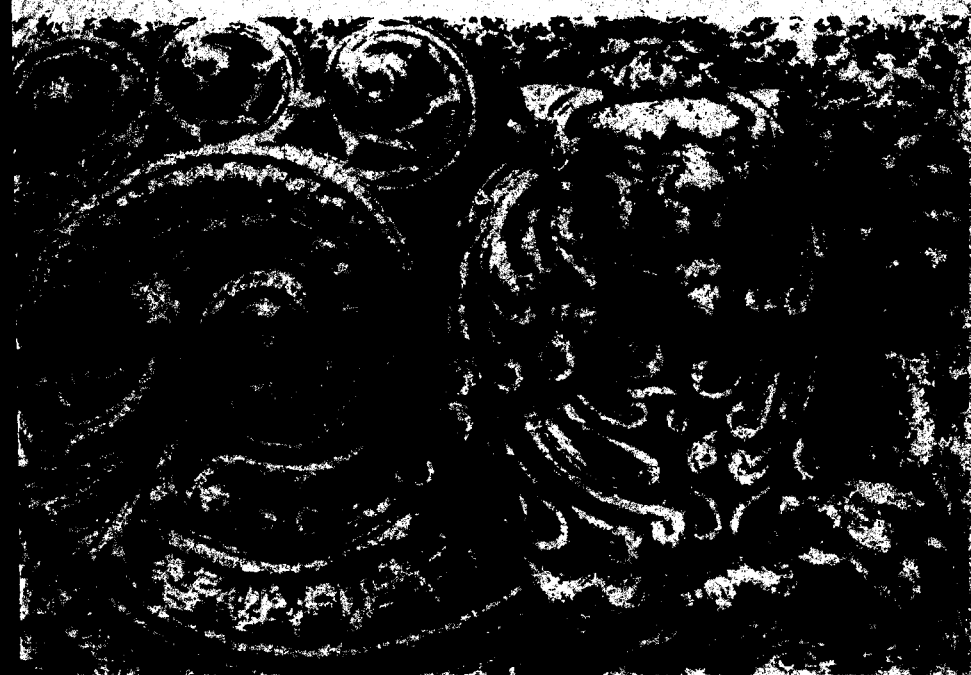


# Summer Session



# UNIVERSITY OF MINNESOTA

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UNIVERSITY OF MINNESOTA BULLETIN

Published February through August inclusive. Three issues in February, two issues in March, seven issues in April, three issues in May, four issues in June, one issue in July, and two issues in August. Second class postage paid at Minneapolis, Minnesota. Send change of address notices and other communications to Office of Admissions and Records, University of Minnesota, Minneapolis, Minnesota 55455.

The contents of this bulletin and of other University bulletins, publications or announcements are subject to change.

UNIVERSITY OF MINNESOTA

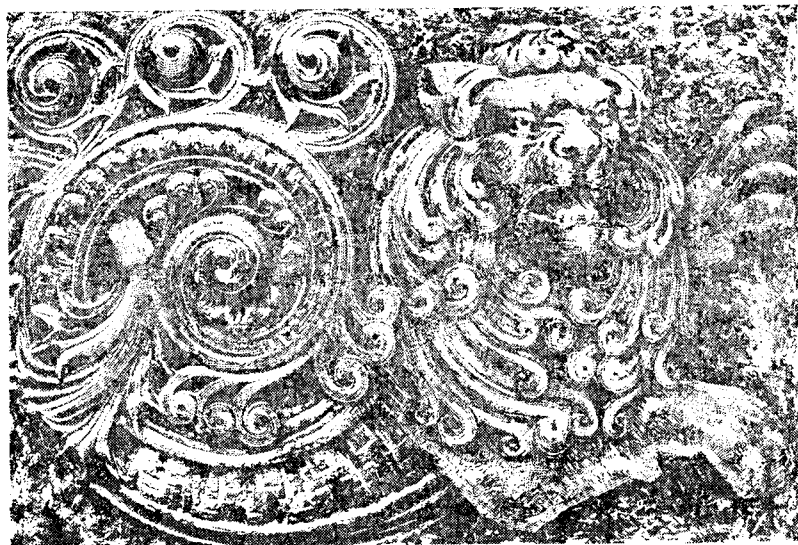
1968  
SUMMER  
SESSION

FIRST TERM

JUNE 17-JULY 20

SECOND TERM

JULY 22-AUGUST 24



# Calendar

## First Term

June	17	Monday	Orientation and Registration; fees due
June	18	Tuesday	First Term classes begin
July	4	Thursday	Independence Day; holiday
July	19	Friday	Classes end at close of VI hour Commencement, 4 p.m.
July	20	Saturday	First Term closes

## Second Term

July	22	Monday	Orientation and Registration; fees due
July	23	Tuesday	Second Term classes begin
August	23	Friday	Classes end at close of VI hour Commencement, 4 p.m.
August	24	Saturday	Second Term closes

Convocation, 8 p.m., Thursday

(See Official Daily Bulletin for announcement)

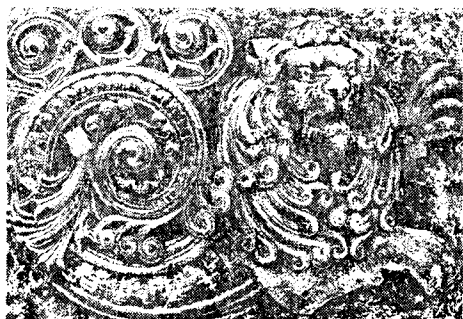
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Compliance with the regulations in this bulletin is expected of each student. This is particularly true with respect to fees, cancellations, and refunds.

Please note that the appropriate late fee will be assessed for registrations subsequent to Monday, June 17, 1968, and registrations subsequent to Monday, July 22, 1968.

Fee statements *prepared on the Mondays* stipulated above may be paid on the following Tuesday without the penalty for late payment of fees.



## How to Use This Bulletin

This bulletin contains announcements of the courses offered in the several colleges and schools of the University. Departmental statements also indicate certain requirements as to entrance and credits. For more detailed statements refer to the *Bulletin of General Information* and the regular bulletin of the college concerned.

**Symbols**—The following symbols are used throughout the course descriptions and will not carry any page footnotes:

- Courses through which it is possible for graduate students to prepare required Plan B papers.
- † All quarters of the course preceding the dagger must be completed before credit will be granted for any quarter of the course.
- ‡ Course may be taken out of sequence.
- § Credit will not be given if the equivalent course listed after the section mark has been taken for credit.
- ¶ Means "concurrent registration" in the course which it precedes.
- ‡ Consent of *instructor* must be obtained.
- △ Consent of *division, department, or school* involved must be obtained.
- A special fee is charged. See section on Course Fees.

