThF; 3E
(9) VII MTWThF; 205E
(10) VIII MWThF, III S; 203E
(11) VIII MWThF, III S; 4E
(12) VI MTWThF; 3E
(13) VI MTWThF; 4E
(14) VI MTWThF; 21E
(15) VI MTWThF; 136E

12s (1) I MTWThF; 4E
(2) I MTWThF; 206E
(3) II MWThFS; 4E
(4) III MWThFS; 3E
(5) VIII MTWThF; 4E
(6) V MTWThF; 4E
(7) V MTWThF; 205E

13f,s,su—Analytical Geometry. Rectangular co-ordinate systems, locus and equation, straight line, circle, parabola, ellipse, hyperbola. Transformation of co-ordinates and simplification of equations. Polar co-ordinates, higher plane

curves, tangents, normals. Empirical equations, solid analytic geometry. 5 cred.; prereq., 11 and 12.

13f (1) V MTWThF; 136E
(2) V MTWThF; 203E
(3) V MTWThF; 215E
(4) I MTWThF; 203E
(5) VIII MTWThF; 104E
(6) III MTWThF; 136E

13s (1) I MTWThF; 3E
(2) I MTWThF; 203E
(3) I MTWThF; 111M
(4) II MWThFS; 3E
(5) II MWThFS; 104E
(6) II MWThFS; 7E
(7) VII MTWThF; 227E
(8) VII MTWThF; 136E
(9) VII MTWThF; 3E
(10) III MWThFS; 206E
(11) III MWThFS; 5E
(12) VIII MTWThF; 227E
(13) VI MTWThF; 3E
(14) VI MTWThF; 4E
(15) VI MTWThF; 203E

24f,w,su—Differential Calculus. Limit, derivative, simple application of derivative, maxima and minima, differentials, rates, radius of curvature, indeterminate forms, partial differentiation, the differential as an approximation, series, expansion of functions. 5 cred.; prereq., 13.

24f (1) V MTWThF; 4E
(2) V MTWThF; 3E
(3) V MTWThF; 104E
(4) IV MTWFS; 106E
(5) IV MWFS, 21E; VI Th, 7E
(6) II TWThFS; 106E
(7) II TWThFS; 206E
(8) VIII MTWThF; 215E
(9) I MTWThF; 22E
(10) I MTWThF; 3E
(11) VII MTWThF; 104E
(12) III MTWThF; 22E
(13) III MTWThF; 104E
(14) III MTWThF; 3E

24w (1) V MTWThF; 203E
(2) V MTWThF; 205E
(3) V MTWThF; 136E
(4) VII MTWThF; 136E
(5) III MTWThF; 104E
(6) III MTWThF; 22E

25w,s,su—Integral Calculus. Integration of standard elementary forms, rational fractions, by substitution, by parts; trigonometric integrals, definite integral, integration as a process of summation; geometric applications, liquid pressure, work, centroids, moments of inertia, double and triple integrals. 5 cred.; prereq., 24.

25w (1) V MTWThF; 215E
(2) V MTWThF; 227E
(3) V MTWThF; 106E
(4) III MTWThF; 106E
(5) III MTWThF; 215E
(6) III MTWThF; 3E
(7) IV MTWF, II S; 106E
(8) VII MTWThF; 106E
(9) VI MTWF, IV S; 106E
(10) I MTWThF; 205E
(11) I MTWThF; 227E
(12) I MTWThF; 22E

25s (1) VII MTWThF; 106E
(2) II MTWThF; 203E
(3) II MTWThF; 206E
(4) V MTWThF; 215E
(5) III MTWThF; 104E
(6) III MTWThF; 106E

31f-32w-33s—Differential and Integral Calculus. Three-quarter course in calculus for students in the School of Mines and Metallurgy. 9 cred.; prereq., 13.

31f II TS, III Th; 111M
32w-33s IV MWF; 111M

91f*—Calculus (Arch., Prebus.). Short course, derivatives, maxima and minima, integration of simple forms, definite integrals, areas. 4 cred.; prereq., 13; I MWFS; 206E.

151f—Differential Equations. Differential equations and their solutions. First order and first degree, first order and higher degree, singular solutions; total differential equations, linear differential equations, miscellaneous methods system of simultaneous equations, integration in series. 3 cred.; prereq., 25; I MWF; 335EE.

152w-153s—Advanced Calculus with Applications. 3 cred. per qtr.; prereq., 151; I MWF; 215E.

* For permissible substitute, see page 75.

154f-155w-156s—Vector Analysis and Applications. 3 cred. per qtr.; prereq., 26; IV MWF; 139EE(f,w), 138EE(s).

164f-165w-166s—Operational Methods and the Operational Calculus. 3 cred. per qtr.; prereq., 151 or by permission; ar.

167f-168w-169s—Mathematics of Modern Engineering. 3 cred. per qtr.; prereq., 26; IV MWF; 7E.

254f-255w-256s—Modern Analysis. Based on Whittaker and Watson's text. 3 cred. per qtr.; prereq., 153.

261f-262w-263s—Functions of a Complex Variable. Elliptic functions and integrals with applications. 3 cred. per qtr.; prereq., 153.

For other courses see Combined Class Schedule Bulletin.

MECHANICS

26f,w,s,su—Technical Mechanics: Statics. Concurrent force systems, parallel forces, couples, center of gravity, statics of rigid bodies, graphical methods, friction, work, theory of moment of inertia. 5 cred.; prereq., 25.

26f	(1) II MTWThF; 136E	(4) V MTWThF; 21E
	(2) II MTWThF; 205E	(5) IV MTWFS; 136E
	(3) V MTWThF; 106E	
26w	V MTWThF; 104E	
26s	(1) VII MTWThF; 104E	(5) IV MTWFS; 106E
	(2) VII MTWThF; 203E	(6) IV MTWFS; 4E
	(3) II MTWThF; 106E	(7) III MTWThF; 136E
	(4) II MTWThF; 215E	(8) III MTWThF; 215Ex

84s*—Technical Mechanics. (Chem., Chem.E., and Prebus.) Statics, resolution of forces, conditions of equilibrium, center of gravity, moment of inertia, stresses in framed structures and machines, kinematics, dynamics of a particle. Newton's laws of motion, work, energy, power, impulse, and momentum. 5 cred.; prereq., 25 or 91.

(1) III MWThFS; 203E	(3) I MTThFS; 22E
(2) III MWThFS; 4E	(4) I MTThFS; 205E

92w*—Mechanics for Architects. Statics, resolution of forces, conditions of equilibrium, center of gravity, moment of inertia of plane sections, stresses in framed structures. 4 cred.; prereq., 91; I MWFS; 7E.

127f,w,s—Technical Mechanics: Dynamics. Kinematics of the particle and rigid body, theorem of Coriolis, particle dynamics, dynamics of a rigid body in plane motion, the energy equation, impulse and momentum, applications to technical problems. 5 cred.; prereq., 26.

127f	(1) III MWThFS; 203E	(4) IV MTWFS; 3E
	(2) I MTWFS; 205E	(5) IV MTWFS; 227E
	(3) II MTWThS; 203E	
127w	(1) II MTWThF; 203E	(3) III TWThFS; 205E
	(2) II MTWThF; 106E	(4) IV MTWFS; 203E
127s	(1) IV MTWFS; 136E	(4) II MTWFS; 205E
	(2) IV MTWFS; 21E	(5) VI MTWThF; 205E
	(3) I MWThFS; 106E	

161f-162w-163s—Advanced Technical Mechanics. Moving axes, Eulerian angles, Lagrange's equations, generalized co-ordinates, dynamical problems soluble in terms of circular and elliptic functions, dynamical specifications of bodies, motion of a top, theory of vibrations, Hamilton's principle. Special problems. 3 cred. per qtr.; prereq., 127; ar.

* For permissible substitute, see page 75.

267f-268w-269s—Advanced Dynamics. Text, Routh's *Rigid Dynamics,* Vol. I. 3 cred. per qtr.; prereq., 153.

274f-275w-276s—Advanced Dynamics of a Particle. 3 cred. per qtr.; prereq., 127.

277f-278w-279s—Advanced Statics. Text, Routh's *Analytical Statics.* 3 cred. per qtr.; prereq., 127. (Not offered in 1940-41.)

297w-298s—Vibration—Problems. 3 cred. per qtr.; prereq., 127.

MATERIALS

85f,s*—Strength of Materials. (Chem.E. and Prebus.) Mechanical and elastic properties of materials of construction, beams, shafts, columns, combined stresses, dynamic stresses. 3 cred.; prereq., 84.

85f (1) VI MWF; 206E
(2) I TS, II Th; 7E
(3) IV T, V Th, 205E; III S, 215E

85s VI MWF; 106E

87f,s—Materials Testing Laboratory. (Chem.E. and Prebus.) Investigation of the physical properties of various metals and engineering materials (steel, cast iron, wood, brick, etc.). Standard methods of testing. 1 cred.; prereq., 85 or reg. in 85.

87f (1) VIII-IX M; Ex
(2) VIII-IX W; Ex
(3) III-IV W; Ex
(4) VI-VII F; Ex
(5) VI-VII T; Ex

87s (1) VIII-IX M; Ex
(2) VIII-IX W; Ex

93s*—Strength of Materials. (Arch.) Mechanical and elastic properties of materials of construction, design of riveted joints, beam theory, columns, arches. 4 cred.; prereq., 91 and 92; I MWFS; 5E.

128f,w,s—Strength of Materials. Mechanical and elastic properties of materials of construction, beams, shafts, columns, combined stresses, hollow cylinder rollers, plates, curved bars, springs, dynamic stresses, true stresses. 5 cred.; prereq., 26.

128f (1) III MWThFS; 205E
(2) II MTWThF; 104E
(3) IV MTWFS; 203E

128w (1) IV MTWFS; 4E
(2) IV MTWFS; 205E
(3) II MTWThF; 136E
(4) II MTWThF; 5E
(5) III MWThFS; 136E
(6) III MWThFS; 5E
(7) VI MTWThF; 205E
(8) I TWThFS; 106E
(9) IV MTWFS; 315M

128s (1) II MTWFS; 110Ex
(2) IV MTWFS; 205E
(3) III MWThFS; 205E

141f,w,s—Materials Testing Laboratory. Investigation of the physical properties of various metals and engineering materials (steel, cast iron, wood, cement, brick, etc.). Standard methods of testing. 2 cred.; prereq., 128 or reg. in 128.

141f Lect. (1) VI T; 110Ex
(2) III M; 110Ex
Lab. (1) VIII-IX T; Ex
(2) VI-VII Th; Ex
(3) VI-VII W; Ex
(4) II-III Th; Ex
(5) I-II S; Ex

141w Lect. (1) VII Th; 110Ex
(2) VI W; 110Ex
(3) VII W; 110Ex
Lab. (1) I-II W; Ex
(2) VIII-IX M; Ex
(3) I-II S; Ex
(4) VIII-IX W; Ex
(5) II-III Th; Ex
(6) VIII-IX F; Ex
(7) VI-VII F; Ex
(8) II-III M; Ex
(9) VIII-IX Th; Ex
(10) VIII-IX T; Ex

141s Lect. (1) VI T; 110Ex
(2) VI F; 110Ex
Lab. (1) VIII-IX T; Ex
(2) VI-VII M; Ex
(3) VIII-IX F; Ex
(4) VI-VII W; Ex
(5) I-II S; Ex

* For permissible substitute, see page 75.

144s—Materials Testing Laboratory. (Mines.) 2 cred.; prereq., 128; VI-IX Th; Ex.

180w—Advanced Strength of Materials. Stress analysis in statically indeterminate structures. Theory of superposition. Energy of strain. Elastic stability. 3 cred.; prereq., M.&M. 128; II MWF; 206E.

181f-182w-183s—Applied Elasticity. Special problems in stress analysis. 3 cred. per qtr.; prereq., M.&M. 128; IV MWF; 5E.

184f-185w-186s—Advanced Testing Materials Laboratory. Special problems relating to the physical properties of engineering materials. 2 cred. per qtr.; prereq., 141.

294f-295w-296s—Mathematical Theory of Elasticity. 3 cred. per qtr.; prereq., 128, 153.

HYDRAULICS

86f*—Hydraulics with Laboratory. (Chem.E.) Hydrostatics, Bernoulli's theorem, flow through orifices, pipes, and over weirs, dynamic action of jets and streams, flow of gases through pipes. 3 cred.; prereq., 84.

(1) VI M, 215E; VI W, 227E; VI-VII F, 201Ex (3) III T, II F, 21E; VIII-IX Th, 201Ex
(2) II MTh, 22E; VIII-IX M, 201Ex

129f,w,s—Hydraulics. Laws of equilibrium of fluids, flow through orifices and over weirs, pressure and flow through tubes and pipes, flow in conduits and rivers, dynamic pressure of water, elementary principles of turbines and pumps. 4 cred.; prereq., 26.

129f	Lect.	(all sections) I Th; HL	
	Rec.	(1) VI TWF; 215E	(4) IV TS, VI Th; 215E
		(2) IV MWF; 215E	(5) II TWS; 110Ex
		(3) III MWF; 7E	
129w	Lect.	(all sections) I Th; HL	
	Rec.	(1) I MTF; 21E	(3) IV MWF; 136E
		(2) I MTF; 203E	
129s	Lect.	(all sections) I Th; HL	
	Rec.	(1) I MWF; 136E	(3) II TThS; 136E
		(2) II MWF; 136E	

130f—Open Channel Flow. Theory of uniform and varied flow in open channels, with practical applications to the design of hydraulic structures, computations for drawdown curves, backwater curves, hydraulic jump, measuring flumes, submerged weirs, etc. 3 cred.; prereq., 129 and 143; I MWF; 110Ex.

132f-133w-134s—Advanced Hydraulic Problems. Special problems in hydraulic design. 2 cred. per qtr.; prereq., 130 or reg. in 130.

143f,w,s—Hydraulics Laboratory. Experimental and demonstrational work. Pressure head, Piezometer tubes, gages, stability of flotation, Bernoulli's theorem. Venturi meter, flow through orifices, over weirs, and through pipes. Open channels, gaging, impact on vanes, pumps, and hydraulic machines. 1 cred.; prereq., 86 or 129 or reg. in 86 or 129.

143f	(1) II-III W; Ex	(6) II-III Th; Ex
	(2) VIII-IX T; Ex	(7) VIII-IX W; Ex
	(3) III-IV M; Ex	(8) VI-VII Th; Ex
	(4) VI-VII W; Ex	(9) VIII-IX F; Ex
	(5) III-IV F; Ex	
143w	(1) VI-VII M; Ex	(3) VIII-IX Th; Ex
	(2) VIII-IX T; Ex	
143s	(1) VI-VII M; Ex	(5) III-IV F; Ex
	(2) VIII-IX F; Ex	(6) III-IV S; Ex
	(3) VIII-IX M; Ex	(7) VIII-IX Th; Ex
	(4) VIII-IX W; Ex	(8) VI-VII W; Ex

* For permissible substitute, see page 75.

190w—Mechanics of Similitude and Dimensional Analysis. Theory of the use of models in design; conditions for similarity in the case of hydraulic structures, elastic structures, aircraft, ships, waves, etc. 3 cred.; prereq., 127, 128, and 129; ar.

191w—Hydraulic Motors and Pumps. Study of the hydraulic theory of the ram, impulse wheel, reaction turbine, and centrifugal pump. 3 cred.; prereq., 129; III TThS; 206E.

192s—Natural and Artificial Waterways. Wave motion, tides, ship resistance, transportation of sediment. Control and regulation of rivers, design of ship canals, locks, dry docks, movable dams, harbors. 3 cred.; prereq., 130 or permission; I TS, VI Th; 136E.

193w—Hydraulic Measurements. Detailed study of the current meter. Venturi meter, weir, orifice. Parshall flume, traveling screen, chemical method of gaging, etc. 3 cred.; prereq., 129; I MWF; 104E.

194f-195w-196s—Advanced Hydraulics Laboratory. Special experimental studies concerning the characteristics of turbines, pumps, etc. Hydraulic models. 2 cred. per qtr.; prereq., 129 and 143; ar.

197f-198w-199s—Mechanics of Soils. 2 cred. per qtr.; prereq., 129, 143; ar.

232f-233w-234s—Advanced Fluid Mechanics. 3 cred. per qtr.; prereq., 190.

281f-282w-283s—Hydrodynamics. 3 cred. per qtr.; prereq., 129, 153.

284f-285w-286s—Advanced Hydrodynamics. 3 cred. per qtr.; prereq., 283.

MECHANICAL ENGINEERING

MANUFACTURING PROCESSES LABORATORIES

1w,s,su—Elementary Woodworking. Fundamental operations in bench practice, manipulation and care of hand tools, elementary wood turning. For industrial education and interior architecture students. 2 cred.; no prereq.; VI-VIII MW. Mr. Richards.

2f,w,s,su—Wood Finishing. Identification and uses of woods and finishing materials. Preparation of surfaces for finishes. Color blending of stains and fillers to obtain various decorative effects; methods of applying stains, fillers, shellac, varnish, lacquers, paints, and waxes. 2 cred.; no prereq. Mr. Richards.

2f Ar.
2w,s II-III MWF

3w,s,su—Furniture Construction. Evaluation, design, and construction of period and modern types of furniture, framework construction for upholstered furniture. Identification of woods, textiles, and upholstering materials. Inspection trips. 2 cred.; prereq., 1 and 2; VI-VIII MW. Mr. Richards.

4f,w,s,su—General Woodwork. (Prebus.) Study of the principles involved in the construction of articles made from wood and wood products. Uses and compositions of paints, varnishes, stains, and wood preservatives. 2 cred.; no prereq. Mr. Richards.

4f,w Ar.
4s Lect. V TTh; 202ME
Lab. I-III T

5f,w,s,su—Pattern Practice. Study of the principles and uses of metal and wooden patterns, core boxes, and sweeps for the production of metal castings. Industrial practices and conventions. Inspection trips. 2 cred.; prereq., Chem. 5 or 15, and Dr. 2. Mr. Richards.

5f Lect. (1) I TTh; 202ME
(2) IX M, II F; 202ME
(3) III F, I S; 202ME

	Lab.	(1) VI-VIII Th	(4) VII-IX F
		(2) II-IV S	(5) II-IV M
		(3) VII-IX T	
5w	Lect.	(1) VI T, II S; 202ME	(3) IX W, IV S; 202ME
		(2) I MF; 202ME	
	Lab.	(1) I-III Th	(4 VII-IX F
		(2) VII-IX T	(5) II-IV T
		(3) VI-VIII Th	
5s	Lect.	IV M, I S; 202ME	
	Lab.	VII-IX T	

6f,w,s,su—Advanced General Woodwork. Study of the factors in mass production of furniture, mill work, and interior finishings. Adaptation of plywoods and plastics. Use of machines in producing general wood products. 2 cred.; prereq., 5; ar. Messrs. Koepke and Richards.

7s—Nonmetal Manufacturing. Methods and processes of manufacturing goods from materials such as wood, glass, plastics, asbestos, bakelite, hard rubber, and other synthetic substances. 3 cred.; prereq., 18, 20. Messrs. Koepke and Richards.

8f,w,s,su—Foundry Practice. Theory and practice in melting and casting ferrous and nonferrous metals. Practice in making cores, bench and floor molds. Problems and reports. 2 cred.; no prereq. Mr. Holtby.

8f	Lect.	II TTh; 153ME	
	Lab.	II-IV S	
8w	Lect.	VI T, I F; 153ME	
	Lab.	(1) I-III T	(2) I-III W
8s	Lect.	VI T, V Th; 153ME	
	Lab.	I-III T	

9f,w,s,su—Foundry Practice. Theory and practice in melting, alloying, and casting ferrous and nonferrous metals. Theory of foundry control methods, risers, feeders, gates, and pattern design. Practice in making cores and molds in relation to part design. Problems and reports. 2 cred.; prereq., Chem. 5, Draw. 2. Mr. Holtby.

9f	Lect.	(1) VI F, I S; 153ME	(3) I TTh; 153ME
		(2) VI T, VII W; 153ME	
	Lab.	(1) VII-IX F	(4) VI-VIII Th
		(2) VII-IX T	(5) VI-VIII W (Met.E. only)
		(3) II-IV W	(6) VI-VIII M (Min. and Pet.E. only)
9w	Lect.	VII M, I S; 153ME	
	Lab.	(1) VII-IX F	(2) VII-IX T
9s	Lect.	VII T, IX Th; 153ME	
	Lab.	(1) VI-VIII M	(2) II-IV S

11f,w,s,su—Metal Working. (Prebus.) Theory and practice in the working and joining of metals including soldering, brazing, and welding. 2 cred.; no prereq. Mr. T. P. Hughes.

11f	Lect.	IV M, IX W; 153ME
	Lab.	III-V W
11w,s	Ar.	

12f,w,s,su—General Metal Work. Working various metals. This course is designed to meet the needs of teachers of elementary forging and art metal courses. Projects designed for individual needs. 2 cred.; no prereq.; ar. Mr. T. P. Hughes.

13f,w,s,su—Forging, Heat Treating, and Welding. Theory of production and working of metals; operation of furnaces; thermit, electric arc, oxyacetylene,

and spot welding. 2 cred.; prereq., Chem. 5 or 15, and Dr. 2. Mr. T. P. Hughes.

13f Lect. (1) IV T, IX F; 153ME (2) II MW; 153ME
Lab. (1) VI-VIII F (3) II-IV S
(2) VI-VIII T (4) II-IV F

13w Lect. (1) II TTh; 153ME (3) VI W, II S; 153ME
(2) III TTh; 153ME (4) VI M, V Th; 153ME
Lab. (1) I-III M (5) VI-VIII F
(2) I-III F (6) VII-IX Th (Met.E. only)
(3) VII-IX T (7) VII-IX M (Min. and Pet.E. only)
(4) VII-IX W

13s Lect. (1) IX M, VIII F; 153ME (2) VI Th, VII F; 153ME
Lab. (1) I-III W (4) VI-VIII T
(2) VI-VIII M (5) VI-VIII W
(3) II-IV S

14f,w,s,su—Advanced Welding. Engineering approach to the technique and application of electric arc, oxyacetylene and resistance welding. Theory and practice. Problems. 2 cred.; prereq., 13; ar. Mr. T. P. Hughes.

15f,w,s—Survey of Manufacturing Processes. (Chem. and Chem. E.) Technique of machine shop, forge, and foundry practices. Lectures and demonstrations. 3 cred.; no prereq. Messrs. T. P. Hughes, Crowder, and Holtby.

15f I MWF; 153ME
15w,s IV MWF; 153ME

16f,s,su—Machine Shop Practice. Fundamental operation on lathes, shaper, drill press, milling machine, and grinder. Bench work. Job analysis based on unit operations. 2 cred.; no prereq. Not for E.E. Mr. Crowder.

16f Lect. VI M, II Th; 202ME
Lab. II-IV S
16s Lect. VI M, II Th; 202ME
Lab. (1) VII-IX M (2) I-III F

17s,su—Machine Shop Practice. Fundamental operation on lathes, drill press, milling machine, and grinder. Turret lathe operation and gear cutter. 2 cred.; no prereq. Mr. Crowder.

Lect. (1) IV T, VI F; 202ME (3) VI WTh; 202ME
(2) II MW; 202ME
Lab. (1) VII-IX F (3) VII-IX W
(2) II-IV S

18f,w—Machine Shop Practice. Fundamental operations on lathes, shaper, drill press, milling machine, boring machine, and grinder, turret lathe operation, polishing and buffing, gear cutting and tool grinding, production methods, routing, and machine selection. 3 cred.; prereq., 6, 9, 12. Mr. Crowder.

18f Lect. VII M, VIII Th; 202ME
Lab. (1) II-IV MW (2) I-III T, VII-IX F
18w Lect. IX M, I W; 153ME
Lab. (1) VI-VIII M, I-III F (2) I-III TTh

71f,su—Machine Shop Practice. (M.E.) Care and operation of machine tools, for the manufacture of an electric motor. Writing of manufacturing operation sheets for quantity production of machine parts. Inspection trips. 2 cred.; prereq., 5, 9, 13. Mr. Crowder.

Lect. (1) VI WF; 202ME (3) VIII M, VI Th; 202ME
(2) IV T, VIII F; 202ME
Lab. (1) VII-IX W (4) II-IV F
(2) VII-IX T (5) VII-IX Th
(3) I-III Th

72w,su—Machine Shop Practice. (M.E.) Care and operation of turret lathes, shapers, milling, and grinding machines. Machinability determinations. Operation sheets for the production of complete units. Inspection trips. 2 cred.; prereq., 71. Mr. Crowder.

Lect. (1) VI MTh; 202ME
(2) II WF; 202ME
(3) VI F, III S; 202ME

Lab. (1) VII-IX T
(2) VII-IX F
(3) VII-IX W
(4) VII-IX Th
(5) I-III M

73w,s—Advanced Machine Shop Practice. Setting up of turret lathes, milling and grinding machines for quantity production. Machinability determinations. Writing of manufacturing operation sheets for complete units. The application of jigs, fixtures, punch press dies, for metal products, and molds for plastic materials. Inspection trips. 3 cred.; prereq., 16, 17, 18, or 72. Mr. Crowder.

110f,w,s,su—Advanced Foundry Practice. Foundry control methods, X-ray analysis of castings. Laboratory practice in sand and metal analysis, permanent mold design and operation. Steel and malleable iron castings. Problems and reports. 2 cred.; prereq., 9; Chem. 16; ar. Mr. Holtby.

111f,w,s,su—Advanced Foundry Practice. Continuation of Course 110. 3 cred.; prereq., 110, Phys. 9, Chem. 16; ar. Mr. Holtby.

MACHINE DESIGN

20f,w—Elementary Machine Design. Technique and knowledge necessary to convey information from engineering department to shop. Drawing room and shop standards; fits, limits, and tolerances; heat treating, welding, and material specifications; records and changes. 2 cred.; prereq., Draw. 3. Messrs. Palmer and Whitson.

20f (1) VI-VII MTW; 10P
(2) VIII-IX MWF; 10P
(3) III-IV MFS; 10P
(4) I-II WFS; 10P

20w I-II TWTh; 10P

21w,s—Kinematics. Instant centers, centroids, point paths, gear tooth profiles, cam construction, velocity diagrams. Lectures and drafting. 2 cred.; prereq., 20. Messrs. Palmer and Whitson.

21w V-VI MThF; 10P

21s (1) I-II MThF; 10P
(2) I-II TS, VI-VII Th; 10P
(3) VI-VII MWF; 10P
(4) VIII-IX MW, III-IV S; 10P
(5) VIII-IX TThF; 10P

22f—Mechanism. Motion studies. Revolving and oscillating bodies, linkages, chains, flexible connectors, gearing, wheels in trains, epicyclic gear trains, worm and wheel, screws, straight line motions, hoists, pulley blocks, ratchets, intermittent motions. Recitations and problems. 3 cred.; prereq., 21 and M.&M. 24. Mr. Martenis.

(1) II TThS; 252ME
(2) I TThS; 252ME
(3) III MWF; 252ME
(4) IV MWF; 252ME
(5) VI MWF; 252ME
(6) III TThS; 252ME

23w—Dynamics of Machine Design. Valve mechanism; governors; static, dynamic, and reciprocating balance; crank effect diagrams; gyroscopic action; critical speeds. 3 cred.; prereq., M.&M. 127. Messrs. Ryan and Palmer.

Lect. (1) III T; 254ME
(2) IV T; 254ME
(3) III W; 254ME

Lab. (1) I-III MTh; 255ME
(2) VII-IX T, II-IV S; 151ME
(3) I-III T, VII-IX F; 255ME
(4) VII-IX W, II-IV F; 151ME

24s—Elements of Machine Design. Design of beams, shafting, columns, screw fastenings, springs, friction clutches, and brakes. Factor of safety. Stresses due to sudden applied, repeated, and reversed loads. 3 cred.; prereq., M.&M. 128. Mr. Ryan.

Rec. (1) II WF; 252ME (2) VI MF; 252ME (3) III TW; 252ME (4) I TS; 252ME
Lab. (1) I-III T; 255ME (2) II-IV S; 255ME (3) VII-IX F; 255ME (4) VI-VIII T; 255ME

26w,s—Mechanism and Kinematics (E.E., Aero.E., and Ag.E.) Kinematics of machines. Levers, linkwork, flexible connections, gearing, screws, cams, epicyclic trains. Graphical studies of velocities. Motion; intermittent, parallel, quick return, and escapements. 3 cred.; prereq., M.&M. 24. Messrs. Martenis and Palmer.

26w (1) III WThS; 252ME (2) IV MWF; 252ME (3) IV TS, VI Th; 252ME (4) I MWF; 252ME (5) I TThS; 252ME (6) II TTh, 252ME; S, 254ME
26s IV MWF; 252ME

27s—Machine Design. (Aero.E. and Ag.E.) Fundamental principles of design of machine elements; lubrication, theory and application; friction drives, shafts, screws, gears, belt connectors, springs, flywheels, machine frames, shrink fits. 3 cred.; prereq., M.&M. 128. Messrs. Ryan and Palmer.

Lect. (1) III MF; 252ME (2) II WTh; 254ME (3) I MW; 254ME (4) IV WF; 254ME
Lab. (1) VII-IX W; 255ME (2) VII-IX M; 255ME (3) VII-IX Th; 255ME (4) I-III Th; 255ME

121f—Machine Design. Spur, bevel, and worm gears; flywheels and pulleys; rotating discs; belt and rope transmission; force and shrink fits; critical speeds; lubrication. 2 cred.; prereq., 24. Mr. Ryan.

(1) VII-IX WF; 255ME (2) VII-IX MT; 225ME (3) I-III TTh; 255ME (4) VI-VIII Th, II-IV S; 255ME

122w-123s—Mechanical Engineering Design. Machine elements as applied to complete machines. Mathematical theory of lubrication; vibration analysis; stress analysis by photoelastic methods. Study of materials for special purposes, high temperatures, etc. 2 cred. per qtr.; prereq., 121. Mr. Ryan.

122w VII-IX MTh; 251ME
123s VII-IX WTh; 251ME

125w,s—Machine Design Laboratory. Experimental studies of critical speeds, vibration, balancing, and noise in high speed machinery; complex stresses in machine parts; the use of vibrograph, oscillograph, stroboscope, photoelastic polariscope, and noise meter. 2 cred.; prereq., 121. Mr. Ryan.

125w Lect. VI M; 252ME
Lab. VI-VIII F; 50ME
125s Lect. VI W; 254ME
Lab. VI-IX F; 50ME

127w—Lubrication. Hydrodynamic theory of lubrication and applications to the design and construction of thrust and journal bearings. Pressure distribution, end leakage, film thickness, temperatures, and heat losses. 3 cred.; prereq., 121; IV MWF; 254ME. Mr. Ryan.

128f—Photoelastic Stress Analysis. Fundamentals of stress analysis; optics of the polariscope; studies in tension, bending, and shear; combined stresses; concentrated stresses; auxiliary equipment; Mohr's diagrams; complex stress analysis. 3 cred.; prereq., M.&M. 128. Mr. Ryan.

129s—Vibration Engineering. Fundamental analysis; factors influencing vibration, critical speeds; rotating, reciprocating, torsional vibration; balancing; instruments for measuring and recording vibration. 3 cred.; prereq., 121; I MWF; 252ME. Mr. Ryan.

221f-222w-223s—Advanced Mechanical Engineering Design. 3 cred. per qtr.; prereq., 121 and grad. Messrs. DuPriest, Martenis, and Ryan.

STEAM ENGINEERING

30f—Steam Engineering. (A.E.) Elementary study of the steam power plant, including boilers, stokers, furnaces, fuels, combustion, steam generation, and prime movers. 3 cred.; prereq., Phys. 7 or 23. Messrs. DuPriest and Easton.

(1) II TThS; 154ME
(2) IV MWF; 154ME
(3) III MWF; 154ME
(4) VII MWF; 154ME

31w—Thermodynamics. (A.E.) Heat and mechanical energy and the laws governing the operation of machines used to convert heat energy into mechanical energy. Steam, gas, and oil engines, air compressors, refrigeration machines, and turbines. 3 cred. per qtr.; prereq., 30. Messrs. DuPriest and Easton.

Lect. (1) VII F; 254ME
(2) VIII Th; 254ME
(3) VII W; 254ME

Rec. (1) III TS; 154ME
(2) VI WF; 154ME
(3) IV MW; 154ME
(4) III WF; 154ME

Lab. (1) VIII-IX T; 154ME
(2) VIII-IX F; 154ME
(3) VI-VII M; 154ME
(4) VIII-IX W; 154ME

32f—Elementary Mechanical Laboratory. (A.E.) Calibration of pressure gages, anemometers, indicator springs. Use of steam calorimeters, planimeters, indicators. Calculations from indicator cards. Tests of mechanical appliances, lubricating oils. 2 cred.; prereq., reg. in 30. Mr. Cobb.

(1) VI-IX F; Ex
(2) VI-IX T; Ex
(3) VI-IX W; Ex
(4) VI-IX Th; Ex

33f—Elementary Mechanical Laboratory. Calibration of pressure gages, anemometers, indicator springs. Use of steam calorimeters, planimeters, indicators. Calculations from indicator cards. Tests of mechanical appliances, lubricating oils. 2 cred.; prereq., reg. in 43. Messrs. Summers and Larsen.

Lect. (1) VI T; 254ME
(2) VI M; 254ME
(3) I T; 254ME

Lab. (1) VII-IX T; 160ME
(2) II-IV T; 160ME
(3) II-IV S; 160ME
(4) VII-IX M; 160ME
(5) VII-IX W; 160ME
(6) VII-IX F; 160ME

34w—Mechanical Laboratory. Calibration of tachometers, pyrometers, steam flow meters. Valve setting. Flow of steam through orifices. Test of steam trap, surface condenser, simple steam engines. Inspection trips. 2 cred.; prereq., 33. Messrs. Summers and Larsen.

Lect. (1) I S; 254ME
(2) VI F; 254ME
(3) VI M; 254ME

Lab. (1) I-III F; 160ME
(2) VII-IX W; 160ME
(3) VI-VIII Th; 160ME
(4) II-IV S; 160ME
(5) VII-IX M; 160ME
(6) VI-VIII T; 160ME

35s—Elementary Steam and Power Laboratory. Friction test of oils. Test of hot air engine, centrifugal fan, injector, steam pump, steam boiler. Calibration of transmission dynamometer. Power study of industrial machines. Ap-

proximate analysis of fuels. Use of Mahler, Bomb, and Junkers calorimeters. 2 cred.; prereq., 34 and reg. in 132. Messrs. Summers and Larsen.

Lect. (1) III Th; 252ME (2) II M; 254ME (3) VI Th; 252ME
Lab. (1) II-IV S; 160ME (2) VII-IX T; 160ME (3) VII-IX W; 160ME (4) VII-IX M; 160ME (5) VII-IX Th; 160ME

38w—Heat Engines. (Chem.E.) Study of steam properties, steam calorimetry, elementary thermodynamics, fuels and combustion. Construction, selection, and operation of steam power plant equipment. 3 cred.; prereq., Phys. 7. Mr. Cobb.

Rec. (1) II MWF; 110Ex (2) VI MWF; 215Ex (3) II TThS; 110Ex

39w,s—Heat Engine Laboratory. (Chem.E.) Calibration and use of instruments: tests of engines, boilers, compressors, and power plant auxiliaries. 1 cred.; prereq., 38 or reg. in 38. Mr. Cobb.

39w (1) VI-VIII F; Ex (2) VI-VIII Th; Ex (3) VII-IX M; Ex
39s (1) VI-VIII Th; Ex (2) VI-VIII M; Ex (3) II-IV T; Ex

40f-41w—Heat Engines. (E.E.) Properties of steam; principles of operation of steam machinery; fuels, combustion, and smoke prevention; construction, operation, and testing of engines, turbines, boilers, condensers, pumps, and power plant equipment. Selection of equipment for different types of plants. 3 cred. per qtr.; prereq., Phys. 7 or 23. Mr. Cobb.

40f Rec. III WF; 110Ex
Lab. (1) VI-VIII M; Ex (2) VI-VIII Th; Ex
41w Rec. III WF; 201Ex
Lab. (1) VI-VIII T; Ex (2) VII-IX W; Ex

42w—Heat Engines. (C.E.) Steam generation and properties. Fuels and combustion. Construction and operation of boilers and auxiliaries. Elementary thermodynamics. Use and calibration of engine-room instruments. Types, details, and tests of steam engines, steam turbines, gas engines, and air compressors. Performance and adaptability of power equipment. 4 cred.; prereq., Phys. 7 or 23. Mr. Cobb.

(1) I TThS, VI W; 201Ex (2) III MWThS; 110Ex

43f—Steam Engineering. (M.E.) An introductory course dealing with power plant equipment and steam generation. 3 cred.; prereq., Chem. 5 and Phys. 7 or 23. Messrs. DuPriest and Easton.

Lect. (1) VII Th; 254ME (2) VI Th; 254ME (3) VII T; 254ME
Rec. (1) I ThS; 154ME (2) II WF; 154ME (3) VI MF; 154ME (4) IV TS; 154ME (5) III ThS; 154ME (6) I MW; 154ME

131w-132s—Thermodynamics. A critical study of the properties of gases and vapors and the fundamental laws for conversion of heat energy into mechanical energy in steam engines, gas engines, air compressors, refrigeration machines, steam turbines, etc. 3 cred. per qtr.; prereq., 9 or 43, M.&M. 25. Messrs. DuPriest and Easton.

131w Lect. (1) VI T; 254ME (2) VII T; 254ME (3) II T; 254ME
Rec. (1) II TS; 154ME (2) I TS; 154ME (3) I WF; 154ME (4) III MTh; 154ME (5) IV TS; 154ME

	Lab.	(1) VIII-IX M; 154ME (2) VIII-IX Th; 154ME (3) I-II M; 154ME	(4) I-II Th; 154ME (5) VI-VII Th; 154ME
132s	Lect.	(1) VII F; 254ME (2) VI F; 254ME	(3) III F; 154ME
	Rec.	(1) III MW; 154ME (2) II TTh; 154ME (3) I TS; 154ME	(4) III TTh; 154ME (5) IV TS; 154ME
	Lab.	(1) VI-VII T; 154ME (2) VIII-IX F; 154ME (3) VIII-IX M; 154ME	(4) VI-VII Th; 154ME (5) VI-VII W; 154ME

138w—General Laboratory. (a) Calibration of pressure gages and anemometers. Use of steam calorimeters. Steam indicator practice, card calculation, valve setting. Tests of steam engines, steam turbines, gas engines, air compressors, and pumps. Physical tests of lubricating oils. (b) The use of hydraulic measuring devices, weirs, differential gages, etc. in the tests of centrifugal pumps, hydraulic turbines, and rams. 2 cred.; prereq., Min.E. 122; VI-IX Th; Ex. Messrs. Shoop and Straub.

141f,w—Power Plant Engineering. Theory, practice, and economics relating to prime movers and steam generating equipment of the modern power plant, including auxiliary units such as condensers, heaters, purifiers, pumps, fans, piping, etc. 3 cred.; prereq., 132. Mr. Shoop.

141f	(1) II MWF; 252ME	(2) I MWF; 252ME
141w	(1) I MWF; 110Ex	(2) II MWF; 201Ex

144w—Steam Turbines. Theory and practice applied to various types. Thermodynamics and mechanical analysis of problems involved in the design of nozzles, blades, rotors, etc. Condition of operation; systems of transmission; lubrication; economy; field of service. Laboratory investigation. 3 cred.; prereq., 132; IV MWF; 201Ex. Mr. Shoop.

145w—Applied Thermodynamics. Laws of heat transmission, mean temperature difference, in condensers, boilers, brine coils, feed water heaters. Treatment of cooling towers, accumulators, multiple stills, stage evaporators, vapor refrigeration; air compressors, multi staging, intercooling, etc. 3 cred.; prereq., 132, 35; III T, 110Ex; ThS, 201Ex. Mr. Shoop.

146s—Fuels and Combustion. Fuels: classification and analyses. Hand and stoker treatment; regulation. Pulverized and liquid fuels. Types of burners, controls. Combustion; generation of heat; furnace gases; stratification; flame way; smoke prevention. Furnaces. Lectures and recitations. 3 cred.; prereq., 141; I MWF; 215Ex. Mr. Shoop.

147w—Design of Steam Machinery. Piping systems, furnace and gas passage dimensions, stokers, oil, gas, and pulverized fuel burners, superheaters, feed water heaters, and pumps, air preheaters, automatic controls, chimneys, etc. 2 cred.; prereq., 141 or reg. in 141; VII-IX MW; 255ME. Mr. Shoop.

148s—Design of Power Plant Units. Treatment of condensers, air pumps, cooling towers, stage evaporators, reheaters, etc. 2 cred.; prereq., 147; VII-IX MT; 251ME. Mr. Shoop.

149f,w,s—Advanced Steam Laboratory. Tests of steam turbines, uniflow and compound steam engines, condensers, evaporators, and vacuum pumps. Tests of compound steam pump. Air compressor, boiler, superheater, and power plant. Studies of fluid flow meters and air-conditioning apparatus. 2 cred.; prereq., 132 and 35, 141 or reg. in 141. Mr. Shoop.

149f,w	(1) I-IV T; Ex	(2) VI-IX T; Ex
149s	(1) I-IV T; Ex	(2) VI-IX F; Ex

241s—Advanced Thermodynamics. Reversible changes of state and efflux of wet and superheated vapors. Flow of compressible fluids in mains, moving channels, into receivers, and communicating vessels. Gas mixtures, critical points, liquefaction. Power plant cycles: regenerative, reheating, and bleeding. 3 cred.; prereq., 145. Mr. Shoop.

242f-243w—Power Plant Design. Problems, designs, and estimates for power plants and central stations. Selection of motive powers, relative advantages of steam, producers, and gas plants. Choice of engines and boilers; pumps, piping, and accessories. 2 cred. per qtr.; prereq., 148. Mr. Shoop.

244s—Power Plant Management. Operation and maintenance of boilers, engines, steam turbines, and accessory apparatus. Smoke prevention, lubricants and lubrication. Power plant finance. Daily logs and power costs. Study of recent power researches. 3 cred.; prereq., 141. Mr. Shoop.

INTERNAL COMBUSTION ENGINES

50f,w,s—Auto and Airplane Engines. Principles and types. Electrical systems. Lubrication and cooling. Carburetors. Accessories. 3 cred.; soph. Messrs. Robertson and Ford.

50f (1) I TThS; 110Ex (2) III TFS; 215Ex
50w (1) I TThS; 110Ex (2) III MW, II S; 215Ex
50s I MWF; 110Ex

55s—Internal Combustion Engines. (E.E.) Brief course in theory and laboratory, including real gas cycles, combustion, fuels and lubrication; construction and performance of gasoline, Diesel, and compression-ignition engines. 3 cred.; prereq., 41. Messrs. Robertson and Ford.