Following each course description is a parenthetical statement of credits, prerequisites, class hours, days of the week, location of the class, and class instructor.

**Prerequisites**—Before you can enroll in certain courses, you must have completed or be concurrently enrolled in other specified courses or possess some particular qualification or class standing. These requirements are known as prerequisites. If no prerequisites are listed, there are none, except as the course number indicates a class standing requirement.

Class standing requirements, unless otherwise noted, are indicated by the course number:

1-49 for freshmen and sophomores

50-99 for juniors, seniors, and fifth-year students

100-199 for juniors, seniors, fifth-year students, and graduate students

200 and over for graduate students only

A minimum of prerequisite information is shown. For example, when courses which must be taken in sequence are prerequisites, only the last course of the sequence is listed.

Example: prereq 2 or 5 and Psy 1 (you must have had Psychology 1 plus either course 2 or 5).

Example: prereq C, or Comp 3 or Comm 3 and 5 addtl cr, or 5 cr in 21-22-23 (you must have had either course C, or 5 credits in the subject matter plus either Composition 3 or Communication 3, or 5 credits from either course 21, course 22, or course 23).

When no departmental abbreviated prefix precedes the course number listed as a prerequisite, that prerequisite course is in the same department as the course being described. Likewise, a prerequisite reading "6 cr" means 6 credits in courses offered by the same department.

Work equivalent to a prerequisite course (having the same content) is ordinarily accepted in lieu of that prerequisite. You will also note that the instructor may, in some instances, waive prerequisites at his discretion.

**Hours and Days**—Class hours are identified by Roman numerals, and continue for 50 minutes after the beginning time shown below:

	I	II	III	IV	V	VI	VII	VIII
Minneapolis (East and West Banks) 8:00	9:05	10:10	11:15	12:20	1:25	2:30	3:35	
St. Paul .....	7:30	8:30	9:30	10:30	11:30	12:30	1:30	2:30

A class listed I-III TTh meets the first *through* the third hours Tuesdays and Thursdays, the hyphen always indicating "through." A class listed I, III meets first *and* third hours. Days of the week are abbreviated M, T, W, Th, F, S.

**Missing Information**—When hours, days, or places of meeting are missing, consult the instructor or department offering the course.

**Changes made subsequent to publication of this bulletin are published in the Official Daily Bulletin in the *Minnesota Daily*.**



**College and Department Abbreviation Code**—Following is the list of abbreviated departmental prefixes used in conjunction with course numbers:

Acct, Accounting	Hlth, School Health Education
Aero, Aeronautical Engineering	Hort, Horticultural Science
AgEc, Agricultural Economics	Hum, Humanities
AgEd, Agricultural Education	Hydr, Hydromechanics
AgEn, Agricultural Engineering	
Agro, Agronomy and Plant Genetics	IE, Industrial Engineering
AmSt, American Studies	InCh, Inorganic Chemistry
Anat, Anatomy	Ind, Industrial Education
AnCh, Analytical Chemistry	Ins, Insurance
Anes, Anesthesiology	IR, Industrial Relations
AnSc, Animal Sciences	Ital, Italian
Anth, Anthropology	
Arab, Arabic	Jour, Journalism and Mass Communication
Arch, Architecture	
ArEd, Art Education	Lat, Latin
Art, Studio Arts	Lib, Library School
ArH, Art History	Ling, Linguistics
Ast, Astronomy	LMed, Laboratory Medicine
BFin, Business Finance	Math, Mathematics
BioC, Biochemistry (Agricultural)	MdBe, Biochemistry (Medical)
Biol, Biology	ME, Mechanical Engineering
BLaw, Business Law	MeAg, Mechanized Agriculture
Bot, Botany	Med, Medicine
	MedT, Medical Technology
CPsy, Child Psychology	MetE, Metallurgical Engineering
CE, Civil Engineering	Mgmt, Management
ChEn, Chemical Engineering	MicB, Microbiology
Clas, Classics	MinE, Mining Engineering
Comm, Communication	Mktg, Marketing
Comp, Composition	MM, Mechanics and Materials
	MdGk, Modern Greek
Ecol, Ecology and Behavioral Biology	Mort, Mortuary Science
Econ, Economics	MuEd, Music Education
Ed, Education	Mus, Music
EdAd, Educational Administration	
EdCI, Curriculum and Instruction	NPsy, Psychiatry and Neurology
EdT, Methods and Student Teaching	NSci, Natural Science
EE, Electrical Engineering	NuAd, Nursing Administration
EG, Engineering Graphics	NuEd, Nursing Education
Engl, English	Nurs, Nursing
Ent, Entomology, Fisheries, and Wildlife	
EPsy, Educational Psychology	Obst, Obstetrics and Gynecology
	OMgt, Office Management
FamS, Family Studies	Opth, Ophthalmology
For, Forestry	OrCh, Organic Chemistry
Fren, French	Otol, Otolaryngology
FS, Foreign Study	
FSci, Food Science and Industries	PA, Public Administration
	Path, Pathology
GC, General College	PCh, Physical Chemistry
GeCh, General Chemistry	Ped, Pediatrics
GE, General Engineering	PEM, Physical Education for Men
Gen, Genetics	PetE, Petroleum Engineering
Geog, Geography	PEW, Physical Education for Women
Geo, Geology and Geophysics	Phcg, Pharmacognosy
Ger, German	Phcl, Pharmacology
Grk, Greek	Phil, Philosophy
	Phsl, Physiology
HE, Home Economics	Phys, Physics
Heb, Hebrew	PlPa, Plant Pathology
HEd, History and Philosophy of Education	PMed, Physical Medicine and Rehabilitation
HEEd, Home Economics Education	PO, Personal Orientation
Hist, History	Pol, Political Science

Port, Portuguese  
Prod, Production  
Psy, Psychology  
PubH, Public Health (including Biometry)

QA, Quantitative Analysis

Rad, Radiology  
Rec, Recreation and Park Administration  
Rhet, Rhetoric  
Russ, Russian

Scan, Scandinavian  
Soc, Sociology  
Soil, Soil Science  
Span, Spanish  
Spch, Speech  
SSci, Social Science  
SSPA, Speech Science, Pathology, and  
Audiology