Rec. III WF; 110Ex
Lab. (1) VII-IX Th; Ex (2) II-IV S; Ex

150f,w—Internal Combustion Engines. Study of real gas cycles, combustion, fuels. Construction and performance. Characters of Otto, Diesel, and compression-ignition engines. Carburetion, fuel injection, cooling, lubrication. Auxiliary systems. 3 cred.; prereq., 31 or 131. Messrs. Robertson and Ford.

150f (1) II MWF; 254ME (3) I MWF; 254ME
(2) III TThS; 254ME (4) II TThS; 254ME
150w (1) II MFS; 252ME (2) I MWF; 254ME

151w—Advanced Internal Combustion Engines. Special reference to automobile, truck, and airplane engines. Theoretical consideration of fuels, combustion, detonation, lubrication, etc. 3 cred.; prereq., 150; VI MF, I S; 135E. Mr. Robertson.

152s—Diesel Engines. An advanced course in the theory, design, operation, and economics of the Diesel engine. 3 cred.; prereq., 150; I MWF; OSL. Mr. Robertson.

153w—Engine Service Management. Instruments and methods used in servicing or reconditioning automobile and airplane engines. Causes of mechanical failure and wear. Permissible tolerance in worn parts. Lubrication and ignition service. 3 cred.; prereq., 150; I MWF; OSL. Messrs. Robertson and Ford.

154w,s—Design of Airplane Engines. Study of the designs of radial and in-line aircraft engines. Drawing room problems, including graphical and analytical calculations of stresses in moving parts. Combined polar diagrams of bearing loads, etc. 2 cred.; prereq., 150. Messrs. Robertson and Ford.

154w II-IV W, I-III Th; OSL
154s II-IV W, VII-IX F; OSL

155s—High Speed Engine Testing. Use of modern research instruments and methods for testing. Experiments showing effect of fuel mixture, distribution, spark timing, etc., upon general engine performance. 2 cred.; prereq., 158 or 159; VII-IX MT; OSL. Mr. Robertson.

156w,s-157s—Design of Internal Combustion Engines. Detailed study of design of automotive and stationary engines. Problems, including calculation of cylinders, bearing loads, stresses in moving parts, and valve mechanisms. 2 cred.; prereq., 121, 150 for 156, 154 or 156 for 157. Messrs. Robertson and Ford.

156w II-IV W, I-III Th; OSL
156s-157s II-IV W, VII-IX F; OSL

158f,s—Aero Engine Testing. The use of modern instruments for testing gasoline, Diesel, and aircraft engines. The use of dynamometers and torque stands in determining engine performance. 2 cred.; prereq., 150 or reg. in 150. Mr. Robertson.

158f (1) III-IV M, VI-IX F; OSL (2) III-IV, VI-IX M; OSL
158s (1) VI-IX T, II-III Th; OSL (2) II-III M, VI-IX W; OSL (3) II-III M, VI-IX Th; OSL

159f,w,s—Internal Combustion Engine Laboratory. Tests of gasoline, semi-Diesel, and Diesel engines. Power plant units and automotive engines. 2 cred.; prereq., 150 or reg. in 150. Messrs. Robertson and Ford.

159f (1) VI-IX T; Ex (2) VI-IX W; Ex
159w (1) VI-IX T; Ex (2) VI-IX F; Ex
159s (1) I-IV T; Ex (2) VI-IX W; Ex

250f,w,s—Dynamics of High Speed Engines. Advanced study of inertia forces; balancing high speed multi-cylinder engines; engine torque analysis; torsional vibration, etc. Conferences, assigned readings, and problems. 3 cred.; prereq., 121, 150. Mr. Ford.

251f-252w-253s—Automotive Vehicles. A study of transmission systems, running gears, chassis, bodies, riding qualities of vehicles, and current developments; lecture and problems. Grad. only. Cred. ar. Messrs. Robertson and Ford.

254s—Automobile Fleet Maintenance. Study of available types of motor coaches and trucks, their design features from a maintenance viewpoint, a survey of service depot requirements with a study of fleet service methods and maintenance practice. 3 cred.; prereq., 150. Mr. Robertson.

255f-256w-257s—Automobile Testing and Research. Dynamometer and road tests including over-all efficiency of cars at various speeds, fuel consumption, effect of road surface on traction, efficiencies, and general performances. Special research problems. 2 cred. per qtr.; prereq., 55 or 159. Mr. Robertson.

258s—Motor Truck and Bus Transportation. Problems involving motor truck transportation, capacity of trucks, trailers, drawbar pull. Efficiencies. Effect of road surface. Freight handling. Analysis of costs of truck operation and maintenance. Relative costs of transportation. 3 cred.; prereq., 152. Mr. Robertson.

HEATING, VENTILATION, AND REFRIGERATION

160f—Heating and Ventilation. Principles of heating, ventilation, and air conditioning. Warm air, steam, hot water, vapor, vacuum, and fan systems of heating; pipe systems; heat regulation. Ventilation and air conditioning, central station heating. 3 cred.; prereq., 131, M.&M. 127, 129. Messrs. Rowley, Algren, and Jordan.

Lect. (1) III W; 201Ex (2) VI M; 201Ex
Rec. (1) II ThS; 201Ex or III ThS; 201Ex (2) IV TS; 201Ex or I ThS; 201Ex

161w-162s—Heating, Ventilation, and Air Conditioning Design. Calculations of heating and cooling loads; selection and arrangement of equipment; design of complete heating, ventilation, and air conditioning systems for various types of buildings. 2 cred. per qtr.; prereq., 160. Messrs. Algren and Jordan.

161w II-IV T, I-III Th; 251ME
162s I-IV T, I-II Th; 229E

164s—Heating and Ventilation. (Arch.) Principles of heating, ventilation, and air conditioning. Heating systems; furnaces, steam, hot water, vapor, vacuum and fan blast. Piping systems. Ventilation, air conditioning, and methods of control. 2 cred.; prereq., M.&M. 92; I TTh; 110Ex. Messrs. Rowley and Algren.

165w—Advanced Heating, Ventilation, and Air Conditioning. Requirements for comfort, health, and industrial processes. Thermodynamics of air vapor mixtures. Heating, cooling, humidification, dehumidification. Atmospheric impurities, sources, classifications, methods of elimination. Air supply and distribution. Methods of control and application. 3 cred.; prereq., 160; IV MWF; 110Ex. Messrs. Rowley and Algren.

166s—Refrigeration. Principles of refrigeration. Various types of refrigerating machines, refrigerants, applications to ice making, cold storage, and air conditioning. 3 cred.; prereq., 132; IV MWF; 110Ex. Messrs. Rowley and Algren.

167s—Advanced Heating, Ventilation, and Air Conditioning. Special problems including air conditioning, heat transfer, heating and cooling loads, solar radiation, etc. Equipment and test methods. 3 cred.; prereq., 160; I MWF; 201Ex. Mr. Rowley.

169f,w,s—Heating and Ventilation Laboratory. Tests of heating, ventilation, and air conditioning equipment. The determination of air qualities as required for comfort and for specific industries. Tests and studies of complete installation. 2 cred.; prereq., 35, 160 or reg. in 160. Messrs. Algren and Jordan.

169f	(1) I-IV T; Ex	(3) VI-IX W; Ex
	(2) VI-IX T; Ex	
169w	(1) I-IV T; Ex	(2) VI-IX F; Ex
169s	(1) VI-IX W; Ex	(2) VI-IX F; Ex

197w—Mechanical Equipment of Buildings. Investigation of heating, ventilating, refrigerating, power, elevator, fire protection, and special equipment for large buildings. Disposal of wastes, light distribution, communication, and plumbing. Lectures, inspection trips, reports with equipment layouts. 3 cred.; prereq., 160, Phys. 9. Mr. Martenis.

265f,w,s—Advanced Heating, Ventilation, and Air Conditioning. Taken in connection with research work in the laboratory. Cred. ar.; grad. only; prereq., 160. Mr. Rowley.

INDUSTRIAL ENGINEERING

70f—Mechanical Technology. Study of mechanical processes involved in various manufacturing industries and in the development and utilization of power. Lectures by various specialists. 1 cred.; open only to soph., jr., and sr.; IV T, III Th; 305E. Mr. Richards.

74s—Safety Engineering. Safety of the worker; fire and other hazards; prevention of industrial accidents. Compensation laws. Fire prevention; construction; automatic sprinkler systems. Effect of safety on production. Factory sanitation. Safety organization. Lectures, assigned reading, factory inspections, and reports. 3 cred.; prereq., 72. Mr. Koepke.

77s—Manufacturing Costs. Determination of factory costs as applied to quantity production. Collection, analysis, and distribution of the costs of labor, materials, and overhead, together with the factors which control costs. 3 cred.; prereq., 72. Mr. Koepke.

83s—Elementary Industrial Engineering. Evolution of modern manufacturing methods and resulting changes in factory costs, labor relationships, and management problems. 3 cred.; prereq., 72, Econ. 9. Mr. DuPriest.

170s—Tool and Jig Design. The design of tools, jigs, dies, and fixtures for manufacturing interchangeable parts. Two lectures, one three-hour laboratory. 3 cred.; prereq., 72, 171. Mr. Crowder.

Lect. VI T, I Th; 202ME
Lab. I-III T; 251ME

171f,w—Production Control. Detailed study of principles used to facilitate factory production. The theoretical considerations involved in getting materials and machines co-ordinated to produce products at minimum costs. 3 cred.; prereq., 72; IV MWF; 202ME. Mr. Koepke.

172w—Industrial Plants. Geographical location, design, and layout of industrial plants. Includes discussions on lighting, heating, ventilation, sanitation, distribution of power, material handling equipment. Lectures and laboratories. Laboratory work includes problems taken directly from local plants. 3 cred.; prereq., 171. I TS, 202ME; I-III Th, 205ME. Mr. Koepke.

173s—Industrial Organization. Problems involved in organizing and controlling factory organizations. 3 cred.; prereq., 172; I MWF; 202ME. Mr. Koepke.

174f,w,s—Motion and Time Study Laboratory. Training in motion and time study as a tool in industrial management. Wage systems, rate setting. Particular emphasis on cost reduction due to better methods. One lecture, one three-hour laboratory. Laboratory problems taken directly from local industries. 2 cred.; prereq., 72, 171, or B.A. 89, or reg. in 171. Mr. Whitson.

174f	Lect. III W; 202ME	
	Lab. (1) VII-IX T; 205ME	(2) VI-VIII F; 205ME
174w	Lect. III W; 202ME	
	Lab. (1) II-IV T; 205ME	(2) VI-VIII T; 205ME
174s	Lect. III F; 202ME	
	Lab. (1) II-IV T; 205ME	(2) VI-VIII Th; 205ME

175w—Materials Handling. Detailed study of equipment necessary for economical transportation and storage of materials and parts during the process of manufacturing; economic considerations involved in the selection of proper type of material handling equipment, arrangements for storing, checking, and issuing materials. 2 cred.; prereq., 172, or reg. in 172. II M, II-III F; 205ME. Mr. Whitson.

179s—Industrial Relations. The relations of a personnel department to industrial engineering. Foreman training, job analysis, service departments. Lect. and lab. 3 cred.; prereq., 171. Mr. Whitson.

277f-278w-279s—Industrial Engineering Problems. Special investigations of practical problems and suggested methods of procedure. Lectures, assigned reading, shop visits, and reports. 3 cred. per qtr.; grad.; prereq., 173, 174. Mr. Koepke.

GENERAL

189s—Hydraulic Machinery. Theory of operation, design, construction, and regulation of water turbines. Turbine testing; characteristics, selection of type. Cost of turbines and water power. 3 cred.; sr.; prereq., M.&M. 129.

190f-191w-192s—Seminar. Reading of assigned articles in current technical press. Classroom presentation of principal features of assigned articles. 1 cred. per qtr.; sr. Mr. DuPriest.

190f	(1) VI W; 154ME	(4) III T; 154ME
	(2) VI T; 154ME	(5) VIII M; 154ME
	(3) II M; 154ME	(6) VIII W; 154ME
190w	(1) VI T; 154ME	(4) II W; 154ME
	(2) IV F; 154ME	(5) ar.
	(3) II F; 154ME	(6) ar.
192s	(1) II S; 154ME	(4) II W; 154ME
	(2) IV W; 154ME	(5) VI M; 154ME
	(3) IV F; 154ME	(6) ar.

193s—Engineering Economics. The cost factor in engineering problems as affected by plant location, kinds of products, size of industry, transportation, marketing, class of labor, etc. Allocation of costs, sunk costs, excess production costs, break even costs, ultimate economy, estimating, specifications, and contracts. 3 cred.; prereq., jr. or sr. in engineering; I MWF; 154ME.

194w,s—Advanced Engineering Problems. Opportunity will be offered for carrying on special investigations in the various fields of mechanical engineering. 2 cred.; registration by permission of the division chief in charge of work. Open only to sr. M.E.

195s—Inspection Trip. During the latter part of the senior year an inspection trip is made to various industrial plants to study mechanical equipment, manufacturing methods and processes. Required of senior mechanical engineers. 1 cred. Mr. DuPriest.

281f—Railway Technology. Systematic course of visits to the various railroad shops in the vicinity to study locomotive details and classifications. Locomotive practice. 1 cred.; prereq., M.&M. 127, 128, 129. Mr. Martenis.

282f-283w-284s—Locomotive Design and Construction. Locomotive details. Design of boiler, cylinders, frame, springs, trucks, axles, wheels, running gear, equalizing arrangements, valve gears, lubrication. Lectures, assigned reading, and drafting. 3 cred. per qtr.; prereq., 281. Mr. Martenis.

290f-291w-292s—Mechanical Engineering Research. Investigations in connection with lubrication, fuels, furnaces, boilers, steam engines, turbines, gas engines, heating and ventilation, industrial and other engineering problems. Cred. as ar. per qtr.; grad. Messrs. DuPriest, Koepke, Rowley, Shoop, Martenis, Robertson, and Summers.

METALLURGY

1f—Assaying. Lectures on the fire assaying of ores and metallurgical products. Theory of sampling, balance manipulation, furnaces, slag calculations, oxidation, reduction, special methods, etc. 2 cred.; prereq., Chem. 5 or equiv.; I MWF; 108M. Mr. Schlechten.

2f—Assaying Laboratory. Application of the principles of fire assaying. Practical determination of gold, silver, and lead in ores and metallurgical products. Metallurgists 3 cred.; prereq., reg. in Met. 1. Messrs. Pease and Schlechten. VI-IX WF; 7M

3f—Assaying Laboratory. Application of the principles of fire assaying. Practical determination of gold, silver, and lead in ores and metallurgical products. 1 cred.; miners, geologists, and petroleum engineers; prereq., reg. in Met. 1; VI-IX W or VI-IX F; 7M. Messrs. Pease and Schlechten.

11w—Metallurgy of Pig Iron. Raw materials, construction, and basic principles of the blast furnace process. Chemistry of the process. Fluxes and slags. Principles for controlling operation and products. 3 cred.; prereq., Chem. 5 or equiv.; I MWF, III Th; 108M. Mr. Joseph.

12s—Metallurgy of Steel. Steel producing processes and various types of steel. Modern furnace construction. Chemistry of refining processes. The application of protective coatings to steel products. 3 cred.; prereq., 11; III MWF, I Th; 108M. Mr. Scott.

13s—General Ferrous Metallurgy. Short course for mining, petroleum, mechanical, electrical, or chemical engineers. The basic principles of the production of pig iron and its refining into steel. Construction of blast furnaces and steel furnaces. Chemistry of iron and steel processes. 2 cred.; prereq., Inorg. Chem. 16 or equiv.; I MWF; 108M. Messrs. Joseph and Scott.

14w—Metallurgy of Copper, Lead, and Zinc. Short course for mechanical, electrical, or chemical engineers. Methods of extraction, recovery, smelting, and refining. 3 cred.; prereq., Inorg. Chem. 8 or equiv.; IV MWF; 108M. Mr. Pease.

106f—Metallurgy of Base Metals. Consideration of principles, methods, and appliances used in smelting and refining of lead, copper, zinc, and other nonferrous metals. Lectures and recitations. 2 cred.; prereq., 12 or 13; III TTS; 108M. Mr. Pease.

107w—Metallurgy of Base Metals. Continuation of Course 106. 2 cred.; prereq., 106; III TThS; 108M. Mr. Pease.

108s—Metallurgy of Precious Metals. Principles, methods, and appliances used in amalgamation, concentration, cyanidation, smelting, and refining of gold, silver, and other precious metals. 2 cred.; prereq., 107; III TThS; 108M. Mr. Pease.

110f—Ore Dressing. A study of jaw and gyratory crushers, ball mills, rod mills, tube mills, volumetric sizing, gravimetric sizing. Concentration by tables, jigs, bowl classifiers, log washers, and miscellaneous devices used in ore dressing. 2 cred.; prereq., Geol. 24; III MWF; 202M. Mr. Searles.

111f—Ore Dressing Laboratory. A practical examination of ores and use of ore dressing machinery as outlined in Course 110. 1 cred.; prereq., with 110; VI-IX F; 203M. Mr. Searles.

112w—Ore Dressing. A study of the principles involving flotation. Special attention to chemical and physical action of the different reagents used, such as frothing, collecting, depressing, activating, conditioning, etc. Also a study of liberation and particle size, grinding circuits and flotation machinery. 2 cred.; prereq., 110; III MWF; 202M. Mr. Searles.

113w—Ore Dressing Laboratory. A practical examination of ores by flotation. This course involves the grinding, use of proper reagents, and examination of products. 1 cred.; prereq., reg. in 112; VI-IX F; 203M. Mr. Searles.

114s—Ore Dressing. An advanced course designed primarily for Group A metallurgists. A continuation of Course 112 giving more detailed study of ore dressing problems. 2 cred.; prereq., 113; III MWF; 202M. Mr. Searles.

115s—Ore Dressing Laboratory. Special problems in ore dressing involving the use of the microscope. A study of polished sections to determine the minerals present, grain size, and association of minerals. 1 cred.; prereq., 114, Geol. 165; VI-IX F; 203M. Mr. Searles.

116s—Ore Dressing Laboratory. A course designed for students of mining and geology. The course incorporates a part of Course 111 and Course 113. 1 cred.; prereq., 112; VI-IX Th; 203M. Mr. Searles.

121f—Ore Testing (Iron Ores). Methods of beneficiation, principles, methods and machines, concentration, formulae, metallurgical and economic considerations. 2 cred.; prereq., 110. Mr. Davis.
Lect. VI F; MEx
Lab. VII-IX F; MEx

122w—Ore Testing. Determination of methods for metallurgical and economic extraction of nonferrous metals from ores. Involves amalgamation, concentration, and cyanidation. Lecture and laboratory. 4 cred.; prereq., 121. Mr. Pease.
Lect. III MW; 108M
Lab. VI-IX MW; 7M

123s—Ore Testing. Continuation of Course 122. Consideration of factors affecting extraction. Study of distribution of values in mill and metallurgical products. 4 cred.; prereq., 122. Mr. Pease.
Lect. III MW; 109M
Lab. VI-IX MW; 7M

124—Special Problems in Ore Testing. Detailed study of ore testing problems. Causes of nonextraction. Methods of correction. Relation of values. Cred. and hr. ar.; prereq., 112. Mr. Pease.

125—Special Problems in Ore Testing. Continuation of Course 124. Cred. and hrs. ar.; prereq., 124. Mr. Pease.

126s—Special Problems in Metallurgy for Miners. Study of metallurgical problem in relation to mine development. Conferences, together with laboratory work. 3 cred.; prereq., 121. Mr. Pease.
Lect. II TS; 108M
Lab. VI-IX W; 7M

130-131-132—Special Problems in Metallurgy. Seminar work on metallurgical problems. Cred. and hrs. ar.; prereq., sr. Met.E. or grad. Messrs. Joseph and Pease.

133w—Electrometallurgy. Application of electricity to thermometallurgy. Design and operation of electric furnaces and their use in smelting of metals and in the production of ferro alloys. 3 cred.; prereq., 12. Mr. Scott.
Lect. I TThS; 108M
Lab. VI-VIII W; 7M

134f—Advanced General Metallurgy. Refractories, fuels, and principles of combustion. Thermochemistry of important reactions in process metallurgy. 4 cred.; prereq., 12. Mr. Joseph.
Lect. II MWF; 108M
Lab. VI-IX Th

135w—Advanced Metallurgy of Iron and Steel. Detailed study of the blast furnace process. Economics of raw materials, their size, preparation, and physical properties. Control of slag-metal reactions. Trend in furnace design and practice. 4 cred.; prereq., 134. Mr. Joseph.
Lect. II MWF; 108M
Lab. VI-IX Th

136s—Advanced Metallurgy of Iron and Steel. A detailed study of steel processes and current problems in controlling quality of product. The physical chemistry of steel making and its application to production problems. 4 cred.; prereq., 135. Mr. Scott.
Lect. II MWF; 111M
Lab. VI-IX F

137w—Metallurgical Problems (Nonferrous). Conferences, lectures, and laboratory on selected problems. 4 cred.; prereq., 108. Mr. Pease.
Lect. IV TS; 108M
Lab. I-II TTh, VI-IX F; 7M

138s—Metallurgical Problems (Nonferrous). Continuation of Course 137. 4 cred.; prereq., 137. Mr. Pease.
Lect. I F, II S; 108M
Lab. I-II TTh, VI-IX Th; 7M

139su—Field Work in Metallurgy. Study of metallurgical operations at mills, smelters, and refineries. Detail reports are required covering plants visited. 6 cred.; 3 weeks beginning about September 1. Mr. Pease.

141f-142w-143s—Special Problems. Special problems in the production of iron and steel. Conferences, laboratory work. 3 cred. per qtr.; prereq., sr. Met.E. or grad. Messrs. Joseph and Scott.
141f III W, VI-IX MT
142w III-IV M, VI-VIII T, VI-IX F
143s VI T, VI-IX MW

175su—Field Trip. Study of metallurgical operations in important iron and steel centers. 6 cred.; prereq., jr. year; three weeks beginning about September 1. Mr. Joseph or alternate.

204-205-206—Special Problems in Advanced Metallurgy. Intended primarily for research work for graduate students. Cred. and hrs. ar. Messrs. Joseph and Pease.

METALLOGRAPHY

150f—Metallography for Electrical Engineers. Principles of metallography, including pyrometry, thermal analysis, constitution diagrams, microscopic and photomicrographic technique; study of typical alloys with special reference to electrical resistance, conductivity, magnets, etc. Laboratory work and demonstrations. 3 cred.; jr., sr. E.E. Mr. Forsyth.
Lect. I TS; 315M
Lab. VII-IX M; 17M

152f—Metallography for Aeronautical Engineers. Principles; metallography of iron and steel with special reference to alloy steels, and light alloys used in airplane construction. Laboratory work and demonstrations. 3 cred.; prereq., sr. Aero.E. Messrs. Dowdell and Jerabek.
Lect. I TS; 315M
Lab. (1) VII-IX M; 17M (2) VII-IX W; 17M

153f-154w-155s—Metallography. (Long course for metallurgical engineers). Theory of metallic alloys. Metallographic technique. Properties of metals and alloys. Metallography of iron and steel and commercial alloys. Technical metallography. Laboratory work. 4 cred. per qtr.; prereq., Met.E. 12 or equiv. Mr. Forsyth.
153f-154w Lect. I MWF; 315M
Lab. VI-IX T; 307M
155s Lect. I MWS; 315M
Lab. VI-IX T; 307M

156w—Metallography for Mechanical, Mining, and Petroleum Engineers. Principles of metallography, including pyrometry, thermal analysis, constitution diagrams, microscopic and photomicrographic technique; metallography and heat treatment of iron and steel. Laboratory work. 3 cred.; prereq., jr., sr. M.E., Min.E., or Pet.E. Mr. Dowdell.
Lect. III ThS; 315M
Lab. (1) VII-IX W; 307M (2) VII-IX F; 307M

157s—Advanced Metallography for Mechanical, Mining, and Petroleum Engineers. Metallography of alloy steels, tool steels, high speed tool steels, and important nonferrous alloys; metallography applied to engineering practice and specifications. Outside reading and special reports. Laboratory work. 3 cred.; prereq., 156. Mr. Dowdell.

Lect. IV MW; 305M
Lab. VII-IX F; 307M

160f,w—Metallography. (Chem.) Principles of metallography, including constitution diagrams, preparation and standardization of thermocouples, preparation and thermal analysis of alloys, their microscopic examination and photomicrographs; typical alloy systems such as iron carbon (steel, cast iron), and some nonferrous alloys. Lab. work; 3 cred.; prereq., Anal. Chem. 1, 2. Mr. Jerabek.

160f Lect. III MF; 111M
Lab. (limit 20 students per section)
(1) VI-VIII Th; 17M (3) I-III S; 17M
(2) VI-VIII F; 17M

160w Lect. III MF; 111M
Lab. (limit 20 students per section)
(1) VI-VIII M; 17M (3) VII-IX F; 17M
(2) VII-IX W; 17M

161w—Advanced Metallography. (Chem.) Metallography and heat treatment of iron and steel, including alloy steels, commercial uses of various steels, and engineering specifications. 2 or 3 cred. depending on lab.; prereq., 160. Mr. Jerabek.

Lect. IV MF; 109M
Lab. VI-VIII Th; 307M

162s—Advanced Metallography. (Chem.) Metallography of the nonferrous metals with a study of the constitution diagrams, properties, and uses of important commercial alloys. 2 or 3 cred. depending on lab.; prereq., 160. Mr. Jerabek.

Lect. III MF; 306M
Lab. VI-VIII Th; 307M

163f—Advanced Metallography. Seminar work on recent advances in metallography. Lectures and recitations, with outside reading and special reports. May be accompanied by laboratory work. 3 cred.; prereq., 6 cred. in metallography. I TThS; 306M. Mr. Dowdell.

164w—Advanced Metallography. Advanced consideration of the structures, properties, and uses of metals and alloys. May be accompanied by laboratory work. 3 cred.; prereq., 6 cred. in metallography. I TThS; 306M. Mr. Dowdell.

165s—Advanced Metallography. Technical metallography as applied to the automotive industry. Lectures and special reports. May be accompanied by laboratory work. 3 cred.; prereq., 6 cred. in metallography. I MWF; 306M. Mr. Dowdell.

166f-167w-168s—Laboratory. Laboratory work on special problems in ferrous, nonferrous, and X-ray metallography. 3 cred. per qtr.; prereq., 155. Mr. Dowdell.

166f Lect. III W
Lab. VI-IX MT
167w III-IV M, VI-VIII T, VI-IX F
168s Lect. VI T
Lab. VI-IX MW

170f,w,s-171f,w,s-172f,w,s—Special Problems in Metallography. Seminar work in metallographic problems. Cred. and hrs. ar.; prereq. sr. Met.E. or grad. Messrs. Dowdell, Jerabek, and Forsyth.

201f-202w-203s—Advanced Metallography for Graduate Students. Intended primarily for research work. Mr. Dowdell.

210f-211w-212s—Thesis Courses for Graduate Students. Intended primarily for research work. Cred. and hrs. ar. Mr. Dowdell.

MILITARY SCIENCE AND TACTICS

All physically fit male students in the Institute of Technology who are citizens of the United States may take instruction in military science for three hours each week as prescribed for the Basic Course, Senior Division, R.O.T.C. Students registered in Electrical Engineering are assigned to the Signal Corps, all others in Engineering, Architecture, Chemistry, and Mines are assigned to the Coast Artillery (anti-aircraft), except that students whose programs will render them eligible for the Advanced Course of Signal Corps in the cryptographic, photographic, or supply specialties may be assigned to that unit by arrangement.

The University allows six credits for the two years' Basic Course. These credits may be applied as elective credits in qualifying for a degree.

Students who have completed the Basic Course, may be selected for advanced work by the professor of military science and tactics. Those who pursue the Advanced Course are required to sign an agreement with the government to continue the two years' course to completion. This includes attendance at a six weeks' training camp, normally held during the summer following the first year of advanced work. The camp is conducted free of cost to the student, and in addition, while actually in camp, the student receives pay. Students pursuing the Advanced Course are also furnished a special uniform and receive a fixed allowance per day. The total government compensation for the two years' advanced work amounts to something over $200. Students who satisfactorily complete the Advanced Course will be commissioned in the Officers' Reserve Corps of the United States Army.

The University allows 18 credits for the two years' Advanced Course of the Coast Artillery Corps (5 hrs. per week) and 15 credits for the Advanced Course of the Signal Corps (4 hrs. per week). These credits may be applied towards graduation.

1f-2w-3s—First Year Basic Course, R.O.T.C.

Coast Artillery. Duties of the coast artillery soldier, with special reference to anti-aircraft equipment and methods; weapons and materiel; organization; leadership; military history; obligations of citizenship; courtesies and customs of the service; marksmanship; national defense and the R.O.T.C.; military sanitation and first aid; map reading. 1 cred. per qtr.; prereq., M.&M. 9 and Draw. 10.

1f	(1) III MWF; A (2) VI MWF; A	(3) VIII MWTh; A
2w	(1) III MWF; A (2) VI MWF; A	(3) IX MWF; A
3s	I M, I T or VII T, V and IX T; A	

Signal Corps. Duties of the signal corps soldier; relationship of the citizen to his government; military history; field telephone and telegraph systems; equipment and operation; discipline and courtesies; national defense and

the R.O.T.C.; sanitation and first aid; army organization; map reading; leadership. 1 cred. per qtr.; prereq., reg. in E.E. or by arrangement with instructor. Captain Maddocks.

1f (1) III MWF; A (3) VIII MWTh; A
(2) VI MWF; A
2w VI MWF or ar.; 321EE†
3s V, VII, and IX T or ar.; 321EE

4f-5w-6s—Second Year Basic Course, R.O.T.C.

Coast Artillery. Duties of non-commissioned officer of Coast Artillery; weapons and materiel; motor transportation; aircraft identification and characteristics; position finding and fire control for seacoast and anti-aircraft artillery. 1 cred. per qtr.; prereq., 1-2-3, M.&M. 11, 12, or equiv.

4f (1) II TThS; A (3) VIII MWTh; A
(2) IV MWF; A
5w (1) II TThS; A (3) IX MWF; A
(2) IV MWF; A
6s (1) I M, V, IX T; A (2) I, V, IX T; A

Signal Corps. Duties of the signal corps noncommissioned officer; field radio telegraph and telephone systems and equipment; code practice, radio procedure and table sets; signal communication for all arms; leadership. 1 cred. per qtr.; prereq., 1-2-3. Captain Maddocks.

4f-5w III MWF; 321EE
6s II, V, and IX T; 321EE

151f-152w-153s—First Year Advanced Course, R.O.T.C.

Coast Artillery. Duties of the coast artillery officer; aerial photographic reading; leadership; basic gunnery, methods of adjusting fire, principles of probability; position finding, gunnery and fire control for anti-aircraft artillery; administration; defense against chemical warfare; signal communications; orientation. 3 cred. per qtr.; prereq., 4-5-6. Major Berry.

151f-152k (1) II MTWThF; A (3) VI MWF, VII MW; A
(2) IV MTWFS; A
153s (1) II MWF, V, IX T; A (3) VI MWF, V, IX T; A
(2) IV MWF, V, IX T; A

Signal Corps. Duties of signal corps officer; message center procedure; homing pigeons; cryptography; aerial photograph reading; defense against chemical warfare; administration; division organization; installation and operation of field telephone, telegraph, and radio sets; signal communication tactics and transmission of decisions in form of orders to subordinates; leadership. 4 class and lab. hrs. per week. 2 cred. per qtr.; prereq., 4-5-6 and reg. in E.E. 64-65-66 or by arrangement with instructor. Captain Maddocks.

151f-152w IV MTWF; 321EE
153s V, VII, IX T; 321EE

154f-155w-156s—Second Year Advanced Course, R.O.T.C.

Coast Artillery. Duties of coast artillery officer; command and leadership; military history and policy; military law, surveying and orientation, field engineering; property procurement; combat orders; seacoast and anti-aircraft; artillery tactics. 3 cred. per qtr.; prereq., 151-152-153. Lieut. Col. French.

† A total of three hours per week.

154f (1) I MWF, VIII-IX W or F; A (3) VI MWF, VIII-IX W or F; A
(2) IV MWF, VIII-IX W or F; A
155w (1) IV MWF, VIII-IX W or F; A (3) IV TTh, II S, VIII-IX W or F; A
(2) III MWF, VIII-IX W or F; A
156s (1) I MWF, V, IX T; A (3) VI MWF, V, IX T; A
(2) IV MWF, V, IX T; A

Signal Corps. Duties of the signal corps officer; military law; training management; handling of property and funds; orientation as a reserve officer; common battery telephony; military history and policy; leadership; military cryptography; property procurement; motor transportation. 4 class and lab. hrs. per week. 3 cred. per qtr.; prereq., 151-152-153, E.E. 64-65-66 or equiv. Captain Maddocks.

154f (1) I MWF; A; VIII-IX W or F; A (3) VI MWF; A; VIII-IX W or F; A
(2) IV MWF; A; VIII-IX W or F; A
155w VII MWF, IV T; 321EE
156s IV, VI, IX T; A

MINING AND PETROLEUM ENGINEERING

MINING

11f-12w-13s—Mine Surveying. Theory and problems in mine surveying, including U. S. land subdivision, foreign methods of land description, stadia measurements, triangulation, railroad curves and cross sections, earthwork computations, areas by co-ordinates, differential and trigonometric leveling, plane-table surveying, topographic map reading, solar and stellar observations for latitude and meridian, surveying of mining claims and bore holes, shaft plumbing and underground traversing and leveling. 3 cred. per qtr. fall, winter; 2 cred. spring qtr.; prereq., Dr. 13, M.&M. 12. Messrs. Lambert and Heilig.

11f Lect. III MWF; 315M
Quiz IV M; 315M
12w Lect. III MWF; 315M
Quiz V S; 315M
13s Lect. III MW; 315M
Quiz III F; 315M

14s—Field Work. General work in plane surveying and adjustment of instruments. 5 cred.; prereq., 11, 12; VI-IX MTWThF. Messrs. Lambert and Heilig.

15su—Field Trip. Field work on the iron ranges of Minnesota. Surveying of an underground mine, including shaft plumbing. Survey of open pit mine including an estimate of the surface stripping. Solar and stellar observations for latitude and meridian. 8 cred.; prereq., soph. year; 4 weeks beginning about June 15. Messrs. Lambert and Heilig.

106f—Mine Mapping. Mine mapping in accordance with prevalent practice in various mining districts including a map of the mine surveyed during the sophomore field trip. Ore estimating, based on current practice. 2 cred.; prereq., 15; VI-IX TTh; 205M. Mr. Lambert.

107w—Mine Mapping. Mapping mine surveyed during field trip. 1 cred.; prereq., 15; VI-VIII T; 205M. Mr. Lambert.

111f—Exploration. Prospecting, boring, drill steel, drill bits. 3 cred.; prereq., Geol. 105; I MWFS; 202M. Mr. Heilig.

112w—Exploration and Development. Explosives and blasting; timbering and timber treating; tunneling and drifting. 3 cred.; prereq., 111; I MWF, II S; 202M. Mr. Heilig.

113s—Development and Exploitation. Shaft sinking, raising, stoping, mining methods; support of excavations. 3 cred.; prereq., 112; I MWF, II S; 202M. Mr. Parker.

120s—First Aid. This course is given by members of the United States Bureau of Mines staff and all students must have completed the course and receive the U.S.B.M. certificate before graduation. One week, 3 hrs. per day.

121f-122w-123s—Mine Plant. Discussion of the machinery and appurtenances employed in the equipment of mines. Air compression, rock drills, mechanical features of hoisting, pumping, ventilation, underground transportation. Electricity applied to mining. 3 cred. per qtr.; prereq., M.&M. 33, Phys. 9. Mr. Comstock.

121f II MTWFS; 202M
122w-123s II MTWThF; 202M

124f—Mining Hydraulics. Application of hydraulic principles to mining and metallurgical problems. Flow measurements and stream gaging. Diversion dams, flumes, and laws of flow. Transporting power of water. Handling of slimes, sands, etc. 4 cred.; prereq., M.&M. 127; III MTWThS; 111M. Mr. Heilig.

125f—Metallurgical Hydraulics. Application of hydraulic principles to metallurgical problems. Flow measurements. Diversion dams, flumes, and laws of flow. Transporting power of water. Handling of slimes, sands, etc. 3 cred.; II TThS; 111M. Mr. Heilig.

126f—Engineering Construction. Theory of structures, loading, analytic and graphic resolution of stresses in frame structures, stresses in ore bins, head frames, etc. 3 cred.; prereq., M.&M. 127; VII-VIII T, VI-IX Th, III-IV F; 303M. Mr. Heilig.

127w—Engineering Construction. Design of structures for mining and petroleum plant. 3 cred.; prereq., 126; II-III M, VII-IX Th, II-IV F; 303M. Mr. Heilig.

130s—Mine Rescue. One week's intensive course in the use of oxygen breathing apparatus. Course is given by members of the staff of the United States Bureau of Mines and is required of all mining and petroleum engineering students. One week, 3 hrs. per day.

138—The Stone Industries. Monumental and building stones, crushed stone, sand and gravel plants and operations. 2 cred.; prereq., 112; 202M. Mr. Parker.

139su—Practical Mining (Field Trip). Study of mining operations, mine plant, and mining in one or more mining camps. 6 cred.; prereq., jr. year. Three weeks beginning about September 1. Mr. Parker.

141f—Reports and Administration. Examinations and reports; valuation and amortization; depletion and depreciation; taxation; corporations; capitalization; stocks and bonds; contracts and specifications. 3 cred.; prereq., 113; 202M. Mr. Parker.

142w—Coal Mining. Coal mining methods; mechanization; tipple arrangements and coal preparation; mine gases; safety lamps and tests; safety work and organization; labor organizations and agreements. 3 cred.; prereq., 141; IV MTWF; 202M. Mr. Parker.

143s—Mining Law, Quarries, and Placers. Mineral laws and court interpretations; mining laws of foreign countries; state mining codes and accident prevention. Placer mining, panning, rockers, sluicing, hydraulicking, dredging and underground methods. Quarries: requirements, methods of working, machines used, and field for product. 3 cred.; prereq., 142; IV MTWF; 202M. Mr. Parker.

144w-145s—Advanced Mining. Preparation of a report on a mining property or some phase of the mineral industry. 3 cred. per qtr.; prereq., 113; 303M. Mr. Parker.

144w II-III TW, VI-IX T; 303M
145s VI-IX TTh; 303M

146—Nonmetallic Minerals. Mining and preparation of cement, lime, gypsum, refractories, ceramic materials, fillers, pigments. 2 cred.; prereq., 112; 112M. Mr. Parker.

147—Earth Handling and Excavation. Excavation by shovels, draglines, dredges; handling materials by railroad, trucks, conveyors, and sluices. 2 cred.; prereq., 112; 205M. Messrs. Comstock and Parker.

151f-152w-153s—Special Problems in Mining. Seminar work on mining problems. Cred. and hr. ar.; prereq., reg. in Min.E. 141-142-143. Mr. Parker.

PETROLEUM ENGINEERING

111f—Oil Field Development. Occurrence of petroleum. Petroleum exploration methods. Drilling equipment and drilling methods. Drilling fluids and circulating systems. Casing and casing methods. Shutting off water. Cement and cementing methods. Crooked holes and directional drilling. Survey of wells. Mechanical and electrical coring. Drilling records, logs, and maps. 3 cred.; prereq., Geol. 105; I MWFS; 112M. Mr. Lacabanne.

112w—Oil Field Production. Principles governing drainage and flow of oil in porous formations. Completing and equipping wells for production. Oil production methods and equipment. Flowing wells and their control. Maintenance and repair of wells. Secondary method of oil recovery. Decline characteristics of wells. Water problems of flowing wells. Storage of petroleum. Oil gaging and sampling. Production of natural gas. 3 cred.; prereq.; Pet.E. 111; I MWFS; 112M. Mr. Lacabanne.

131s—Petroleum Refining. Distillation and purification processes used in making commercial products from crude petroleum. 2 cred.; prereq., Inorg. Chem. 16, Phys. 7 or 23; III MW; 112M. Mr. Lacabanne.

134s—Petroleum Plant. Mechanical features of drilling equipment, gas lift, pumping, natural gasoline extraction. Special devices for abnormal conditions. Oil emulsions. Mechanical features of transmission lines for oil and gas. Flow formulas, soil corrosion and prevention. 2 cred.; prereq., Min.E. 122; I MWF; 112M. Mr. Comstock.

135su—Field Work. Study of equipment and operations in one or more oil fields. 6 cred.; prereq., jr. year. Three weeks beginning about September 1. Mr. Lacabanne.

138s—Oil Field Mapping. Oil and gas well logs, property, contour, and subsurface maps. Cross section and correlation maps, oil well survey plates. Methods of displaying data and records, graphical, stereograms, peg models. 2 cred.; prereq., Min. 107; VI-IX M, VI-VII Th; 205M. Mr. Lacabanne.

144w-145s—Advanced Petroleum Engineering. Lectures on explosives, rock drilling and blasting, oil well shooting. Shaft sinking and timbering, timber treating, marine foundations, and caissons with reference to use in petroleum industry. Coal mining methods, oil shale and oil sand mining. Proration, unitization, and legal problems of the industry. Valuation, amortization, and depletion. Preparation of a report on the exploration and development of an oil property or some phase of the industry. 5 cred. per qtr.; prereq., Pet.E. 141. Mr. Parker.

144w Lect. I MWF, II S; 109M
Lab. VI-IX T, II-III W; 303M
145s Lect. II MTWF; 315M
Lab. VI-IX T, VI-VII Th; 303M

152f-153w-154s—Petroleum Production Technology. Special problems in oil and gas production. Mud fluids, formation correlations, electrical and mechanical coring, oil well cements, oil flow and drainage through porous formations, water analysis, oil shales, and miscellaneous production problems. 3 cred. per qtr.; prereq., Pet.E. 112. Mr. Lacabanne.

152f Lect. VI F; 112M
VI-VII MW, VII-VIII F; 112M
153w Lect. II Th; 112M
Lab. II-III T, VI-IX F; 112M
154s Lect. II S; 112M
Lab. III-IV T, VI-IX W; 112M

155-156-157—Special Problems in Petroleum Engineering. Seminar in petroleum problems. Cred. and hrs. ar.; prereq., reg. in Pet.E. 141 or Pet.E. 144-145. Messrs. Parker and Lacabanne.

NAVAL SCIENCE AND TACTICS*

Courses in naval science and tactics are given for those who intend to complete the four years of training for a commission in the Naval Reserve. Only students signifying such a purpose will be accepted.

Naval Science I and II with Navigation comprise the Basic Course in training. Naval Science III and IV, or IIIa and IVa, plus any uncompleted navigation, comprise the Advanced Course. A student who has completed the Basic Course is admitted to the Advanced Course upon the approval of his application by the professor of naval science and tactics, and upon his agreement to complete the course and take an Advanced Course cruise before his graduation, and upon passing a prescribed physical examination.

The Navy Department pays monthly commutation of subsistence to juniors and seniors who maintain a satisfactory standing and attendance. This, with cruise pay, amounts to about one hundred seventy-five dollars ($175) for the two years.