Stat, Statistics  
Surg, Surgery  
SW, Social Work  
Swed, Swedish

Th, Theatre  
Tran, Transportation

VAna, Veterinary Anatomy  
VBac, Veterinary Microbiology and Public  
Health

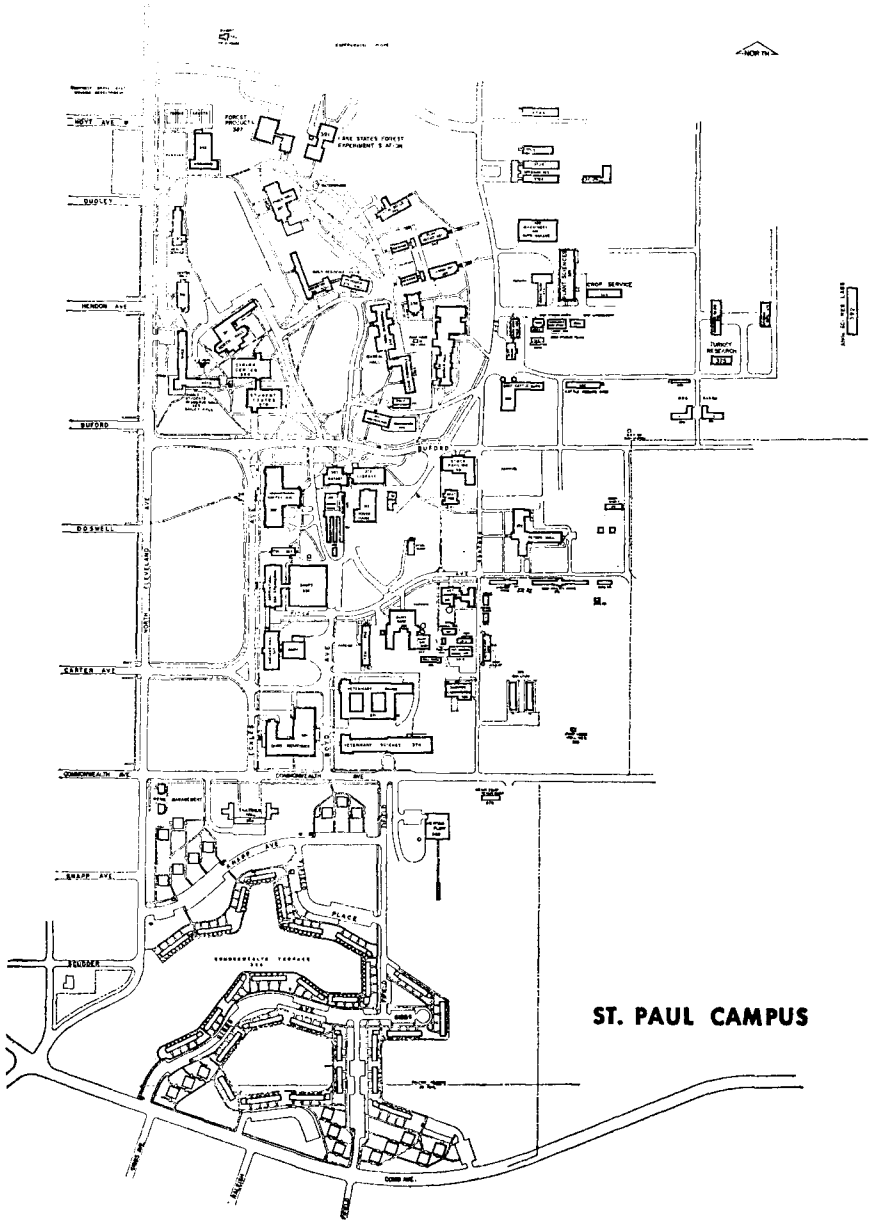
VM, Veterinary Medicine  
VObs, Veterinary Obstetrics  
VPaP, Veterinary Pathology and Parasitology  
VPP, Veterinary Physiology and Pharma-  
cology

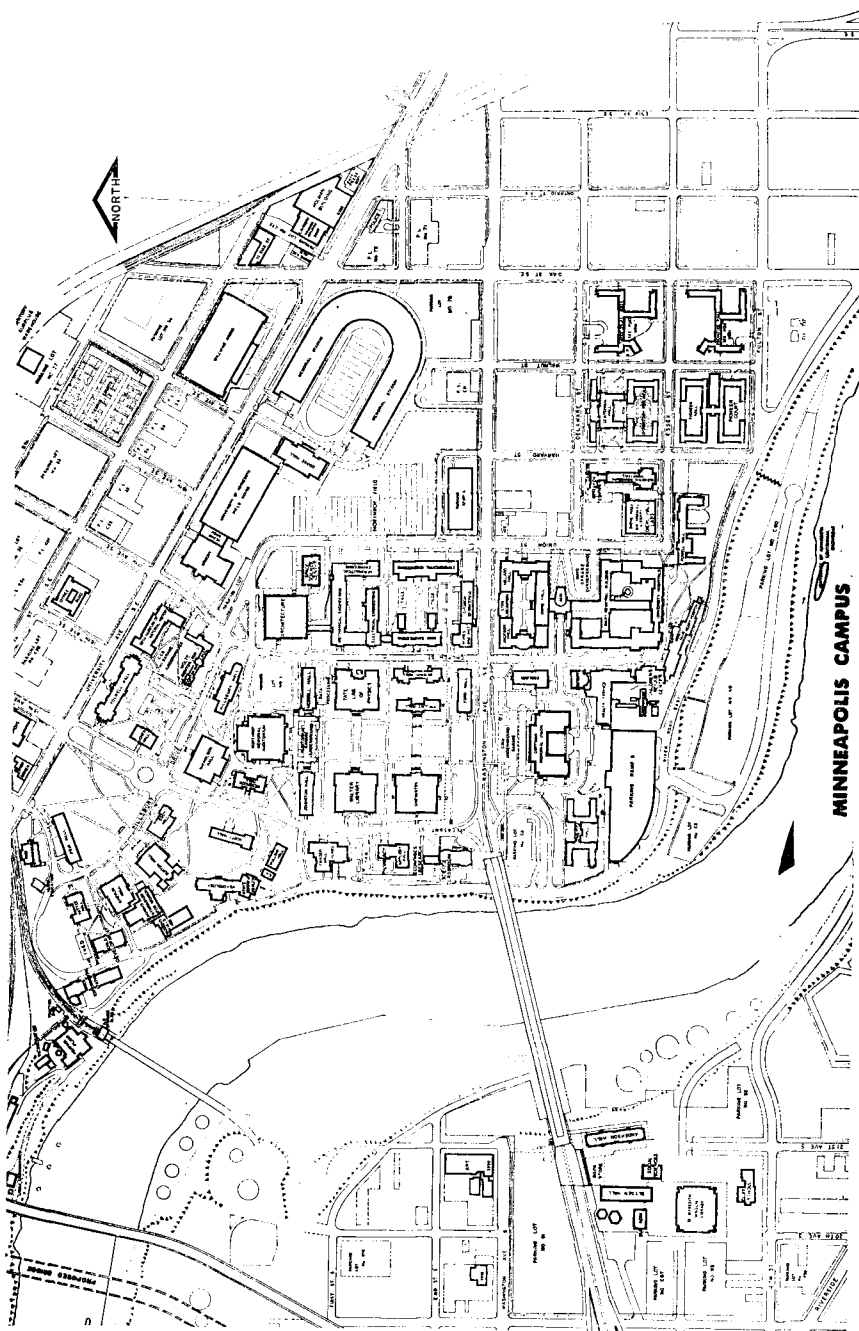
VSR, Veterinary Surgery and Radiology

Zool, Zoology

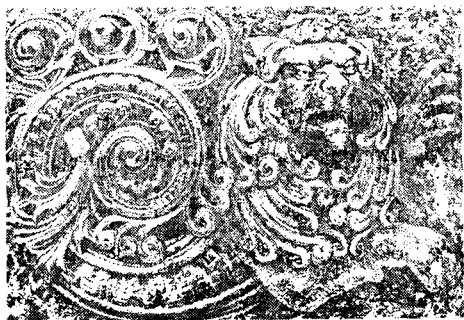
**Building Name Abbreviations**—Abbreviations followed by (StP) indicate buildings located in St. Paul. Those followed by (W) indicate buildings located on the West Bank. All other buildings are on the East Bank, Minneapolis.

A, Armory  
 Aero, Aeronautical Engineering  
 AgBot(StP), Agricultural Botany  
 AgLib(StP), Agriculture Library  
 AgEng(StP), Agricultural Engineering  
 Agr(StP), Agronomy  
 AH, Appleby Hall  
 AndH(W), Anderson Hall  
 Arch, Architecture  
 ArtB(W), Art Building (2020 Washington Ave S)  
 BA(W), Business Administration  
 BlegH(W), Blegen Hall (formerly Classroom Building)  
 Bo, Botany  
 BoG, Botany Greenhouse  
 Bu, Burton Hall  
 C, Chemistry  
 CD, Child Development  
 CH, Cooke Hall  
 ChE, Chemical Engineering  
 CMU, Coffman Memorial Union  
 CofH(StP), Coffey Hall  
 DCB(StP), Dairy Cattle Barn  
 DI(StP), Dairy Industries  
 DiehlH, Diehl Hall  
 E, Main Engineering  
 EdH, Eddy Hall  
 EE, Electrical Engineering  
 Ex, Experimental Engineering  
 FieldHse, Fieldhouse  
 FolH, Folwell Hall  
 ForH, Ford Hall  
 FP(StP), Forest Products  
 FraH, Fraser Hall  
 GH(StP), Green Hall  
 GorL(StP), Gortner Laboratory  
 Gy(StP), Gymnasium  
 HH(StP), Haecker Hall  
 HL, Hydraulic Lab (Hennepin Island)  
 Hosp, University Hospitals  
 Hr(StP), Horticulture  
 HS, Health Service  
 J, Jones Hall  
 JacH, Jackson Hall  
 JOAd, Jackson-Owre Addition  
 JohH, Johnston Hall  
 Lib, Walter Library  
 LiuA, Linear Accelerator  
 LinL, Linac Laboratory  
 LsPav(StP), Livestock Pavilion  
 Lyon, Lyon Laboratories  
 Mayo, Mayo Memorial  
 McNH(StP), McNeal Hall  
 ME, Mechanical Engineering  
 MEx, Mines Experiment Station  
 MH, Millard Hall  
 MinMet, Mines and Metallurgy  
 MMA, Mayo Memorial Auditorium  
 MNH, James Ford Bell Museum of Natural History  
 MorH, Morrill Hall  
 MurH, Murphy Hall  
 MusE, Music Education  
 NCCE, Nolte Center for Continuing Education  
 NGW, Norris Gymnasium for Women  
 NH, Nicholson Hall  
 NMA, Northrop Memorial Auditorium  
 Owre, Owre Hall  
 P, Pillsbury Hall  
 PalmC(StP), Palmer Classroom  
 PeikG, Peik Hall Gymnasium  
 PeikH, Peik Hall  
 PetH(StP), Peters Hall  
 Ph, Physics  
 PP(StP), Plant Pathology  
 Psy, Psychology  
 Pt, Pattee Hall  
 SBH, State Board of Health  
 ScH, Scott Hall  
 SciCB, Science Classroom Building  
 ShH, Shevlin Hall  
 SniH(StP), Snyder Hall  
 So(StP), Soils  
 SocSci(W), Social Sciences Building  
 TEH(StP), Temporary, East of Haecker Hall  
 TNCD, Temporary, North of Child Development  
 TNCE, Temporary, North Court of Engineering  
 TNM, Temporary, North of Mines  
 TSC(StP), Temporary, South of Coffey Hall  
 TSCE, Temporary, South Court of Engineering  
 TSF, Temporary, South of Folwell  
 VCHH, Variety Club Heart Hospital  
 VetA(StP), Veterinary Anatomy  
 VetC(StP), Veterinary Clinic  
 VetS(StP), Veterinary Science  
 VH, Vincent Hall  
 WeH, Westbrook Hall  
 WinsA, Williams Arena  
 WuH, Wulling Hall  
 Z, Zoology





**MINNEAPOLIS CAMPUS**



## Admission and Registration

### Admission

The courses of the Summer Session are open to all qualified high school graduates, regularly admitted students of the University including those attending regular session, and those with previous college work. Recent high school graduates must be regularly admitted before enrolling in the Summer Session. Students beginning their University attendance during the Summer Session who wish to attend during the academic year must submit credentials in the usual way.

**Incoming Freshmen**—Students graduating from high school in June may begin their University studies in the Summer Session. Orientation programs for many of these students are being scheduled prior to the session. Applications for admission should be received by the Admissions and Records Office prior to May 1. All freshman applicants are required to present ACT scores before final admission can be granted. For further information see the *Bulletin of General Information* or write to Office of Admissions and Records, University of Minnesota, Minneapolis, Minnesota 55455.