N.R.O.T.C. practice cruises will be held annually as prescribed by the Navy Department. Attendance at one Advanced Course cruise is required of all students enrolled in the Advanced Course. Basic Course students may be authorized to take cruises, and while doing so will receive subsistence but no pay. All N.R.O.T.C. students attending cruises are furnished transportation and subsistence by the United States Government.

Those who complete the Advanced Course, if recommended, will on their application be appointed as ensigns in the Volunteer Reserve without professional entrance examinations.

BASIC COURSES

1f—First Year Basic. 1½ cred.; no prereq.

(1) III MWF; A
(2) VI MWF; A
(3) VII MWF; A
(4) VIII MWF; A

* All students must be interviewed by the professor of naval science and tactics, given special physical examination, and selected for the course before registering for Naval Science 1.

2w—First Year Basic. 1½ cred.; prereq. 1.
(1) III MW; A (3) VI TTh; A
(2) IV WF; A (4) VIII WF; A
All sections V T; A

3s—First Year Basic. 1½ cred.; prereq. 2.
(1) I TTh; A (3) VII MW; A
(2) III TTh; A (4) VII Th, III S; A
All sections IX T; A

4f—Second Year Basic. 1½ cred.; prereq. 3.
(1) II TThS; A (3) VIII MWF; A
(2) IV MWF; A

5w—Second Year Basic. 1½ cred.; prereq. 4.
(1) II TTh; A (3) VII MW; A
(2) IV MT; A
All sections V T; A

6s—Second Year Basic. 1½ cred.; prereq. 5.
(1) I WF; A (3) VI TTh; A
(2) IV MW; A
All sections IX T; A

NAVIGATION

Navigation courses taught under this department are open to all students.

1f,s—Navigation and Nautical Astronomy. Elementary Navigation and Piloting. Fundamental principles of astronomy underlying navigation of ships and aircraft, charts, piloting, compasses, compensation of magnetic compass error, sextants, chronometers, dead reckoning. Three hours per week for one quarter. 3 cred.; prereq., plane trigonometry. Lieut. Cdr. Pullen.
1f (1) VI MWF; A (2) VII MWF; A
1s (1) I MWF; A (2) IV MWF; A

2f,w—Navigation and Nautical Astronomy. Celestial Navigation. Piloting, time, solar ephemeris, determination of latitude and longitude by the sun, azimuth, astronomical triangles, lines of position, deep sea navigation. Three hours per week for one quarter. 3 cred.; prereq., Nav. 1. Lieut. Cdr. Pullen.
2f IV MWF; A
2w (1) I MWF; A (2) VI MWF; A

3w,s—Celestial Navigation. Deep Sea and Aerial Navigation. Sidereal time, determination of position by moon, stars, and planets, short methods, tides, chart work, star identification, theory and principles of gyroscopes, gyrocompasses. Three hours per week for one quarter. 3 cred.; prereq., Nav. 2. Lieut. Cdr. Pullen.
3w IV MWF; A
3s VI MWF; A

PHYSICAL EDUCATION FOR MEN

The courses in sports education are offered by the Department of Physical Education to men students of the University for the purpose of providing instruction and practice in sports of a recreational nature in which men may participate in future years as a means of obtaining recreation, regular exercise, and social intercourse.

A towel and locker fee of $1.25 per quarter is charged all students taking exercise courses.

The University furnishes uniforms to students for class work or recreational play for $1 per quarter.

The facilities of the Department of Physical Education including the golf course, tennis courts, gymnasium, swimming pools, handball and squash courts, golf gymnasium, table tennis room, and playing fields, are available for use by the general student body. All men are invited to participate in some form of physical activity. For information regarding the intramural and intercollegiate athletic programs see the physical education handbook published by the Department of Physical Education for Men or inquire at the offices in Cooke Hall.

SPORTS EDUCATION

Supervisor of Sports Education: Mr. Piper.

1f,2w,3s†—Sports Education.

Survey Course	III MWF	
	IV MWF	
Fall: Touchball, Swimming, Volleyball, Badminton		
Winter: Boxing, Wrestling, Basketball, Golf		
Spring: Soft Ball, Tennis, Handball, Squash Racquets		
Beginning Swimming	II MWF	
Intermediate Swimming	II TThS	
Advanced Swimming	III MWF	(w,s)
Lifesaving	III TThS	
Miscellaneous Swimming	VI MWF	
Boxing	VIII MWF	Fall and winter only
	IX MWF	Fall and winter only
Tennis	VII MWF	Spring only
Individual Physical Education Activities	III MWF	
(by special permission)	IV MWF	
	VIII MWF	(f,w)
	VII MWF	(s)

Substitution of athletic team practice may be allowed by the department to men who rank sufficiently high on the introductory test.

PHYSICAL EDUCATION FOR WOMEN

Women students registering in any curricula in the Institute of Technology requiring G.E. 13, Orientation, will substitute one quarter of Phys. Ed. 1, 2, 3, 4, 5, or 6, General Course in Physical Education for this course.

Consult the Combined Class Schedule for hours and statement of fees.

PHYSICS

1f-2w-3s—Introduction to Physical Science. Lectures and experimental demonstrations of the principles underlying physical phenomena. Open to students in architecture. 3 cred. per qtr.; all; prereq., M.&M. 9 or equiv.; III MWF; 166Ph. Mr. Buchta.

7f,w‡-8w,s‡-9f,s‡—General Physics. Mechanics, heat, sound, light, and electricity. Laboratory work an integral part of the course. 5 cred. per qtr.; all; prereq., M.&M. 12.

† Three credits are given when three quarters are completed.
‡ A fee of $2 per quarter is charged for this course.

7f	Lect.	(1) III MTWF; 150Ph	(3) VI MWThF; 150Ph
		(2) II MWThF; 150Ph	
	Quiz*	(1) IX Th; 150Ph	(3) IX T or Th; 150Ph
		(2) IX M; 150Ph	
	Lab.	(1) I-II M; ar	(10) VI-VII W; ar
		(2) III-IV M; ar	(11) VI-VII Th; ar (Chem., Chem.E., Phys. only)
		(3) VI-VII M; ar	
		(4) VIII-IX M; ar	(12) VIII-IX Th; ar (Chem., Chem.E. only)
		(5) I-II T; ar	
		(6) III-IV T; ar	(13) I-II F; ar
		(7) VI-VII T; ar (Chem., Chem.E. only)	(14) III-IV F; ar
			(15) VI-VII F; ar
		(8) VIII-IX T; ar (Mines only)	(16) I-II S; ar
		(9) III-IV W; ar	(17) III-IV S; ar (Chem., Chem.E. only)
7w	Lect.	II MWThF; 166Ph	
	Quiz	II S; 150Ph	
	Lab.	(1) VI-VII M; ar	(4) VIII-IX Th; ar
		(2) VI-VII W; ar	(5) III-IV S; ar
		(3) VI-VII F; ar	
8w	Lect.	(1) III MWFS; 150Ph	(3) VI MWThF; 150Ph
		(2) II MWThF; 150Ph	
	Quiz*	(1) IX T; 150Ph	(3) IX Th; 150Ph
		(2) VII T; 150Ph or IX M; 150Ph	
	Lab.	(1) I-II M; ar	(10) III-IV W; ar
		(2) III-IV M; ar	(11) VI-VII W; ar
		(3) VI-VII M; ar	(12) VI-VII Th; ar (Chem., Chem.E. only)
		(4) VIII-IX M; ar	
		(5) I-II T; ar	(13) VIII-IX Th; ar (Chem., Chem.E. only)
		(6) III-IV T; ar	
		(7) VI-VII T; ar	(14) I-II F; ar (Chem., Chem.E. only)
		(8) VIII-IX T; ar (Chem., Chem.E. only)	(15) VI-VII F; ar (Mines only)
			(16) I-II S; ar
		(9) I-II W; ar	(17) III-IV S; ar
8s	Lect.	II MWThF; 166Ph	
	Quiz	VIII T; 150Ph	
	Lab.	(1) VI-VII M; ar	(4) VIII-IX Th; ar
		(2) VI-VII W; ar	(5) III-IV S; ar
		(3) VI-VII F; ar	
9f	Lect.	II MWThF; 166Ph	
	Quiz	II S; 150Ph	
	Lab.	(1) VI-VII M; ar	(4) VIII-IX Th; ar
		(2) VI-VII W; ar	(5) III-IV S; ar
		(3) VI-VII F; ar	
9s	Lect.	(1) III MTWF; 150Ph	(3) VI MWThF; 150Ph
		(2) II MWThF; 150Ph	
	Quiz*	(1) III Th; 150Ph	(3) VI T; 150Ph
		(2) II S or VIII Th; 150Ph	
	Lab.	(1) I-II M; ar	(10) VI-VII W; ar (Chem., Chem.E. only)
		(2) III-IV M; ar	
		(3) VI-VII M; ar	(11) I-II Th; ar
		(4) VIII-IX M; ar	(12) VI-VII Th; ar
		(5) I-II T; ar	(13) VIII-IX Th; ar
		(6) III-IV T; ar	(14) III-IV F; ar
		(7) VI-VII T; ar (Chem., Chem.E. only)	(15) VI-VII F; ar
			(16) I-II S; ar
		(8) VIII-IX T; ar (Chem., Chem.E. only)	(17) III-IV S; ar
		(9) I-II W; ar (Chem., Chem.E. only)	

* The quiz section must correspond to the lecture section.
‡ A fee of $2 per quarter is charged for this course.

29f—Introduction to Meteorology. A presentation of the fundamental physical principles underlying meteorological phenomena, accompanied by instrumental observations and weather map study. 3 cred. per qtr.; all; prereq., high school phys. or equiv.; VI MWF; 133Ph. Mr. Miller.

52w,s‡—Laboratory Arts. 3 cred.; prereq., 15 cred. in phys. and approval of dept.; VI-VIII TTh; 39Ph.

61w—Introduction to Geophysical Prospecting. Qualitative discussions of the application of physical measurements to the location of petroleum and mineral deposits together with some applications of geophysical methods to problems of shallow geologic structure. 3 cred.; jr., sr.; prereq., general course in physics, M.&M. 12; ar. Mr. Wetzel.

100f-102w-104s—Intermediate Physics. 3 cred. per qtr.; all; prereq., Calculus and 15 cred. in phys.; II TThS; 145Ph. Mr. Buchta.

101f-103w-105s—Theoretical Physics. An analytical survey of fundamental principles of mechanics, sound, heat, light, electricity, and magnetism, designed to supplement the general course and to prepare students for more specialized graduate courses. 5 cred. per qtr.; jr., sr., grad.; prereq., 15 cred in phys. and Differential Equations or reg. in Differential Equations; III MTWThF; 145Ph. Mr. Rumbaugh.

107f-109w-111s—Modern Physics. 3 cred. per qtr.; prereq., 15 cred. in phys.; I TThS; 145Ph. Mr. Nier.

110w‡-112s‡§—Modern Experimental Physics. 3 or 4 cred. per qtr.; prereq., 144; VI-IX TTh; 145Ph. Mr. Williams.

113w—Intermediate Acoustics. 3 cred.; prereq., M.&M. 25, 15 cred. in phys.; ar. (Not offered in 1940-41.)

114f-116w-118s—Elementary Physical Investigation. 3 cred. per qtr.; prereq., 15 cred. in phys. Staff.

124w‡—Pyrometry. Experimental study of the principles underlying temperature. One lecture, two three-hour sessions in the laboratory a week. 3 cred.; prereq., 15 cred. in phys.; VII-IX MW, or ar.; 241Ph. Mr. Miller.

126s‡—Advanced Heat. Temperature standards, expansion, calorimetry. Kinetic theory of matter. Change of state and heat transfer. Lecture and laboratory. 3 cred.; prereq., 15 cred. in phys.; VII-IX MW, or ar.; 241Ph. Mr. Miller.

131f—Geometrical and Physical Optics. 3 cred.; prereq., 15 cred. in phys.; ar.; 342Ph. Mr. Valasek.

134f,w‡—Experimental Optics. 3 or 4 cred.; prereq., 15 cred. in phys.; VII-IX MF; 348Ph. Mr. Valasek.

136w,s‡—Spectrum Analysis. 3 or 4 cred.; prereq., 15 cred. in phys.; VII-IX MF; 348Ph. Mr. Valasek.

144f‡—Electricity Measurements. Devoted mainly to the study of potentiometer methods, capacitance, inductance, magnetic flux. One lecture, one quiz hour and two two-hour laboratory periods a week. 3 cred.; prereq., 15 cred. in phys., M.&M. 25. Mr. Rumbaugh.

Lect. III S; 133Ph
Quiz II Th; 133Ph
Lab. (1) VI-VII MF; 231Ph
(2) VIII-IX M, VI-VII W; 231Ph
(3) III-IV T, VIII-IX Th; 231Ph
(4) VI-VII TTh; 231Ph
(5) VIII-IX TF; 231Ph

‡ A fee of $2 is charged for this course.
§ Students may enter any quarter.

146w‡—Advanced Electricity Measurements. 3 cred.; prereq., 144 and permission of instructor; ar.; 232Ph. Mr. Rumbaugh.

152s—X-Rays. Study of the nature and production of X-rays. 3 cred.; prereq., 43; I MWF; 166Ph. Mr. Valasek.

154w‡—X-Ray Spectroscopy. 3 cred.; prereq., 44, 152, M.&M. 25 and permission of instructor; ar. (Not offered in 1940-41.)

161f-162w—Principles of Geophysical Prospecting. Quantitative discussions of theory, instruments and interpretation of data for seismic, electric, gravitational, and magnetic geophysical methods. 3 cred. per qtr.; jr., sr., grad.; prereq., general course in physics, M.&M. 25; ar. Mr. Wetzel.

164f-165w-166s—Special Problems in Geophysics. Cred. and hrs. ar.; prereq., 161. Mr. Wetzel.

181f-183w-185s—Atomistic and Elementary Quantum Mechanics. Atomic structure, X-ray, spectrum analysis, and an introduction to wave mechanics. 3 cred. per qtr.; sr., grad.; prereq., 101-103-105, or reg. in 101-103-105. Mr. Bardeen.

PHYSIOLOGICAL CHEMISTRY

100f,su-101w,su—Physiological Chemistry. The components of the animal body; foods, digestion, and excreta, and metabolism. Prereq., physics, organic chemistry. 222 hours; 13 credits. Mr. Burr, Dr. Armstrong, Mr. Hemingway, Mr. Samuels.

100f	Lect.	IV MTWF; MeS Aud	
	Quiz	I F	
	Lab.	(1) I-III MW; 310MH	(3) I-III ThS; 310MH
		(2) I-III MW; 310MH	(4) I-III ThS; 310MH
101w	Lect.	IV TS, VI F; MeS Aud	
	Quiz	VI T	
	Lab.	(1) I-III MW; 310MH	(3) I-III ThS; 310MH
		(2) I-III MW; 310MH	(4) I-III ThS; 310MH

136f,w,s—Conference in Physiological Chemistry. Arranged with qualified students. Various topics in the field of physiological chemistry will be considered by the several instructors. Consult department office for schedule. 1 cred.; 11 hrs. ar. Mr. Burr, Dr. Armstrong, Mr. Hemingway, Mr. Samuels, Dr. Arnow.

153f,w,s,su—Problems in Physiological Chemistry. Special work arranged with qualified students. May be taken one or more quarters. Prereq., 100, 101; cred. ar.; ar. Mr. Burr, Dr. Armstrong, Mr. Hemingway, Mr. Samuels, Dr. Arnow.

154f,w,s—Review of Current Literature in Physiological Chemistry. Cred. ar. Mr. Burr, Dr. Armstrong, Mr. Hemingway, Mr. Samuels, Dr. Arnow.

170f,w,s—Seminar in Dental and Oral Biochemistry. Cred. ar. Dr. Armstrong.

205f,w,s,su—Research in Physiological Chemistry. Cred. ar.; ar. Mr. Burr, Dr. Armstrong, Mr. Hemingway, Mr. Samuels, Dr. Arnow.

POLITICAL SCIENCE

1f-2w†-3s—American Government and Politics—Parts 1 and 2. National, state, and local. Constitutions and fundamental laws; governmental organizations; divisions and separation of powers; legislative, executive, and judicial pro-

† To receive credit for any part of this course a student must complete the parts preceding the dagger.

‡ A fee of $2 is charged for this course.

cedure and problems. Part 3. Principal functions and services of government; defense, law enforcement, regulation of business, public works, and social services. 9 cred.; all; no prereq. Messrs. Christensen and Kirkpatrick.

(1) VII MWF; BuAud (2) IV MWF; Bu Aud

RHETORIC

(College of Agriculture, Forestry, and Home Economics)

22f,w,s—Public Speaking. Practical course in fundamentals of speech making. 3 cred.; prereq., Engl. 6. Messrs. Routledge and Nichols.

22f (1) I MWF; 311En(UF) (4) II TThS; 311En(UF)
(2) I TThS; 310En(UF) (5) III MWF; 311En(UF)
(3) II MWF; 310En(UF) (6) IV MWF; 311En(UF)

22w (1) I MWF; 311En(UF) (5) III MWF; 311En(UF)
(2) I TThS; 307En(UF) (6) III TThS; 311En(UF)
(3) II MWF; 311HH(UF) (7) IV MWF; 311En(UF)
(4) II TThS; 311En(UF)

22s (1) II TThS; 307En(UF) (3) III TThS; 307En(UF)
(2) III MWF; 311En(UF)

23s—Public Speaking. 5 cred.; prereq., Engl. 6; IV MTWFS; 311En(UF). Mr. Routledge.

SOILS

9w—Soils. Origin, formation, physical properties, moisture relations, principles of soil fertility, use of lime, commercial fertilizers, and stable manure; soil organisms and green manures; tillage. 4 cred.; no prereq.; II MTWThF; 100GH(UF). Mr. Rost.

108w—Physical Properties of Soils. The determination of physical constants of soils, including mechanical composition. 3 cred.; jr., sr.; prereq., 9. Mr. McMiller.

Lect. VI W; 204So(UF)
Lab. VII-IX W, VI-VIII F; 201So(UF)

ZOOLOGY

1f‡-2w‡-3s†‡§—General Zoology. 10 cred.; no prereq. Messrs. Minnich, Wodsedalek, Dawson, and Olson.

Lect. (1) II TTh; 06Bo (Limit 320) (3) III WF; 06Bo (Limit 320)
(2) VIII WF; 06Bo (Limit 320) (4) IV WF; 06Bo (Limit 240)

Lab. (1) I-II MF; 101Z (Limit 150) (5) I-II TTh; 101Z (Limit 174)
(2) III-IV MF; 101Z (Limit 174) (6) III-IV TS; 101Z (Limit 174)
(3) VI-VII MF; 101Z (Limit 174) (7) VI-VII TTh; 101Z (Limit 60)
(4) VIII-IX MF; 101Z (Limit 174)

14f‡-15w‡—General Zoology. Structure, physiology, embryology, classification, and evolution of animals. Textbook, lectures, laboratory, and quizzes. 3 cred. per qtr.; no prereq. Mr. Dawson.

Lect. VII TTh; 150Ph (Limit 288)
Lab. (1) V-VI TTh; 101Z (Limit 114) (2) VIII-IX TTh; 101Z (Limit 174)

† The entire course must be completed before credit is received for any quarter.

‡ A fee of $1 per quarter is charged for this course.

§ Students should elect lecture sections in which they can continue throughout the three quarters. Changes from one lecture or laboratory to another may be made only with the consent of the department office.

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The Bulletin of the
UNIVERSITY *of* MINNESOTA

West Central School and Station
Morris, Minnesota
Announcement for the Year 1940-1941

Volume XLIII, Number 42 June 8, 1940

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SCHOOL CALENDAR

1940-41

1940			
September	30	Monday	First term opens; registration new students
October	1	Tuesday	Registration of old students
October	2	Wednesday	Organization of classes
November	11	Monday	Armistice Day; a holiday
November	28	Thursday	Thanksgiving Day; a holiday
December	20	Friday	First term closes
1941			
January	6	Monday	Second term opens; registration
January	7	Tuesday	Organization of classes
February	12	Wednesday	Lincoln's birthday; a holiday
February	22	Saturday	Washington's birthday; a holiday
March	15	Saturday	Senior Class Play
March	21	Friday	Music Pupils' Recital
March	22	Saturday	Achievement Banquet
March	27	Thursday	Junior-Senior-Alumni Banquet
March	28	Friday	Commencement Exercises
			Second term closes

FACULTY

Guy Stanton Ford, Ph.D., Litt.D., LL.D., L.H.D., President of the University
Walter C. Coffey, M.S., LL.D., Dean of the Department of Agriculture

AT MORRIS

ADMINISTRATION

Theodore H. Fenske, M.S., Superintendent
Edwin J. Volden, Registrar
Hazel Brevig, Secretary and Assistant Registrar
Dagmar Pedersen, B.A., Librarian
Dorothy Zellers, B.S., Director of Home Economics
Nanna Jelstrup, B.A., Dean of Women
Amy Lundquist, R.N., School Nurse
Gudrun Fredensberg, Accountant
Henrietta Novy, Secretary

AGRICULTURAL ENGINEERING

Julius Felt, Carpentry, Farm Structures
Albert C. Heine, Physics, Farm Mechanics, and Electricity
Alex B. Rolfe, Forge, Welding, and Mechanics
Albert Anderson, Forge
Earl H. Pederson, Automotive Engineering

AGRONOMY AND HORTICULTURE

John A. Anderson, B.S.A., Botany and Horticulture
Roy O. Bridgford, M.S., Farm Crops and Soils

ANIMAL HUSBANDRY

Allen W. Edson, B.S., Poultry
Philip S. Jordan, B.S. in Agr., Animal and Dairy Husbandry
Walter Hokanson, Herdsman

AGRICULTURAL ECONOMICS

Allen W. Edson, B.S., Farm Management and Marketing
Glenn I. Prickett, B.A., Rural Sociology and Economics
Clarence J. Hemming, B.S., Farm Accounts, Agriculture

HOME ECONOMICS

Eva Paulson, M.S., Applied Art and Foods
Lois Hotvedt, B.S., Clothing
Helen Prindle, B.S., Home Management and Child Training
Dorothy Zellers, B.S., Foods and Home Furnishing
Amy Lundquist, R.N., Nursing

ASSOCIATED SUBJECTS

Judith Homme, B.A., Typewriting and English
Lucile Cox, B.A., Business Training
Nanna Jelstrup, B.A., English and Mathematics
Theodore S. Long, M.A., English and Public Speaking
Margaret O'Connor, M.A., Music
Doris Gahlon, B.A., Music
Dagmar Pedersen, B.A., English and Physical Training
Glenn I. Prickett, B.A., History, Home Project Supervisor
Helen Swan, Piano
Edwin J. Volden, Accounting

GENERAL INFORMATION

PURPOSE

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

LOCATION

The school is admirably situated to serve that large section of the state in which it is located. A network of improved state highways connects the city of Morris with all parts of the district. The school itself adjoins the city of Morris and is situated on a natural rise of ground overlooking the Pomme de Terre Valley. The campus, with its thirty-one buildings, attractive lawns, and pleasant drives, is one of the beauty spots in this section.