**Summer Students**—Students with previous college work who wish to attend the Summer-Session-only may do so without filing applications if they are not in a “dropped” status at their previous college and do not plan to obtain a degree from the University of Minnesota. Such students will be considered for admission as “summer students.”

Persons about 24 years of age or older who have not had previous college work and who do not plan to obtain a degree from the University of Minnesota but wish to complete certain specific college subjects will be considered for admission as “summer students.”

High school graduates under 24 years of age without previous college work will also be considered for admission as "summer students" but must have specific approval of the Office of Admissions and Records.

Attendance during the summer terms in no way guarantees "summer students" admission to the regular academic year. "Summer students" who wish to be considered for admission to a subsequent term during the regular academic year must file regular admission applications (see *Bulletin of General Information*).

**Graduate Students**—The procedure for admission of graduate students is discussed in the Graduate School section of this bulletin.

**Degree Candidates**—All students who expect to receive a degree from the University must have filed an application for admission and have been regularly admitted to a college of the University. A \$10 credentials examination fee must accompany all applications.

All students should consult the *Bulletin of General Information* for detailed requirements governing admission and the granting of degrees. This bulletin and specific college bulletins may be obtained by writing to Office of Admissions and Records, University of Minnesota, Minneapolis, Minnesota 55455. Zip code *must* accompany request for bulletins.

**High School Students**—Outstanding high school students who have special interests which can be satisfied by attending college before high school graduation may apply for admission to the Summer Session to take work between their junior and senior high school years. Credits earned will be counted toward graduation if the student later enrolls at the University.

**Intent to Register**—Students who are defined as "summer students" in the preceding section on "Summer Students" may speed their registration process by submitting an Intent to Register found inside the back cover of this bulletin. This does not obligate the student in any way. A confirmation of Intent to Register and registration forms will be sent to qualified students.

Students in attendance Spring Quarter 1968, Graduate School students, new regularly admitted students, or those who have applied for regular admission, and formerly admitted students returning as regular students should *not* submit the Intent to Register.

## Place of Registration

### ADVANCE REGISTRATION

Currently enrolled students and former students seeking a degree from the University of Minnesota should register through the college in which they were last registered unless they have been approved for change of college. New summer students, former summer students, and former regular students no longer planning to obtain a degree from the University of Minnesota (if eligible to return) should begin registration through the college in which they are taking all or most of their summer courses.

*Exceptions*—Students in the summer student categories and former regular students no longer planning to obtain a degree from the University who plan to register for professional education courses should register through the College of Education. Students whose last college attendance was General College should register through General College. Students admitted to Graduate School must register through Graduate School.

The advance registration for First Term will take place at the college offices as listed below:

Agriculture, Forestry, Home Economics, 225 Coffey Hall (St. Paul)	Science and Math (and Central), 223 Johnston Hall
Biological Sciences, 123 Snyder Hall (St. Paul) or 307 Zoology	Social Sciences, 214 Social Sciences Building (West Bank)
Business Administration, 225 Business Administration Building (West Bank)	Honors, 115 Johnston Hall
Dental Hygiene, 360A Millard Hall	Special Students, 216B or 225 Johnston Hall
Dentistry, 136 Owre Hall	Medical Technology, C-205 Mayo Memorial Building
Education, 206 Burton Hall	Medicine, 1360 Mayo Memorial Building
General College, 20 Nicholson Hall	Mortuary Science, 114 Vincent Hall
Graduate School, 316 Johnston Hall	Nursing, 125 Owre Hall
Institute of Technology, 133 Main Engineering Building	Occupational Therapy, 860 Mayo Memorial Building
Liberal Arts	Pharmacy, 115 Appleby Hall
Summer Students	Physical Therapy, 860 Mayo Memorial Building
122 Johnston Hall	Public Health, 1325 Mayo Memorial Building
Regularly Admitted Students	University College, 106 Nicholson Hall
Lower Division, 214 Johnston Hall	Veterinary Medicine, 225 Coffey Hall (St. Paul)
Upper Division:	
Humanities, 206 Folwell Hall	

The advance registration for Second Term will take place in the college offices listed above, with the exception that Summer Students in the College of Liberal Arts will register at the appropriate division office as listed. There will be no registration in 122 Johnston Hall.



## Registration Dates

In order that the short Summer Session terms may prove of maximum value, and that late entrants will not disrupt courses in progress, students are expected to complete their registration during the following periods:

### FIRST TERM

**Advance Registration**—Students registered for Spring Quarter, or those whose last attendance was at the University and who are returning as degree candidates on the Twin Cities Campus, should register during the advance registration period announced by their colleges.

Other students planning to attend Summer Session on the Twin Cities Campus may register during the period Monday, May 27, through Wednesday, May 29, except those newly admitted regular students who have been scheduled for a specific registration period by the University and those Graduate School applicants whose admission is still pending.

Registration will not be open between June 1, the first day of final exams, and June 16.

**Final Registration**—Monday, June 17, 8 a.m. to 3:15 p.m.

Students registering in Coffman Union will find congestion in the lines during the early part of the day and may find it more convenient to register during the afternoon.

Registration on Tuesday, June 18, incurs late fee.

Late fees for the First Term are as follows for payment of fees on:

June 18-21 .....	\$ 3.00
June 24-28 .....	5.00
Thereafter .....	10.00

No registrations accepted by mail.

### SECOND TERM

**Advance Registration**—Students who register for the First Term and who plan to attend Second Term should register for both terms at the same time. Students registered for the First Term who have not registered for Second Term should register during the advance registration period for Second Term, July 15-19. Students who are not registered for the First Term may register during the advance registration period for Second Term or on July 22.

**Final Registration**—Monday, July 22, 8 a.m. to 4 p.m.

Registration on Tuesday, July 23, incurs late fee.

Late fees for the Second Term are as follows for payment of fees on:

July 23-26 .....	\$ 3.00
July 29-August 2 .....	5.00
Thereafter .....	10.00

No registrations accepted by mail.

*No provision is made for allowing exemption from the late fee to those who are unable to reach the University during the scheduled registration days.*

## FINAL REGISTRATION

### FIRST TERM—June 17

#### A. Registration at Coffman Union Ballroom

##### Education

Graduate School (registration material for students in St. Paul departments may be obtained at 220 Coffey Hall, St. Paul)

##### Medical School

College of Liberal Arts (Summer Students)

#### B. Registration at College Offices

Agriculture, Forestry, Home Economics, and Veterinary Medicine, 225 Coffey Hall (St. Paul)

Biological Sciences, 123 Snyder Hall (St. Paul)

Business Administration, 225 Business Administration Building (West Bank)

Dental Hygiene, 360A Millard Hall

Dentistry, 136 Owre Hall

General College, 20 Nicholson Hall

Institute of Technology

Architecture, Engineering and Mathematics, 133 Main Engineering Building

Chemistry, 139 Chemistry Building

Geology and Geophysics, 108 Pillsbury Hall

Physics, 148 Physics Building

Medical Technology, C-205 Mayo Memorial Building

Mortuary Science, 114 Vincent Hall

Nursing, 125 Owre Hall

Pharmacy, 115 Appleby Hall

Physical and Occupational Therapy, 860 Mayo Memorial Building

Public Health, 1325 Mayo Memorial Building

College of Liberal Arts (regularly admitted students)

Lower Division, 216B Johnston Hall

Upper Division:

Humanities, 206 Folwell Hall

Science and Math (and Central), 223 Johnston Hall

Social Sciences, 214 Social Sciences Building (West Bank)

Adult Special Students, 214 or 225 Johnston Hall

Honors, 115 Johnston Hall

University College, 106 Nicholson Hall

Veterinary Medicine, 225 Coffey Hall (St. Paul)

### SECOND TERM—July 22

#### A. No special registration at Coffman Union for Second Term

#### B. Registration at College Offices

Agriculture, Forestry, Home Economics, 225 Coffey Hall (St. Paul)

Biological Sciences, 123 Snyder Hall (St. Paul)

Business Administration, 225 Business Administration Building (West Bank)

Dental Hygiene, 360A Millard Hall

Dentistry, 136 Owre Hall

Education, 206 Burton Hall

General College, 20 Nicholson Hall

Graduate School, 316 Johnston Hall

Institute of Technology, 133 Main Engineering Building

Liberal Arts

Summer Students

122 Johnston Hall

Regularly Admitted Students

Lower Division, 216B Johnston

Hall

Upper Division:

Humanities, 206 Folwell Hall

Science and Math (and Central), 233 Johnston Hall

Social Sciences, 214 Social Sciences Building (West Bank)

Honors, 115 Johnston Hall

Special Students, 216B or 225 Johnston Hall

Medical Technology, C-205 Mayo Memorial Building

Medicine, 1360 Mayo Memorial Building

Mortuary Science, 114 Vincent Hall

Nursing, 125 Owre Hall

Occupational Therapy, 860 Mayo Memorial Building

Pharmacy, 115 Appleby Hall

Physical Therapy, 860 Mayo Memorial Building

Public Health, 1325 Mayo Memorial Building

University College, 106 Nicholson Hall

Veterinary Medicine, 225 Coffey Hall (St. Paul)

# Registration Procedure

## REGISTRATION PROCEDURE AT COFFMAN UNION

### FIRST TERM—June 17

(Education; Graduate School; Medical School; and Summer Students in College of Liberal Arts)

- Step 1.** Obtain registration material in the balcony (off the first floor—not shown on floor plan) of Coffman Union Ballroom. If you have a Summer Session bulletin, please bring it with you. Bulletins will be available only to students who do not already have a copy. Secure two registration blanks if you will be attending both first and second summer terms. Fill out a separate blank for each term.
- Step 2.** Go downstairs to Main Ballroom on the ground floor. Use the tables located under the balconies for filling out registration blanks. (Green line)
- Step 3.** Obtain adviser's approval of registration at the department table representing your principal interest. (Not required of Summer Students registering through the College of Liberal Arts unless desired.)
- Step 4.** Obtain college approval of your study program at the appropriate college table. Registration blanks must be stamped at your college table. (College tables: Graduate School—Main Ballroom; Education, Liberal Arts, Medical School and Public Health—North Star Room. Follow the blue line.)
- Step 5.** Class reservations—Ski-U-Mah room. If any of your courses are listed on pages 26-28 of the bulletin, you must obtain a class reservation IBM card for each course to be reserved. Follow the red line. If none of your courses are reserved, skip to step 6.
- Step 6.** Obtain a fee statement at the appropriate fee statement table for the college through which you are registering. Education and graduate students—Game Room, 1st floor, East Wing. All other colleges—Men's Lounge, 2nd floor, East Wing. Turn in your registration blanks and any needed class reservation cards. You will walk away with your fee statement for the First Term. Note that it is due June 18. Your fee statement for the Second Term will be mailed to you on July 1, and it will be payable on or before July 23.

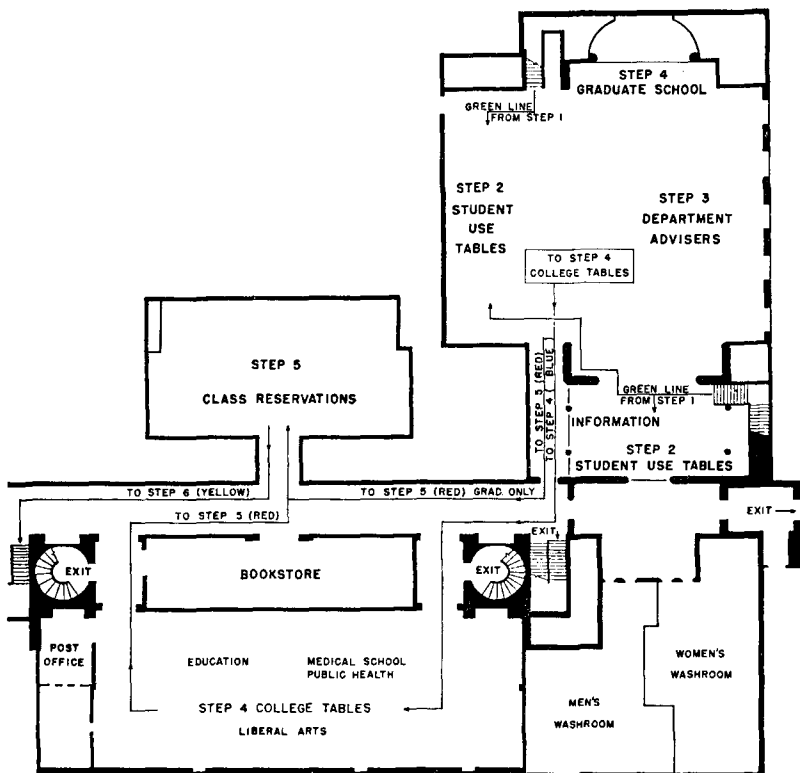
If you are a new student who has been admitted for the summer and the ensuing regular session, this is the place and the time to turn in your Registration Permit—and also your Medical Appointment Card, which you should obtain at the University Health Service (a nearby building).