ADMISSION

The school will admit any young man or young woman of good moral character, who has completed the eighth grade and who desires a technical training in agriculture and home economics. In special cases those who have not completed eighth grade work will be admitted. Mature young men and women who have been out of school for one or more years and desire special training in agriculture and home economics will be admitted. High school courses equivalent to courses offered in the School of Agriculture will receive the same credit as those offered in the school. High school graduates may register for any of the courses offered, and by properly planning their program, may become graduates of the School of Agriculture in much less time than the three years required for the regular student. Many high school graduates come for one year of specialized vocational training. Students should correspond with the registrar, before coming to the school, and make the necessary preliminary arrangements for registration.

TIME OF OPENING

The fall term of the West Central School of Agriculture will open the last Monday in September and close the Friday before Christmas. The winter term will open the first Monday in January and close the last Friday in March. The school work covers a period of six months, at a time when the student can best be spared from home.

THREE-YEAR COURSE

The regular courses cover a period of three sessions of six months each, from October through March. The course for young men is so arranged as to make it possible for the student to select a portion of the work in any of the following groups: agronomy, horticulture, animal husbandry, farm management, economics, or agricultural engineering. The course for young women provides special training in home management, clothing construction, foods, music, home nursing, public speaking, and business training. Both young men and young women may elect courses and receive credit in music in connection with any of the regular courses. They may also elect academic subjects in the third and fourth years, preparatory to college entrance. The main emphasis of the institution is given to the regular courses and all students are urged to complete the three-year course.

INDEPENDENT STUDY COURSE

Young men and young women who give satisfactory evidence that they have the ability and other necessary qualifications, may, with the approval of the superintendent and the Scholarship and Standards Committee, pursue an independent course of study plan which does not require the completion of specified courses. In such an independent study course, it is necessary for the student to submit a definite plan to be followed, and from time to time pass comprehensive examinations covering all work completed. Since the English language is the basis of all study and reading, the student will be expected to complete the equivalent of English courses required of all students in the regular three-year course at the West Central School of Agriculture. A regular school of agriculture diploma will be awarded to students who complete, satisfactorily, the independent study course.

ADVANCED COURSES

It has been found that many students desire an advanced year after completing the regular three-year course. To meet this demand a fourth session of six months of work is offered. During this advanced year, graduates of the three-year 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, livestock production, farm engineering, economics, and academic subjects. The major lines for girls are home training, nursing, music, business training, and academic subjects.

COLLEGE PREPARATORY

Graduates of the three-year course at the West Central School of Agriculture who have completed two summers of supervised work on their home farms, one additional school year of six months, and one additional summer's work or the equivalent thereof, will be admitted to the University of Minnesota, and to the state teachers colleges.

DEPARTMENT OF MUSIC

For students desiring special courses in music, credit courses in both vocal and instrumental music are offered. Prospective students should refer to the description of the music courses on page 26.

HOME PROJECT WORK

The purpose of this work is to promote and extend the technical work given in the classrooms and laboratories during the regular school sessions. The approved

methods of home economics and agricultural practice are applied to some branch of the home or farm enterprise which the project is intended to cover. Reports are required throughout the season and the work is, at all times, in charge of supervisors who make the necessary visits to each student.

A description of all projects is given on pages 28-31.

ROOMS IN DORMITORIES

Old or new students planning to attend the West Central School of Agriculture should write early to the registrar, asking him to reserve a room in one of the dormitories. Students should reserve rooms in advance. Each dormitory room is furnished with two single beds, mattresses and pillows, a dresser, table, and chairs. Preference as to roommates should be stated early, and will be considered as far as possible.

WHAT TO BRING

Each student should bring with him one comforter and two blankets, towels, comb, brushes, one tumbler, one teaspoon, bedroom slippers, and at least two nightgowns or pajama suits. Students will also bring four single-bed-size sheets, two pillow cases, and a bedspread for a single bed. Sheets and pillow cases should be plainly marked with student's name, marking to be done with nonwashable ink, or by embroidering the name.

Each girl should bring with her, in addition to the items mentioned above, a bathrobe or housecoat, an apron, and a laundry bag. The bathrobe or housecoat may be of any style and material, the laundry bag should be of washable material large enough to hold the soiled clothes of one person. The bedroom slippers should have soft soles; tennis shoes and gymnasium suits are also needed, but it is recommended that students acquire these after entering school.

TUITION FEES

The Minnesota legislature during the 1935 session amended the State School Aid Law, making it possible for eligible students to attend the schools of agriculture without the payment of tuition fees. The fees of such students are paid from State School Aid funds. These students will be required to pay only board and room.

All residents of Minnesota are eligible for tuition exemption who are eighth grade graduates and have not graduated from high school; who are under 21 years of age; and who do not reside in accredited high school districts.

A student who is eligible for tuition exemption must secure a tuition certificate from the county superintendent of the county in which the student graduated from the eighth grade. This certificate must be presented at the time of registration.

Students who do not qualify for tuition exemption are those who have not completed the eighth grade or who are high school graduates; who are 21 years of age or older; who reside in accredited high school districts; or who reside outside of the state of Minnesota.

Students not eligible for fee exemption will pay the following fixed fees as well as fees charged for various courses where laboratory material is used. The amount of these fees will be found in the description of the courses, pages 18-28.

Fees and first month's board and room are payable at the time of registration.

	Per term (3 months)
Registration	$3.00
Gymnasium	1.00
Health Service	3.00
Book rent	1.50
Post office	.20
Privilege	2.50

Students who are not eligible for fee exemption may elect to pay $18 per term to cover all the tuition, laboratory, and equipment fees (except deposit) rather than pay the individual fees listed above and the special fees charged for various courses.

BOARD AND ROOM

The cost of board will be $14 per school month and for room $5 per school month. No increases will be made unless living costs make the same necessary.

Board and room are payable the first of each month in advance. No accounts can be carried. If students are compelled to be absent from school, the following regulations will govern refunds. No refunds are given for week-end absences. Room rent refunds are not made for any period of less than one month. Board refunds are made to the extent of one-half credit for the first two-week period and full credit for any additional time, provided the student notifies the dining hall manager before leaving. All students not residents of Morris are required to live in the dormitories and to board in the school dining hall, unless special arrangements are made with the superintendent. Such arrangements should be made prior to registration for classes.

On entering the school each student should bring sufficient money to pay for one month's board and room, and to pay his fees, if required. This will amount to from $24 to $42.

BREAKAGE DEPOSIT

All students are required to make a breakage deposit of $5 at the time of registration. Students who break laboratory equipment or damage school property are charged for necessary repairs or replacement and such charges are deducted from breakage deposits. Miscellaneous damage to dormitories and other school buildings, which cannot be charged to individual students, must be charged collectively to the breakage deposits of all students occupying the building. The unused balance of the breakage deposit is returned to the students after the close of the second term. No refunds, either from breakage fees or credit account balances, are made to students who have an unpaid student loan. In such cases balances are credited toward payment of the loan.

HEALTH SERVICE

The health fee is used to maintain the Students' Health Service. A special health service building is maintained and a full-time nurse is engaged during the school year. The health fee also provides for daily calls at the Health Service Building by a doctor at a specified hour, and his services are available to all students at that time. It does not provide for extra nurses or for physicians' calls in case of serious sickness, where such are necessary, nor does it provide for extra costs caused by epidemics. These must be paid for by the student receiving the service. The Health Service is not equipped to take care of serious illness and cannot accept responsibilities for such cases.

REGISTRATION

No student will be allowed to register for less than 23 credit hours of work, except by special permission of the chairman of the Scholarship and Standards Committee.

All fees must be paid at the time of registration.

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

CANCELLATION OF REGISTRATION

Students may cancel out of a course without a penalty of failure during the first six weeks of the term. If a student cancels after the first six weeks and is below grade in a subject at the time of cancellation, his record in that subject will be entered as a failure. Subjects may be added only during the first week of the term.

All changes in registration must be made on the proper form which the student will obtain from the chairman of the Scholarship and Standards Committee or his designated representative. All changes in registration must be approved by the Scholarship and Standards Committee.

Where cancellation of registration is necessary before the close of the term, tuition fees will be refunded as follows:

Period of Attendance	Percentage of Deduction	Percentage of Refund
None	None	100
Two days to one week	10	90
One week to two weeks	20	80
Two weeks to three weeks	30	70
Three weeks to four weeks	40	60
Four weeks to five weeks	50	50
Five weeks to six weeks	60	40

No student who has been in attendance more than one half of the term shall receive any refund of tuition.

ABSENCES

Each student who has been absent from a class shall, upon a lapse of not more than two class periods after an absence, present a pass from his preceptor or preceptress. Students off the campus may secure a pass from the chairman of the Scholarship and Standards Committee. In case of sickness, where students are under the care of the nurse, passes will be obtained through her only. All work lost through absence from class must be made up.

Where no legitimate excuse can be given for a class absence, it shall be deemed an unexcused absence. An unexcused absence will automatically reduce the grade to an E for the month in the class where the absence occurred. Failure to submit a pass from the preceptor within the time limit shall be evidence of failure to receive an excused absence.

Permission to go home necessitating absences from classes must be applied for, and approved by the preceptor or preceptress, at least two days in advance of such anticipated absence. Students are expected to present with their application a bona fide letter from the parents stating the reasons or need for such absence. In emergency, permission may be received from the superintendent who shall present the application and letter from the parent to the Scholarship and Standards Committee for approval. Failure to make the necessary arrangements shall be considered as evidence of an unexcused absence.

CLASSIFICATION

In order to be classified as a junior, a student must have not less than 42 credit hours of work.

In order to be classified as a senior, a student must have not less than 94 credit hours of work.

In order to be classified as an advanced student, a student must have not less than 160 credit hours of work.

In order to be classified as a special student, a student must be a high school graduate, or must have completed the advanced course.

SCHOLARSHIP STANDARDS

Marking System

Students are graded on a scale of A, B, C, D, and E. A is a high honor mark and E denotes failure. The mark "incomplete" is reserved for special cases and means that for reasons not within the control of the student, he has failed to meet a specific and important requirement of the course, but has, in other respects, done passing work. The incomplete must be removed the month after it has been received. Extension of time for the removal of incompletes may be granted in special cases. If the deficiency is not made up, the mark of E is automatically substituted for the incomplete. If, on account of poor work, a student drops a subject after the first six weeks of the term, he receives a mark of E in the subject.

Honor Point System

Honor points are determined on the basis of grades. For each hour credit of A quality, students receive 3 honor points; of B quality, 2 honor points; and of C quality, 1 honor point. Work of D quality commands no honor points. When a course in which a student receives a mark of E is repeated, only the second grade is considered in reckoning the honor points.

SCHOLARSHIP REQUIREMENTS

In order to obtain a diploma or certificate from the school, a student must have as many honor points and credit hours as are required for graduation. This means that an average scholarship of C is required.

PROBATION AND ELIMINATION

A student who has less honor points than he has credit hours is placed on probation. A student is removed from probation when his total honor points equal his credit hours. A student on probation is subject to dismissal from the school. He may, however, appeal for reinstatement to the Scholarship and Standards Committee.

ELIGIBILITY

The following rules will govern eligibility for all interscholastic contests. The Scholarship and Standards Committee must approve all eligible students.

A. The student must be enrolled in the school not less than one week before the contest.

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

REQUIREMENTS FOR GRADUATION

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

Attainment of 160 honor points.

Completion of two summers of home project work, earning at least 3 credits each summer.

All boys who expect to graduate from the West Central School of Agriculture will be required to complete one crops project, and either a livestock or farm accounts project. Special cases may arise which make impossible the carrying out of the outlined schedule, in which case the student may, with the approval of the home project supervisor, complete one project and substitute other projects or additional credits for the project requirements. Such substitution must be petitioned for on blanks provided by the project supervisor, and must be approved by the chairman of the Scholarship and Standards Committee.

Girls who expect to graduate from the three-year course must complete two foods projects, two clothing projects, and either a home management or a home furnishing project.

Candidates for graduation from the advanced or four-year course must complete the required work of forty-five additional credit hours and make forty-five additional honor points. They must also complete an additional summer of home project work or substitute extra school credits if this is not possible.

A satisfactory rating in attitude.

Payment of all accounts.

For students transferring from other schools, one full year of residence is required. Under no circumstances will any student be permitted to participate in the graduation exercises who has not completed, in full, all of the requirements for graduation.

HOME LIFE IN THE DORMITORIES

The dormitory life of the students while attending the West Central School of Agriculture is subject to supervision. Everything possible is done to promote a healthful, moral atmosphere.

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

From 8:00 a.m. to 4:20 p.m. students are busy with their school work. From 4:20 to 6:00 p.m. is a recreation period during which students' time is at their own disposal. During study hours students are expected to be in their rooms and to be quiet so that all may study undisturbed. Students may leave the campus in the evening only upon permission of the preceptors or preceptresses. No firearms of any kind will be permitted in dormitories.

The use of profanity and tobacco in dormitory rooms is strictly forbidden. Infraction of dormitory rules may be sufficient cause for dismissal from school. Any student found using intoxicating liquor on the school premises will be subject to expulsion from school.

DISCIPLINE

It is the aim of the administration to be firm, reasonable, and sympathetic. A student who becomes antagonistic to the spirit of the school will be dismissed whenever the general welfare requires. The school does not wish to undertake the problem of disciplining students who are not in sympathy with its purposes.

BUILDINGS AND EQUIPMENT

The physical plant now includes thirteen modern brick and stone buildings which compose the educational group, and eighteen frame buildings which make up the farm group. The school group includes two girls' dormitories with facilities for 125 girls; three boys' dormitories with accommodations for 225 boys; Agricultural Hall, with stock judging pavilion, meat cutting, dairy, soils, chemistry, horticulture, botany, and farm crops laboratories, and classrooms for all agricultural and academic work; the Engineering Building with woodshop, forge shop, welding shop, farm mechanics laboratory, drafting room, and three lecture rooms; the Music Hall, with two studios and numerous practice rooms. The Business Training Department is also located in this building and includes typewriting, shorthand, business training, and penmanship rooms. The Dining Hall has two large dining rooms and modern kitchens. The Students' Hospital and Health Service Building is equipped with twenty-seven beds, a dispensary, and the nurses' quarters. The Home Economics Building has two foods laboratories, two sewing laboratories, laundering laboratory, home management room, classrooms, and departmental offices. The Administration Building houses the auditorium, the large library, and the administration, business, and registrar's office. The Home Management Practice House will accommodate a group of ten people; and the Physical Education Building includes the gymnasium, swimming pool, locker rooms, and team training quarters.

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

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

ASSEMBLY PERIOD

An assembly period is held three times each week throughout the school year. Students are required to attend these assembly exercises. It is the purpose of the school to secure prominent speakers to address the student body at these morning exercises. The assembly period is also used as a forum for public discussion of the many questions and for announcements of importance to the student body.

RELIGIOUS WELFARE

In maintaining the highest moral and religious atmosphere and in fostering the development of complete Christian manhood and womanhood—physical, intellectual, social, and spiritual—the student body and faculty have developed a close relationship with all of the churches in Morris. Students affiliate with the church of their preference and make it their church home while attending school. In addition to this affiliation, religious services are held each Sunday on the school campus. These exercises are under the joint direction of the Faculty-Student Religious Welfare Committee. The Young Women's Christian Association is represented on the campus by a strong and active organization.

MUSICAL ORGANIZATIONS

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

THE MOCCASIN

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

WEST CENTRAL SCHOOL NEWS

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

STUDENT LOAN FUNDS

Students attending the West Central School of Agriculture are afforded the opportunity of participating in the student loan funds available to students who attend the University of Minnesota. This money is loaned to worthy and deserving students at the West Central School in amounts not to exceed $50 to any one person in one year, at the rate of 5 per cent per annum. Students interested in securing a student loan should correspond with the superintendent of the West Central School of Agriculture.

THE WEST CENTRAL SCHOOL OF AGRICULTURE LOAN FUND

The classes of 1930 and 1931 have left a loan fund of $450 to be loaned to needy and worthy students. This money is loaned in amounts not to exceed $50 to any one person in one year at the rate of 5 per cent per annum.

SEVENTH DISTRICT FEDERATION OF WOMEN'S CLUBS LOAN FUND

The Seventh District Federation of Women's Clubs presented the sum of $1,000 to the West Central School of Agriculture in 1932 to be used as a loan fund to assist needy and worthy students to acquire an education at the West Central School. Students who benefit from this fund must reside in the Seventh District. This fund is loaned in amounts and under conditions that govern other student loan funds.

CALEB DORR CASH SCHOLARSHIPS

By a decision made in April, 1922, by the Board of Regents of the University of Minnesota, a part of the income from a bequest made by the late Caleb Dorr, of Minneapolis, was made available to the schools of agriculture. At the West Central School this fund is awarded to worthy students for excellence in scholarship and for achievement in leadership. The scholarships awarded are used in helping to defray the students' expenses while they are in school.

INTERSCHOLASTIC ACTIVITIES

Each year the school is represented by teams in debating, declamation, and stock and grain judging, which meet in interscholastic contests with students from similar institutions.

In athletics the school is represented by both football and basketball teams. These teams schedule games with colleges and other agricultural schools.

LIBRARY

The library is well equipped to supply the needs of the students. A large number of books have 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 assistance in directing students in the selection of books they may need in the pursuit of their work.

BOYS' AND GIRLS' CLUB WEEK

The annual Boys' and Girls' Club Week is held during June. This is a three-day course open to all boys and girls engaged in 4-H Club work. Boys are given special training in all of the boys' club projects. The girls are given work in home economics with special reference to the club projects. At the close of the course free trips to the Minnesota State Fair will be awarded to students who have done the best work in judging and other activities. Games, music, and special entertainment will make the entire program of special interest to all who attend. A special circular describing this short course is issued.

SHORT COURSE FOR FARM WOMEN

An annual short course for farm women is held during the month of June. The main object of this course is to provide a few days rest, recreation, and instruction for the women of the farms in west central Minnesota. Talks, classes, and demonstrations along lines of interest to farm women will fill in part of the day. The large dormitory and dining hall will provide ample living accommodations, and part of each day will be given to rest and recreation. A special bulletin describing this course will be issued.

EXPERIMENT STATION

The West Central School and Station is now conducting extensive experiments in crops, soils, horticulture, and animal husbandry. Special reports and bulletins are published from time to time giving the results of experimental work.

SCHOOL FARM

The farm comprises approximately 800 acres and furnishes an extensive laboratory for the work of the school. Information concerning the methods employed on the farm is always available to the students. The classroom work is supplemented with actual practice, either in the field or with laboratory practice using the crops grown on the farm.

STATION FLOCKS AND HERDS

The school now maintains excellent livestock herds and flocks, all of which are used for student work in the Animal Husbandry Department. Purebred Holstein and Shorthorn cattle, Percheron horses, Shropshire sheep, Poland China hogs, and White Leghorn chickens are maintained for station and school purposes. These afford excellent opportunities for students to study intelligently the various courses in animal husbandry.

COURSES OF STUDY

Figures following the names of courses indicate the number of credit hours. One credit hour is equivalent to one class period per week devoted to recitation or two such periods devoted to laboratory work.

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

For description of the following courses see pages 18-28.

For description of home project work see pages 28-31.

High school courses equivalent to required courses will be substituted for them in the case of students who transfer from other schools.

COURSES FOR BOYS

In addition to the required courses as outlined below, a boy who wishes to graduate from the three-year course must, during the time he is in school, elect three courses totaling at least 6 credit hours in each of the following: Agronomy and Soils, Animal and Poultry Husbandry, and Agricultural Engineering; and two courses in Agricultural Economics. He may choose these from the elective courses listed. During any one term, at least 23 required and elective credit hours must be carried.

FRESHMAN YEAR

First Term	Second Term
Required	
English I A, 5	English I B, 5
§Farm Arithmetic A, 3	§Farm Arithmetic B, 3
Agricultural Science A, 2	
†Freshman Lectures—no credit	
†Types of Farming	
Either Term	
§Word Study and Penmanship, 3	
Electives	
*Carpentry I A, 2	*Carpentry I B, 2
*Forge I A, 2	*Forge I B, 2
*Farm Mechanics I A, 2	Farm Mechanics I B, 2
Management of Laying Flock, 3	Incubation and Brooding, 3
Elementary Beekeeping, 2	Livestock Selection, 1
	Agricultural Science B, 2
	Crops and Soil Management
	Elementary English
Either Term	
*Grain Crops, 5	
Livestock Production, 4	
Fruit and Vegetable Crops, 3	
Automotive Engineering, 5	
Chorus, 2	
Freshman Vocal Study, 1	
Group or Private Music, 1 or 2	

* Required as a prerequisite for later courses.