If you are a student enrolling for the Summer Session **only**, you will have a Confirmation of Intent to Register or a Statement of Intent to Register (not required for Graduate School) which should be turned in at this point.

The optional Religious Census Card (if completed) should also be turned in when you obtain your fee statement.

**Step 7.** Pay fees at the Bursar's Office on the first floor of Morrill Hall, or by mail, or (if you are paying by check) a depository is available in Coffman Union. In St. Paul, you can pay at Cashier's Office, Coffey Hall. The hours are 8:15 a.m. to 3:30 p.m. Fees must be paid, or post-marked if mailed, not later than Tuesday, June 18.

**Step 8.** Begin classes Tuesday. Minneapolis classes on the East Bank and on the West Bank begin at 8 a.m. Classes in St. Paul begin at 7:30 a.m.



## REGISTRATION PROCEDURE AT COLLEGE OFFICES

(For all colleges not represented at Coffman Union [see page 17] and for regularly admitted or returning students in College of Liberal Arts)

### **FIRST TERM—June 17**

- Step 1.** Obtain registration material at your college office. If you have a Summer Session bulletin, please bring it with you. Bulletins will be available only to students who do not already have a copy. Secure **two** registration blanks if you will be attending both first and second summer terms. Fill out a separate blank for each term.
- Step 2.** Obtain college approval of your study program at your college office.
- Step 3.** Go to Coffman Union and proceed with steps 5, 6, and 7 listed under "Registration Procedure at Coffman Union."

*Exceptions:* Students in Agriculture, Forestry, Home Economics, Biological Sciences, and Veterinary Medicine should turn in their registration blanks and class reservation cards and obtain their fee statements at 220 Coffey Hall, St. Paul.

### **SECOND TERM—July 15-22**

- Step 1.** Obtain registration material at your college office.
- Step 2.** Obtain college approval of your study program at your college office.
- Step 3.** Obtain class reservation cards for reserved courses.
- Step 4.** Turn in registration blanks and class reservation cards and obtain fee statements in Morrill Hall.

*Exceptions:* Students in Agriculture, Forestry, Home Economics, Biological Sciences, and Veterinary Medicine should turn in their registration blanks and class reservation cards and obtain their fee statements at 220 Coffey Hall, St. Paul.

- Step 5.** Pay fees at the Bursar's office on the first floor of Morrill Hall; Cashier's office, Coffey Hall; or by mail. The hours are 8:15 a.m. to 3:30 p.m. Fees must be paid or postmarked, if mailed, not later than Tuesday, July 23.

## Changes in Registration

After a student's registration has been accepted by the recorder, any change must be approved by the Committee on Student Scholastic Standing or the dean of the college through which the student registered. Forms for changing registration may be obtained in the office of the college in which the student is registered. *Only in exceptional cases will any change be made after classes have begun.*

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

## Tuition and Incidental Fees

The following fees are payable each term by each full-time student (whether resident or nonresident) at the time of registration and must be paid before registration is complete:

	4 credits or less	More than 4 credits
Tuition fee (per term) .....	\$59.00	\$72.00
Incidental fee†† (per term) .....	15.25	15.25
Total fee (per term) .....	\$74.25	\$87.25

*Note*—Regular tuition fees as provided during the academic year will be charged all students in medicine and nursing. In veterinary medicine, and dentistry, students pay tuition at the summer rate or academic year rate, whichever is higher. Special tuition fees are collected for the Biology Session. All students pay the Summer Session incidental fee.

Graduate students who have passed their preliminary oral examinations and have been accepted for candidacy for the Ph.D. degree may register for 6 credits or less or thesis-only for \$20 per summer term with incidental fee optional to maintain required continuous registration. Other graduate students may register for thesis-only upon payment of \$31 tuition per term and required incidental fee.

Summer Session staff members are entitled to the same fee privileges in the summer as during the academic year. Eligible staff members pay at the resident rate in the Graduate School as follows: more than 4 credits, \$52 per term; 4 credits, \$50 per term; less than 4 credits or thesis-only, \$26 per term; plus incidental fee.

Please refer to the index for fees in the bulletins of the following schools, colleges, and stations:

Medical School  
School of Dentistry  
Biology Session

School of Nursing  
College of Veterinary Medicine

†† The incidental fee of \$15.25 per term is charged each student for which the student receives the privileges of the Coffman Memorial Union, the Health Service, and the recreation program including the *Minnesota Daily*.

## Course Fees

*(All fees are per term unless otherwise indicated)*

Students taking the following courses will pay course fees in addition to tuition as follows:

<b>Health Service (field trips and foreign study)</b> \$8.90 per summer term—required of students on University field trips such as anthropology, civil engineering, geology, mines, etc. Students in University-sponsored foreign travel groups are required to enroll in the Blue Cross-Blue Shield program or take out other adequate insurance.	\$50.00 for two (2 cr), \$100 for four (4 cr) half-hour individual lessons per week—11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 100
<b>Itasca Biological Station</b> \$8.50—Laboratory fee ††\$5.00 per week—Research Table fee	\$100.00—204 \$15.00—Piano for children, ages 6-16 Students paying \$50.00 or more in music fees pay only the special fees indicated for these courses. Such students may take other courses by paying regular summer tuition and incidental fee in addition to the applied music fee.
<b>Mathematics</b> ††\$35.00—Z (Preparatory Mathematics)	Upper Division music majors check with Music Department office about course fees.
<b>Modern Language Residence Houses (Summer Session)</b> \$40.00 per term—French (100); or German (100)	<b>Public Health</b> \$100.00 per year—169 (Field Work) \$100.00—190 (Field Work) \$100.00—138 (Hospital Problems) \$200.00—230 (September Field Course) \$251.00—231, 232 (Ground Water)
<b>Music</b> \$50.00 for two, \$100 for four half-hour individual lessons per week—A, D (no cr)	

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†† In lieu of tuition.

†† Students taking Math Z only will pay a course fee of \$35. Students taking Math Z and additional courses will pay the full-time tuition fee and the incidental fee.