† Not required of transfer students.

§ May be removed as a requirement by special examination.

JUNIOR YEAR

First Term	Second Term
Required	
English II A, 5	English II B, 5
Chemistry A, 3	Chemistry B, 3
Either Term	
Farm Accounts, 3	
Electives	
Grain Judging, 2	*Feeds and Feeding, 5
*Physics, 5	Soils, 4
*Farm Mechanics, II A, 3	Farm Mechanics II B, 3
Plant Diseases, 3	*Electricity, 4
Stock Judging A, 1	Stock Judging B, 1
Elementary Beekeeping, 2	Fruit and Vegetable Crops, 3
Landscape Gardening, 2	Forage Crops, 2
Argumentation, 2	Incubation and Brooding, 3
Pure Seed Production, 2	Public Speaking, 2
	Electric Arc Welding, 2
Either Term	
*Gas Welding, 2	
Typewriting, 2 or 5	
Conservation, 2	
Farm Painting, 1	
Group or Private Music, 1 or 2	
Chorus, 2	
Music Appreciation, 2	

SENIOR YEAR

First Term	Second Term
Required	
English III A, 5	English III B, 5
United States History, 5	Government, 5
Electives	
*Farm Management A, 3	Farm Management B, 3
Livestock Management, 3	Animal Diseases, 2
Dairy Production, 3	Rural Sociology, 3
Pure Seed Production, 2	Farm Structures B, 1
Farm Structures A, 1	Advanced Electricity, 3
Animal Breeding, 3	Bookkeeping B, 5
*Bookkeeping A, 5	Elementary Algebra B, 5
*Elementary Algebra A, 5	Farm Finance, 3
Farm Marketing, 2	Livestock Problems, 2
Farm Mechanics III, 4	Commercial Law B, 5
*Commercial Law A, 5	First Aid, 2
Farm Economics, 3	Advanced Poultry Production, 2
Mechanical Drawing, 1	
Special Problems in Farm Crops, 2	
Either Term	
Conservation, 2	
Meats, 4	
Typewriting, 2 or 5	
Shorthand, 5	
Gas Welding, 2	
Electric Arc Welding, 2	
Advanced Stock Judging, 2	
Group or Private Music, 1 or 2	
Chorus, 2	
Music Appreciation, 2	

* Required as a prerequisite for later courses.

Two credits shall be allowed for participation in interscholastic debate. Members of interscholastic athletic teams will be excused from gymnasium classes. Not more than five special credits, including credits for debate and music, shall count toward graduation.

COURSES FOR GIRLS

FRESHMAN YEAR

Required

First Term	Second Term
English I A, 5	English I B, 5
General Science A, 3	General Science B, 5
†Social Training A, 2	Social Training B, 2
Home Accounts I A, 3	Home Accounts I B, 3
§Word Study I A, 2	§Word Study, I B, 2
Gymnasium, 1	Gymnasium, 1

Electives

*Clothing I A, 3	*Clothing I B, 3
*Foods I A, 3	*Foods I B, 3
*Drawing and Design I A, 2	*Drawing and Design I B, 2
*Landscape Gardening, 2	Incubation and Brooding, 3
Management of Laying Flock, 3	

Either Term
Freshman Vocal Study, 1
Group or Private Music, 1 or 2

JUNIOR YEAR

Required

First Term	Second Term
English II A, 5	English II B, 5
Home Furnishing II A, 3	Home Furnishing II B, 3
Gymnasium, 1	Gymnasium, 1

Electives

*Foods II A, 3	*Foods II B, 3
*Clothing II A, 3	*Clothing II B, 3
*Crafts A, 2	Crafts B, 2
Costume Design, 2	*Home Nursing II B, 3
*Laundering, 2	Incubation and Brooding, 3
*Home Nursing II A, 3	Fruit and Vegetable Crops, 3
	Household Equipment II B, 2
	*Child Care and Training, 3

Either Term
Shorthand, 5
Group or Private Music, 1 or 2

SENIOR YEAR

Required

First Term	Second Term
English III A, 5	English III B, 5
Home Management A, 3	Home Management B, 3
United States History, 5	Government, 5
Economics of Buying, 3	Foods III B, 3
Clothing III A, 4	Clothing III B, 4
Home Nursing III A, 3	Home Nursing III B, 3
*Art Appreciation A, 2	

Either Term
Home Management House, 8

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* Required as a prerequisite for later courses.
† Not required of transfer students.
§ May be removed as a requirement by special examination.

Electives

First Term	Second Term
*Crafts A, 2	Crafts B, 2
*General History A, 5	General History B, 5
*Elementary Algebra A, 5	Incubation and Brooding, 3
*Bookkeeping A, 5	Elementary Algebra B, 5
*Commercial Law A, 5	Rural Sociology, 3
	Bookkeeping B, 5
	Commercial Law B, 5
	Art Appreciation B, 2

Either Term

Typewriting, 2 or 5
Dictation, 5
Group or Private Music, 1 or 2

Through their choice of electives, students may prepare themselves for one of several lines of work. At the time of registration, students will be advised how to select their work so that it will prepare them for the vocation in which they are interested. They may prepare for business positions, for teacher training work, for college entrance, or for nurse's training.

COURSES FOR BOYS AND GIRLS

ADVANCED YEAR AND COLLEGE PREPARATION COURSES

Required

First Term	Second Term
English IV A, 5	English IV B, 5
Elementary Algebra A, 5	Elementary Algebra B, 5
Plane Geometry A, 5	Plane Geometry B, 5
General History A, 5	General History B, 5
Botany, 5	

Electives

Any course not previously completed during the regular three-year program or any business training courses. Attainment of 45 honor points and 45 credits required to complete advanced year.

BUSINESS TRAINING COURSES

Bookkeeping A, 5	Bookkeeping B, 5
Advanced Bookkeeping A, 5	Advanced Bookkeeping B, 5
Business Spelling and Penmanship A, 3	Business Spelling and Penmanship B, 3
Typewriting A, 2 or 5	Typewriting B, 2 or 5
Advanced Typewriting A, 2 or 5	Advanced Typewriting B, 2 or 5
*Business English A, 5	Business English B, 5
Shorthand A, 5	Shorthand B, 5
Beginners' Dictation A, 5	Beginners' Dictation B, 5
Dictation A, 5	Dictation B, 5
Secretarial Studies A, 5	Secretarial Studies B, 5
Commercial Law A, 5	Commercial Law B, 5

* Required as a prerequisite for later courses.

DESCRIPTION OF COURSES

AGRICULTURAL ECONOMICS

Farm Economics. A study of the fundamental economic principles including the economic organization for production, demand and supply, price and value, the economics of government, the nature of money and banking, international trade, and other current economic problems. Rec. 3 hrs.; 3 credits.

Farm Finance. A study of the financial structure of agriculture, rural taxation, the relation of tariffs and the monetary system to the agricultural industry. The Farm Credit Administration is fully covered. Rec. 3 hrs.; 3 credits.

Farm Accounts. A study of farm accounts. The student keeps a practical set of books on the year's work, from the taking of the inventory to closing the accounts at the end of the year. Rec. 3 hrs.; 3 credits.

Farm Management A. A study of farm organization as related to types of farming, combinations of enterprises, crop rotation, soil management, field and farmstead arrangement, and the efficient use of labor and equipment. Rec. 3 hrs.; 3 credits.

Farm Management B. An advanced course in farm organization. Farm budgeting will be given important consideration. Prerequisite: Farm Management A. Rec. 3 hrs.; 3 credits.

Farm Marketing. A study of the present system of distributing farm products. Special study is made of co-operative laws and co-operative marketing organizations. Rec. 2 hrs.; 2 credits.

Types of Farming. Different types of agriculture in the state and nation are studied. Designed to point out to the beginning student the diversity of the agricultural occupation and the opportunities in the different fields. Rec. 2 hrs.; 2 credits.

AGRICULTURAL ENGINEERING

Carpentry I A. Carpentry; care, use, and sharpening of tools; laying-off work; making of joints and framing, and work designed to be especially helpful in planning, framing, and construction of farm buildings. Lab. 2, 2 hrs.; 2 credits; fee $1.

Carpentry I B. Continuation of Carpentry I A, with emphasis placed on completion of some project selected by the student. Prerequisite: Carpentry I A. Lab. 2, 2 hrs.; 2 credits; fee $1.

Farm Structures A. Design, location, and erection of farm buildings. A study is made of roofs, pitches, trusses, etc. Exercises in building, framing, window and door frame construction. Part of the time is devoted to mechanical drawing and plan reading. Lab. 1, 2 hrs.; 1 credit.

Farm Structures B. A continuation of Farm Structures A. The student draws plans and makes up the material list for a farm building. Prerequisite: Farm Structures A. Lab. 1, 2 hrs.; 1 credit.

Farm Painting. A study of paints and their uses. Simple exercises in painting, actual practice on buildings and farm equipment. Lab. 2 hrs.; 1 credit.

Forge I A. Blacksmithing; forging and welding of iron and steel, making and tempering of hand tools. Work designed to be especially helpful in the repair and operation of machinery. Lab. 2, 2 hrs.; 2 credits; fee $1.

Forge I B. Continuation of Forge I A. Lab. 2, 2 hrs.; 2 credits; fee $1.

Farm Mechanics I A. A course designed to be of help in repairing general farm machinery and equipment. Work is offered in soldering, rope splicing, knots, belt lacing, use of taps and dies, tool sharpening and adjustment, harness repair work, etc. Lab. 2, 2 hrs.; 2 credits.

Farm Mechanics I B. A continuation of Farm Mechanics I A. Emphasis is placed on some definite repair project which involves use of shop tools and equipment. Prerequisite: Farm Mechanics I A. Lab. 2, 2 hrs.; 2 credits.

Farm Mechanics II A. Use of farm level—simple exercises in "running levels," chaining and measuring land. Exercises in map reading, making of farm plats from measurements taken in the field. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits.

Farm Mechanics II B. A study is made of all types of farm machinery, their adjustment and care. Materials used in the construction of farm machinery are covered. Selection of machinery for the field. Prerequisite: Farm Mechanics II A. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits.

Farm Mechanics III. The first six weeks are given to a study of the uses of concrete about the farm, grading and proportioning of sand and gravel, water cement ratios, mixing and placing of concrete, use of reinforcing in concrete, and the estimating of materials, etc. The last six weeks are devoted to a study of modern lighting, heating, ventilating, plumbing, and sewage disposal systems for the farmstead, their cost of installation, care, and maintenance. Prerequisites: Physics and Electricity I. Rec. 3; lab. 1, 2 hrs.; 4 credits.

Automotive Engineering. A study of internal combustion engines with emphasis placed on tractor, truck, and automobile motors. A careful study is made of carburetors, ignition, lubrication, and cooling systems; also differentials and transmissions. Rec. 3 hrs.; lab. 2, 2 hrs.; 5 credits.

Electricity. Kinds of electrification, magnetism, electromagnetism, magnetic induction, chemical generators, dynamos, motors, etc. Rural electrification, wiring of farm buildings, maintenance of electrical appliances in the home. Prerequisite: Physics. Rec. 3 hrs.; lab. 1, 2 hrs.; 4 credits.

Advanced Electricity. A continuation of Electricity, with considerable time devoted to the study of alternating currents. Rec. 2; lab. 1, 2 hrs.; 3 credits.

Mechanical Drawing. Principles of drafting, lines, lettering, views of objects, making of working drawings, interpretation of drawings. Lab. 2 hrs.; 1 credit.

Gas Welding. A careful study is made of the apparatus, of safety measures, of action of the various metals under the torch, and uses of flux. Student begins by running simple beads, gradually working into actual repair projects on welding, brazing, and cutting with the torch. Prerequisites: Forge I A and B. Rec. 1 hr.; lab. 1, 2 hrs.; 2 credits; fee $3.

Electric Arc Welding. The course covers practice in both A.C. and D.C. equipment. Much practice is given on actual repair welds. Prerequisite: Gas Welding. Rec. 1 hr.; lab. 1, 2 hrs.; 2 credits; fee. $6.

AGRONOMY AND SOILS

Grain Crops. A study of corn and the principal cereal crops with emphasis placed upon the types and varieties most desirable, soil and cultural requirements, seed selection and preparation, cost of production, harvesting, and methods of improvement. Rec. 5 hrs.; 5 credits.

Grain Judging. Score card practice, commercial grading and judging work, with the object in view of making the student proficient in the selection and growing of purebred seed. Lab. 2, 2 hrs.; 2 credits.

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 to the farm. Lab. 2, 2 hrs.; 2 credits.

Pure Seed Production. Methods of breeding and growing purebred seed corn and grain on the farm. The course includes a study of certification and seed registration. Prerequisite: Grain Crops. Lab. 2, 2 hrs.; 2 credits.

Plant Diseases. A study of the most important diseases affecting farm crops, with the recommended methods for control. Rec. 3 hrs.; 3 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 attention. Prerequisite: Chemistry A. Rec. 3 hrs.; lab. 1, 2 hrs.; 4 credits.

Special Problems in Farm Crops. A course for seniors and advanced students. Takes up problems of a practical nature in farm crops and farm management and covers them more fully than do the elementary courses. Prerequisites: Grain Crops and Forage Crops, or their equivalent. Rec. 2 hrs.; 2 credits.

Crops and Soil Management. A course for special students who intend to spend only three months' time in school. Includes a comprehensive study of the practical phases of corn and grain growing and soil management. Rec. 3 hrs.; 3 credits.

ANIMAL AND DAIRY HUSBANDRY

Livestock Production. An introduction to the livestock industry. The place of livestock on the farm is discussed, the types and breeds best adapted to the needs of different kinds of farms are studied. Principles of care and management outlined. Practice in selection and judging. Rec. 4 hrs.; 4 credits.

Livestock Selection. Study and practice in the use of score cards, showing the relation of the body structure to economical production, covering all classes of livestock. Lab. 1, 2 hrs.; 1 credit.

Stock Judging A. Comparative judging of beef cattle, swine, and sheep. Lab. 1, 2 hrs.; 1 credit.

Stock Judging B. An advanced course in comparative judging of dairy cattle and horses. Lab. 1, 2 hrs.; 1 credit.

Advanced Stock Judging. Open to those trying out for the interscholastic stock judging team. Lab. arranged; 2 credits.

Feeds and Feeding. General composition of the animal body; composition and digestibility of feeds; feeding standards; methods of feeding. Prerequisite: Chemistry A. Rec. 5 hrs.; 5 credits.

Livestock Management. Production of beef cattle, sheep, swine, and horses, both purebred and market stock, including, from a practical standpoint, feeding and management of the herd or flock, selection of breeding stock, and arrangement of buildings and yards. Rec. 3 hrs.; 3 credits.

Dairy Production. This course is designed to fit the student for the successful management of a dairy herd. The course prepares students for positions as testers in dairy herd improvement associations. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits.

Animal Diseases. Causes, prevention, and cure of animal diseases, including emergency treatment. Rec. 2 hrs.; 2 credits.

Animal Breeding. Theory and practice of animal breeding, including variation, heredity, selection, effect of purebred animals in improving types of stock and pedigrees. Rec. 3 hrs.; 3 credits.

Meats. Practice in killing, cutting, and curing of meats for home consumption on the farm. Course is limited to seniors. Lab. 8 hrs.; 4 credits.

Livestock Problems. A seminar and reading course in which the student selects problems of special interest to him. Open only to seniors and advanced students with at least 10 credit hours in animal husbandry. Rec. 2 hrs.; 2 credits.

BEE CULTURE

Elementary Beekeeping. Fundamentals of bee behavior throughout the cycle of the year. Fundamentals of beekeeping practice throughout the year. Modern equipment for beekeeping practice. Starting with bees, increase, moving, uniting, feeding. Rec. 2 hrs.; 2 credits.

BUSINESS

Business Spelling and Penmanship A. An advanced course in spelling and penmanship for students taking the business course. Rec. 3 hrs.; 3 credits.

Business Spelling and Penmanship B. Continuation of Business Spelling and Penmanship A. Rec. 3 hrs.; 3 credits.

Typewriting A. Individual instruction in the manipulation of all parts of the machine. The keyboard is learned by the touch method. Practical lessons are used. Drill 5 hrs., lab. 5 hrs.; 5 credits; fee $1.50.

Typewriting B. A continuation of Typewriting A. 2 or 5 credits; fee $1.50.

Advanced Typewriting A. For those who have had previous typing experience and can meet the set standards. Accuracy and speed is stressed. 2 or 5 credits; fee $1.50.

Advanced Typewriting B. A continuation of Advanced Typewriting A. 2 or 5 credits; fee $1.50.

Shorthand A. The Gregg System taught according to the functional method and supplemented with speed studies is used. Rec. 5 hrs.; 5 credits.

Shorthand B. Continuation of Shorthand A. Rec. 5 hrs.; 5 credits.

Beginners' Dictation A. Dictation and transcription drill for those students taking Shorthand A. Rec. 5 hrs.; 5 credits.

Beginners' Dictation B. Continuation of dictation and transcription drill for those students taking Shorthand B. Rec. 5 hrs.; 5 credits.

Dictation A. For those who have had previous training in shorthand. A continuation of Shorthand A, stressing speed, accuracy, and machine transcription. Rec. 5 hrs.; 5 credits.

Dictation B. Continuation of Dictation A. 5 hrs.; 5 credits.

Business English A. A thoro study of grammar and effective English usage in relation to business. Rec. 5 hrs.; 5 credits.

Business English B. Continuation of Business English A, dealing with the writing of business letters and other forms. Rec. 5 hrs.; 5 credits.

Secretarial Studies A. Course includes training in office routine, such as filing, indexing, and stenciling. Individual instruction in dictaphone. Rec. 5 hrs.; 5 credits.

Secretarial Studies B. Continuation of Secretarial Studies A. Rec. 5 hrs.; 5 credits.

Bookkeeping A. Preparation and interpretation of balance sheets; purpose of accounts and principles of account classification; profit and loss statements. Rec. 5 hrs.; 5 credits.

Bookkeeping B. Source of ledger entries; cash receipts and disbursements; general journal; purchase and sales records; practice set. Rec. 5 hrs.; 5 credits.

Advanced Bookkeeping A. Controlling accounts; records of original entry; business practice and procedure; depreciation and bad debts; accruals and deferred items; adjusting and closing entries; partnerships, departmental revenue accounts; practice set. Rec. 5 hrs.; 5 credits.

Advanced Bookkeeping B. Nature and characteristics of the corporation; proprietorship in the corporation; formation and operation of a corporation; corporation accounts; fixed and intangible assets; manufacturing; analysis of financial statements; use of statistical data in business management; graphical method of presenting accounting facts. Rec. 5 hrs.; 5 credits.

Commercial Law A. A thoro study is made of contracts, sales, agency, and negotiable instruments. Rec. 5 hrs.; 5 credits.

Commercial Law B. Continuation of Commercial Law A and further study includes guaranty, bailment, insurance, real property, fixtures, partnership, corporations, and bankruptcy. Rec. 5 hrs.; 5 credits.

ENGLISH AND PUBLIC SPEAKING

English I A. Functional grammar, capitalization, punctuation, word study, and library instruction. Oral composition, discussions, reports, and simple debates. Extensive reading with memory work from various types of literature of representative English and American authors. Rec. 5 hrs.; 5 credits.

English I B. Continuation of English I A. Written composition with special emphasis on letter writing and story telling. Rec. 5 hrs.; 5 credits.

English II A. Review of functional grammar, advanced work based on variety in sentence structure and the paragraph. Extensive reading with memory work from various types of literature of representative English and American authors. Rec. 5 hrs.; 5 credits.

English II B. Continuation of English II A. Library instruction, gathering information, organization, oral reports, and letter writing. Rec. 5 hrs.; 5 credits.

English III A. Remedial work in grammar, punctuation, and the mechanics of English with special emphasis on the clause and phrase for variety and clearness. Understanding of American life and ideals of the past and the present by the study of great American writers and their works. Rec. 5 hrs.; 5 credits.

English III B. Continuation of English III A. Gathering material from books and periodicals, compiling a bibliography, with special emphasis on the logical outline in exposition and argument. Stress on public speaking, and formal and informal debate. Rec. 5 hrs.; 5 credits.

English IV A. Advanced work in grammar, good usage, variety in diction, and punctuation. Creative writing and library research. Extensive reading from English literature to modern times with major emphasis upon the selections themselves and minor attention to historical backgrounds and biography of writers. Rec. 5 hrs.; 5 credits.

English IV B. Continuation of English IV A. Rec. 5 hrs.; 5 credits.

Elementary English. A course for older boys and men who attend school during the winter term. Reading, spelling, and a brief review of the principles of grammar is given. Rec. 3 hrs.; 3 credits.

Argumentation. Principles of debate are studied, gathering of evidence and outlining arguments stressed. Practice in speaking. Rec. 2 hrs.; 2 credits.

Public Speaking. A study of the facts and principles common to all speaking, together with platform projects. Rec. 2 hrs.; 2 credits.

Word Study and Penmanship. Drill in spelling and usage of common words, and penmanship. Rec. 3 hrs.; 3 credits.

Word Study I A. (Girls.) A study of the spelling, meaning, use, and pronunciation of words designed to increase and improve the student's written and oral work. Rec. 2 hrs.; 2 credits.

Word Study I B. A continuation of Word Study I A. Rec. 2 hrs.; 2 credits.

HOME ECONOMICS

To defray costs of laboratory supplies used in the various courses, a fee of $2 per term is charged all students registering in home economics courses.

FOODS AND HOME MANAGEMENT

Foods I A. This course is divided into five parts. It gives the basic principles and standards for each of the following: canning, food service, planning and preparation of breakfasts, breads, and salads. Lab. 3, 2 hrs.; 3 credits.

Foods I B. A continuation of the Foods I A course as applied to luncheons or suppers and dinners. A study of batters, doughs, cakes, cookies, and meats is included here. Lab. 3, 2 hrs.; 3 credits.

Foods II A. A study of body needs, planning of dietaries, menus, and meals. Prerequisites: Foods I A and B. Lab. 3, 2 hrs.; 3 credits.

Foods II B. A continuation of Foods II A, the actual serving of meals to small groups, and a detailed study of meats. Lab. 3, 2 hrs.; 3 credits.

Foods III B. This course is planned to help the girls realize the possibility of using their foods training to provide an income and to aid them in planning, preparing, and serving special foods for club meetings, ladies' aids, group suppers, buffet meals, teas, etc. Rec. and lect. 2 hrs.; 2 hrs. lab. as arranged; 3 credits.

Home Management A. A study of the problems of management in the home including family and community relationships. Prerequisites: Child Care and Training, Foods I and II, Laundering. Rec. 3 hrs.; 3 credits.

Home Management B. A continuation of Home Management A. Includes a study of possible vocations for the home economics trained girl. Rec. 3 hrs.; 3 credits.

Home Management House. Senior girls spend eight weeks living in the practice house, where, with the supervision of a resident instructor, they actually manage the home, and care for a child. 8 credits.

Child Care and Training. This course is to give an understanding of the place of the child in the home, through the study of the physical care and mental training of the infant and preschool child. Rec. 3 hrs.; 3 credits.

Laundering. Includes care of laundry and utensils, study of water, soap, starch, removal of stains, washing of woolen and silk garments, ironing, and the principles of dry cleaning. Rec. 1 hr.; lab. 1, 2 hrs.; 2 credits.

Social Training I A. The subject-matter includes the study of conversation, table etiquette, dress, boy and girl relationships, and social correspondence. Rec. 2 hrs.; 2 credits.

Social Training I B. Continuation of Social Training I A. Rec. 2 hrs.; 2 credits.

Economics of Buying A. A general study of buying points for household supplies, such as clothing, equipment, and luxuries. Rec. 3 hrs.; 3 credits.

Home Accounts A. Simple arithmetic as applied in figuring costs of what we produce and consume. The making of budgets and keeping of accounts as suited to needs. Rec. 3 hrs.; 3 credits.

Home Accounts B. Continuation of Home Accounts A. Rec. 3 hrs.; 3 credits.

Household Equipment II B. A study of the basic principles for the selection and use of large and small equipment used in the home. Lab. 2, 2 hrs.; 2 credits.

CLOTHING AND RELATED ART

All materials for clothing courses must be selected in consultation with the instructor. Students are requested not to bring materials from home, unless arrangements have been made with the instructor. Each girl should have a thimble, tape measure, scissors, and needles.

Clothing I A. Two aprons, a holder, a slip or panties, and Christmas gifts are made. Problems of darning and patching are required. A study of cotton materials is made, including wearing qualities and prices. Simple decorations, trimmings, and the cost of finished garments are discussed. Demonstration of sewing machine attachments. Lab. 3, 2 hrs.; 3 credits.

Clothing I B. A study of cotton and linen dress fabrics; making pajamas, a simple wash dress, and a better wash dress. Simple problems in decorative needlework; discussion of clothing budget. Lab. 3, 2 hrs.; 3 credits.

Clothing II A. Includes the study and making of a house dress for wear in foods classes and the Home Management House. A study of wool and making of at least one wool garment. The use of sewing machine attachments is studied and practiced. Prerequisites: Clothing I A and B, or equivalent. Lab. 2, 3 hrs.; 3 credits.

Clothing II B. A study of silk fabrics, the making of a silk garment. A study of children's clothing and the making of one child's outfit. Lab. 2, 3 hrs.; 3 credits.

Clothing III A. A course in make-over. Each student in conference with the instructor decides on the problem. A study of millinery is included. Prerequisites: Clothing II A and B, or equivalent. Lect. 1 hr.; lab. 3, 2 hrs. or lab. 4, 2 hrs.; 4 credits.

Clothing III B. Each girl makes as many complicated garments as time will permit, in order to improve her technique. At least one dress or suit and a complete outfit for graduation is made. Lect. 1 hr.; lab. 3, 2 hrs. or lab. 4, 2 hrs.; 4 credits.

Costume Design. This course is so planned that it enables the girl to plan clothes appropriate to various types, figures, and colorings, and which are suitable for long wear. Lect. 2, 1 hr.; 2 credits.

Home Furnishings II A and B. Courses include the fundamentals of artistic home planning and furnishing, including interior finish of walls, floors, and furniture, as well as selection of rugs or carpets, curtains, and pictures. Renovation of used furnishings is discussed and whenever possible, carried out in the laboratory. Prerequisites: Drawing and Design, Landscape Gardening. Rec. and lect. 3, 2 hrs.; 3 credits, each course.

Drawing and Design I A. Principles of design and color harmony with emphasis upon design as expressed in clothing, house furnishings, and articles in common use. Lab. 2, 2 hrs.; 2 credits.

Drawing and Design I B. Application of design principles to costume selection and design. Lab. 2, 2 hrs.; 2 credits.

Crafts A. Application of the principles of design to the making of worth-while decorative household articles and personal belongings. Lab. 2, 2 hrs.; 2 credits.

Crafts B. Continuation of Crafts A, with more advanced problems. Lab. 2, 2 hrs.; 2 credits.

Art Appreciation A and B. Appreciation gained through the study of various forms of art, including pictures, ceramics, decorative objects, and costume. Rec. or lect. 2, 1 hr.; 2 credits.

Home Nursing II A. Structure and function of the human body and personal hygiene. Rec. 3 hrs.; 3 credits.

Home Nursing II B. Communicable diseases, prevention and care. First aid. Rec. 3 hrs.; 3 credits.

Home Nursing III A. Home care of the sick, including preparation and serving of food. Prerequisites: Home Nursing II A and B. Rec. 3 hrs.; 3 credits.

Home Nursing III B. Hygiene of maternity, prenatal care; infant nutrition and care. Rec. 3 hrs.; 3 credits.

HORTICULTURE

Fruit and Vegetable Crops. Planning, planting, culture, value, and management of the orchard and garden on the general farm. Rec. 3 hrs.; 3 credits.

Landscape Gardening. A study of trees, shrubs, and flowers adapted to western Minnesota and the proper arrangement of these plants on the farmstead. Rec. 2 hrs.; 2 credits.

MATHEMATICS

Farm Arithmetic A (Boys). Training in simple mathematical processes, applications of principles to problems requiring measurements of material, extension, capacity, with practical applications to farm work. Assists in the mathematics of the technical school course. Rec. 3 hrs.; 3 credits.

Farm Arithmetic B (Boys). Continuation of Farm Arithmetic A. Rec. 3 hrs.; 3 credits.

Elementary Algebra A. Includes the study of symbols used in mathematics, the formula, simple equation, exercises and problems involving positive and negative numbers, the making and interpretation of graphs. Rec. 5 hrs.; 5 credits.

Elementary Algebra B. Practice in multiplication, factoring, division, and fractions is followed by the study of fractional and literal equations, set linear equations, ratio, proportion, square root, radicals, and quadratic equations. 5 hrs.; 5 credits.

Plane Geometry A. Begins with an introductory study of geometric terms, constructions and methods of proof. Includes propositions involving triangles, perpendiculars, parallel lines, polygons and the constructions based upon them. Rec. 5 hrs.; 5 credits.

Plane Geometry B. A continuation of Geometry A including the study of circles, angles, and arcs, and the measurements of angles and arcs, loci, proportional line segments, similar polygons, and area. Rec. 5 hrs.; 5 credits.

MUSIC

Private musical instruction includes twelve private lessons and daily supervised practice periods. Music Hall is equipped with practice rooms for the use of music students. The fees for private lessons pay also for the use of a practice studio.

Piano. Elementary training in scales, chords, arpeggios, and selected studies. Technical exercises for the development of the hands, fingers, and arms. Studies and compositions adapted to the individual student. 2 credits; fee $7.

Voice. Fundamentals of voice culture, breathing, placement, formation of vowels, diction, and flexibility. Studies and solos selected according to the ability of the individual student. 2 credits; fee $7.

Violin. Methods and studies by Grun, Fischel, Sevcik, Dancla, Kayser, Kreutzer, Rode, and Fiorillo. Solos adapted to each grade. 2 credits; fee $7.

Organ. For students sufficiently advanced in music. Hammond electric organ is used. 2 credits; fee $7.

Band and Orchestral Instruments. Carefully arranged courses in each instrument. Cello, trombone, clarinet, trumpet, saxophone, drums, etc. 1 credit; fee $7.

Freshman Vocal Study. A beginning course in vocal study for freshmen. Principles of musical notation, formation of scales, musical terms, sight reading, ear training, and the appreciation of music taught through participation in group singing. Rec. 1 hr.; 1 credit.

Music Appreciation. A general survey of music intended to enlighten the listener of music. Form and analysis, instruments, and voices taught with the use of the phonograph and demonstration. Rec. 2 hrs.; 2 credits.

Chorus. Both sacred and secular music are sung by this group. The chorus sings on Sunday evenings at the vesper service and furnishes music for assembly programs and concerts throughout the year. 2 credits.

Orchestra. Two orchestras, one for beginners and one for advanced students, are organized at the beginning of the school year. Credit is given for membership in these organizations. 1 credit.

Group lessons are offered in piano, voice, and instruments. These are small classes for the benefit of those who do not desire to register for private instruction. 1 credit; fee $1.50.

PHYSICAL TRAINING

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

POULTRY HUSBANDRY

Management of Laying Flock. Principles of general management, house construction, important commercial breeds and types, feeding and culling for egg production; common ailments and treatments. Rec. 3 hrs.; 3 credits.

Incubation and Brooding. A study of the best methods of incubation and brooding, natural and artificial, includes selection of breeds, eggs for incubation, feeding and care of chicks, how to avoid losses. Rec. 2 hrs.; 2 credits.

Advanced Poultry Production. A seminar course for students especially interested in poultry production. Prerequisites: Management of Laying Flock, and Incubation and Brooding. Rec. 2 hrs.; 2 credits.

SOCIAL SCIENCE

General History A. A study of world history during the ancient and medieval periods to the French Revolution, designed to show the social and political development of men and nations during these periods. Rec. 5 hrs.; 5 credits.

General History B. A continuation of General History A from the French Revolution to the present time, with special emphasis on the growth and development of nationalism and democratic and liberal reforms during this period. Rec. 5 hrs.; 5 credits.

United States History. A course intended to present a clear account of the colonial backgrounds of the United States with greater emphasis on the recent industrial, economic, and social development of our nation. Rec. 5 hrs.; 5 credits.

Government. A limited study of the departmental organization and function of the national, state, and local government. Rec. 5 hrs.; 5 credits.

Rural Sociology. A limited study of the backgrounds of sociology. Rural social institutions and existing rural problems. Rec. 3 hrs.; 3 credits.

Freshman Lectures. A noncredit course for beginning students, designed to aid them in adjusting themselves to the school, and to life.

SCIENCE

General Science A. To acquaint the student with the many happenings of everyday life and their relation to the sciences of chemistry, physics, and biology. Rec. 3 hrs.; 3 credits.

General Science B. Continuation of General Science A. Rec. 5 hrs.; 5 credits.

Agricultural Science A. A foundation course covering the fundamentals of botany, zoology, chemistry, and soils, and their relationship and use to agriculture. Rec. 2 hrs.; 2 credits.

Agricultural Science B. A continuation of Agricultural Science A. Rec. 2 hrs.; 2 credits.

Botany. A study of flowering plants, molds, mushrooms, rots or decays, and yeast. Rec. 3 hrs.; lab. 2, 2 hrs.; 5 credits.

Chemistry A. A general introductory course in chemistry treating of the foundamental principles necessary for an understanding of chemistry in its relation to agriculture. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits; fee $1.

Chemistry B. A continuation of Chemistry A, with a more direct application to the chemistry of plants and animals. Rec. 2 hrs.; lab. 1, 2 hrs.; 3 credits; fee $1.

Physics. A practical course in physics as related to agricultural engineering. Covering a study of the mechanics of solids, liquids, gases, heat, sound, and light. Rec. 5 hrs.; 5 credits.

Conservation. A study of the natural resources of the state, with special emphasis on the student's responsibility and opportunities for their conservation. Rec. 2 hrs.; 2 credits.

First Aid (Boys). A course in junior first aid, as outlined by the American Red Cross. The course includes artificial respiration, and diagnosis and temporary treatment of all kinds of accidents. Rec. 2 hrs.; 2 credits.

SUMMER HOME PROJECTS

AGRICULTURAL PROJECTS

From 2 to 10 credits will be allowed, depending on the quantity and quality of work. A charge of 25 cents is made for the record books made up by the school. Other record books and supplies are charged for at cost. Sequence in which project work must be taken is explained in Requirements for Graduatoin, on page 10.

Farm Accounts. Keep complete records of the farm business at home for six months. Submit the completed book at the close of the project year. Four reports will be required for the six months. This project may be carried for an entire year for extra credit.

Personal Accounts. Those boys who are working out and unable to carry the Farm Accounts project may keep records of personal expenses for a period of six months. Submit bank book or other evidence of saving, to indicate that at least 50 per cent of wages earned have been saved. Included in savings shall be evidences of old notes or bills paid, and clothing bought for personal use.

Swine—Cost of Production. Take over the management of the swine herd, keep farrowing records, earmark litters if possible (extra credit for doing so), keep accurate labor, feed, and financial records, and submit the same monthly. Final report is also required.

Swine—Ton Litter. For those who are enrolled in the Swine 4-H Club Project, produce a ton litter, if possible, from one sow. Must be kept separate from other hogs. Keep labor, feed, and financial records, and submit same as called for.

Swine Sanitation. Take over the management of the entire herd. Keep farrowing records. Pigs are to be raised on clean and sanitary ground, on which pigs have not been grown the previous year. The McLean System, or a modification of it, is expected to be carried out. Keep labor, feed, and financial records and submit same monthly. Sow testing may also be carried on with this for extra credit.

Sheep Management. Take over the management of the flock. Ownership by student is desirable. Lambs should be creep fed for at least a month. Student should dock and castrate lambs and treat for stomach worms, and if necessary, dip sheep. Keep labor, feed, and financial records, and submit same as called for.

Dairy Herd Management. Student assumes care of dairy herd on his home farm for at least six months, making regular reports in regard to feeding and management and keeping accurate accounts of milk production, butterfat test, feed consumed, etc.

Horse Management. Take over the management of the horses on the farm. Not less than four horses. Keep records of work done by horses, feeds fed, time spent in caring for horses, and submit records monthly. Final report, including summary of financial and labor records.

Beef. Intended for boys in the 4-H Beef Club Project. Fatten a baby beef and keep accurate feed and labor records of the same. Submit records as called for by supervisor. Extra credit given to students who reach Junior Livestock Show with their beef animal.

Incubation and Brooding. Course in poultry work required as prerequisite. In this project 100 or more chicks, or 50 poults, are brooded, fed, and raised by the student. Poultry must be kept on clean ground or screen, up to 12 weeks of age. A definite ration is fed throughout the project, and accurate feed and labor records are kept.

Beekeeping. In this project the student takes charge of an apiary of not less than ten hives. Care and management of the bees and production records are included as a part of the project.

Fruit Growing. Management of the home orchard for one season. The work will consist of pruning, cultivating, spraying, harvesting, and preparing the orchard for winter. Cost records are kept.

Home Beautification. Planning and planting foundation shrubs and plants around the farm home and other buildings, caring for the same during the growing season, and preparing for winter. The student makes a planting plan which is approved before the work is undertaken. At least one farm building must be completely planned for and planted.

Tractor Operation. A study of the management and operation of the tractor on the home farm, including cost of fuel and oil, repairs, etc., and complete records of work done.

Farm Woodwork. Make five small articles, or two larger ones, selected from list prepared by supervisor, or build one small farm building. Keep farm tools in good condition. Submit records during the summer and a final report before August 1.

Potato. Grow one-half acre or more of a standard variety to be compared with one-half acre or more of one of the new varieties of potatoes developed by the University of Minnesota, such as the Warba and Katahdin. If possible, select and show peck sample of potatoes at county fair. Keep cost of production and labor records, and submit reports as called for.

Garden. Grow a garden of at least 5,000 square feet. Prepare a garden plan and submit it to the project supervisor. Keep yield, labor, and financial record and submit reports as called for.

Corn—Varietal Comparison. Plant at least one half an acre of one of the improved hybrids of the University of Minnesota, alongside at least a similar amount of local farm variety. Record of labor and costs required, and reports to be submitted as called for by supervisor. Yields to be checked by county agent. Make application through your county agricultural agent for 5 pounds of seed for this project.

Corn—Cost of Production. Consists of keeping accurate costs of production record on at least ten acres of corn. The student should choose one field of ten acres or more in size and keep the records of all cash and labor items which go into producing the corn. Ownership desirable. Three reports throughout the summer, and a final summary report required from all students.

Crops—Varietal Comparison. In this project students will make a comparative yield trial of a standard recommended variety of grain with a farm variety. At least one acre or more to be grown alongside an equal amount of their home variety and wherever possible the two varieties cut and threshed separately for determining yields. Square yard samples to be taken by student for yield check. Prerequisite: Cereal Crops course.

Windbreak Planting. Plan, plant, and care for a standard windbreak around the farmstead. Plan to be submitted to supervisor before project is started. Keep labor and cash records and submit reports as called for.

Weeds I. Involves a study of the most noxious weeds on the home farm. Students registered for this project are required to identify and describe at least twenty-four different kinds and make a weed seed and plant collection of same.

Weeds II. Make a collection of forty-eight noxious weed seeds, together with the plants. If the student has already received credit for Weeds I project, the weed case from it must be submitted with the two required for this.

Weeds III. Select a patch of ground infested with quack grass or some other noxious weed. Practice cultural methods to eradicate the same; keep a financial and labor record and submit reports as called for during the summer.

Farm Improvement. Plan a comprehensive program of farm repair, improvement, and beautification work, such as fencing and building repairs, painting buildings, cutting and killing weeds, cleaning out orchard and woodlot, rearranging or repairing smaller outbuildings, etc. Submit plan to supervisor at beginning of the project. Keep labor and cash record and submit reports as called for by supervisor.

4-H Club Leadership. Must be a junior leader of a standard 4-H Club; must take part in county, state, or interstate events through an exhibit or as a member of a demonstration or judging team, must submit a report of all work done on the regular 4-H Club Work Leadership Report Blank, and in addition a report of regular 4-H Club project carried.

Community Club or Church Leadership. The student will submit the annual program of work and meetings, as outlined by the officer and committee of the organization. Record shall be made of the part the student had in this program. Wherever possible, the student shall help with all regular meetings and help plan and participate in any special events, such as local or county picnics or other activities sponsored by the organization. This report shall be supplemented by a scrapbook, including newspaper and poster advertising, snapshots, and any other illustrative material which will better picture the student's work in the organization.

Alumni Relationships. Secure a list of all alumni and former students of W.C.S.A., living within a reasonable radius of one's home territory, contact them by letter or in person, arrange an Aggie-Alumni reunion, prepare publicity, send in three news items for *Projector,* and promote alumni relationships in every way possible. Reports required.

HOME ECONOMICS PROJECTS

Canning Fruits and Vegetables. The student will can not less than twelve quarts of vegetables, including two or more kinds, and not less than twelve quarts of fruit, including two or more kinds, and not less than six glasses of jelly. Records of methods, time, and costs are made a part of this project. 2 credits.

Baking. Includes the baking of not less than eight bakings of yeast bread and rolls, and the baking of quick breads until a standard product is obtained with a record of time, costs, and materials. 2 credits.

Foods and Cookery. Includes the preparing of salads, salad dressing, cakes, pies, cookies, puddings, and other simple desserts. Each product is made and scored at least three times. 2 credits.

Home Management. Includes the planning and preparation of all meals in the home for a period of two weeks. 2 or 3 credits.

Garment Making. Making a dress for self or for another member of the family. A record is to be kept of the time and cost. Credit will be given according to garment made and material used. 1 to 3 credits.

Clothing Repair. Not less than 15 articles of clothing and household linen are to be repaired. A record is kept of time and expenses, and money saved. 1 or 2 credits.

Laundering. This project includes doing the family laundering for four weeks, dry cleaning, stain removal, etc. 1 or 2 credits.

Children's Clothing. Consists of making a layette for a baby, or two suits or dresses for a small child. 2 credits.

Make-Over. In consultation with instructor the student will arrange to make over some garment before leaving school. After the work is completed, it is to be approved by the instructor before credit is given. 2 credits.

Home Furnishing. Includes the redecorating of a room, including walls, woodwork, and furniture, making of curtains, etc. 2 or 3 credits.

Working Out. In this project, with the approval of her employer, the girl keeps a careful and complete record of her daily tasks. 2 to 4 credits.

Personal Accounts. Records are kept of personal expenses for a period of six months. Bank book or other evidence of saving should indicate that at least 50 per cent of earnings have been saved. Payment of old bills and notes and clothing bought shall be included as savings. Credit will be based on merit of record submitted.