## Special Fees

### Music Practice Room

\$1.75 per term, 5 hours per week for 5 weeks

\$3.50 per term, 10 hours per week for 5 weeks (25¢ per hour for each additional hour per week—all instruments except organ)

.25 per hour—small organ

.50 per hour—large organ

### Physical Education††

#### *Cooke Hall*

Locker and towel fee—\$3.00 plus \$1.00 deposit

Gym clothing rental fee—\$3.00

#### *Norris Gymnasium*

Locker and towel fee—\$3.00 plus \$1.00 deposit

#### *St. Paul Gymnasium*

Locker and towel fee—\$3.00

### Speech and Hearing Clinic—Nonstudents

Articulatory cases, per 10 weeks—\$15.00 for one, \$25.00 for two, \$30.00 for three, \$35.00 for four, \$40.00 for five lessons per week.

Stuttering, per session—\$100.00 for full-time remediation.

### Speech and Hearing Clinic—Students

\$5.00 per term—special clinical treatment

### Miscellaneous

\$ 2.50 per term—Foreign student health fee, required of all non-citizens

10.00—Credential examination fee

5.00—Large diploma

5.00—Master's thesis binding

25.00—Ph.D. thesis binding

5.00—Special examination

1.00—Record service fee, required of all new students

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†† Locker, towel, and gym clothing rental fees are for one or both terms.



## Regulations Governing Granting of Degrees

The Board of Regents will confer the degree appropriate to the course pursued, subject to all the following conditions:

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

2. **Recommendation by the Faculty.**

3. **Residence Requirement**—The student must earn at least 1 year's credit in residence in this University. If the term of residence is only 1 year, that year must be the senior year. In any case, the student must spend 2 quarters of the senior year in residence. This last requirement may be waived under such rules as may be established by each college for such exemptions. In addition, special residence requirements must be met in several of the schools and colleges. Extension courses (not independent study courses) may apply toward the residence requirement.

4. **Payment or satisfactory arrangement of all financial obligations due the University.**

5. **Attendance at Commencement**—A candidate for a degree is required to be present at the commencement exercises at which his degree is conferred. Commencement exercises for Summer Session candidates will be held:

First Term .....	Friday, July 19, 4 p.m.
Second Term .....	Friday, August, 23, 4 p.m.

A student who fails to attend may not receive his diploma until the expiration of 1 year, unless in the meantime he attends commencement exercises or unless excused from such attendance by the dean of the college.

6. **Graduation Fee**—each degree, \$10.

7. **Placement Service Fee**—required of candidates for degrees from:

Duluth .....	\$10.00
Institute of Technology .....	5.00
College of Education (except Nursing Education) .....	15.00
Morris (optional) .....	10.00

## Deposit Cards

Deposit cards may be purchased from the bursar (or from the cashier, Coffey Hall, for agricultural biochemistry). Chemistry cards are \$10; biochemistry (agricultural), art, pharmacy, and biochemistry (medical) cards are \$5.

Laboratory material and breakage will be charged against your deposit card. Any unused balance will be refunded at the end of the course.

You must present your deposit card to be assigned a laboratory desk. Veterans (P.L. 894) will receive information from their instructor concerning deposit cards and laboratory assignments.

## Refund of Fees

Students who cancel their Summer Session registration without class attendance shall be allowed a 100 percent refund of fees. Students who cancel after having attended classes shall be allowed a refund of fees on the following basis:

<i>Length of Term</i>	<i>80 Percent Refund for Attendance</i>	<i>60 Percent Refund for Attendance</i>	<i>No Refund for Attendance of More Than</i>
5 weeks	during 1st week	during 2nd week	2 weeks
4 weeks	1 to 4 days	5 to 8 days	8 days
3 weeks	1 to 3 days	4 to 6 days	6 days
2 weeks	1 to 2 days	3 to 4 days	4 days
1 week	1 day	2 days	2 days

## Auditors

*Fees for auditors are the same as for students registered for credit.* Permission to attend classes as auditors may be granted by the dean of the college or school with the consent of the department concerned. The procedure for registration as auditor is the same as for registration for credit, except that "auditor" should be indicated on the registration sheet in the credits column. It is expected that auditors will be registered in at least one course for credit, but this regulation may be waived in exceptional cases.

## Amount of Work

A maximum of 9 credits or two 5-credit courses is considered a full program for either term. Registration for a greater number requires special permission from the Committee on Student Scholastic Standing or the dean of the school or college in which the student is registered.

## Examinations

Examinations are normally held at the last scheduled class hour for each course.

## Courses to Be Reserved

As part of registration, all students, including graduate students, must obtain IBM class reservation cards for the courses listed below. Students registering for College of Education and College of Liberal Arts courses on June 17 will obtain class reservation cards for these courses in Coffman Union. Course cards for reserved courses must be attached to the student's registration blank when turned in to obtain a statement of fees.

### TWIN CITIES CAMPUS—FIRST TERM

- Accounting**  
24, 25—JohH 205
- American Studies**  
101-201—JohH 205
- Analytical Chemistry**  
57A, 57B—CofH 225 for AFHE, and  
JohH 205 for other students  
All other courses under 200—E 136
- Anthropology**  
140—JohH 205
- Architecture**  
All courses—E 136
- Art Education**  
10C, 53C—Bu 206
- Biology**  
1—CofH 225 for AFHE, and JohH 205  
for other students
- Botany**  
118, 127—CofH 225  
See Itasca Biology Session, page 28
- Business Law**  
58, 158—BA(W) 225
- Child Psychology**  
223—Bu 206
- Civil Engineering**  
All courses—E 136
- Curriculum and Instruction**  
60, 61, 62, 63, 64, 65, 161A, 101B, 102,  
103, 108, 112, 113, 121, 122B, 143A,  
145, 149A, 150, 153, 192B, 193A—Bu  
206
- Ecology and Behavioral Biology**  
See Itasca Biology Session, page 28
- Economics**  
1, 2, 65—JohH 205
- Education**  
55A, 75A—Bu 206
- Educational Administration**  
218, 239—Bu 206
- Educational Psychology**  
110, 116, 125, 150, 159, 160, 160A, 193,  
209, 216A, 218, 218A, 248, 257, 270,  
283—Bu 206
- Electrical Engineering**  
All courses—E 136
- Engineering Graphics**  
All courses—E 136
- English**  
55, 56—JohH 205
- English Composition**  
1, 3—JohH 205
- Entomology, Fisheries, and Wildlife**  
See Itasca Biology Session, page 28
- Family Studies**  
1, 1A, 15, 25—JohH 205
- French**  
22, 56A, 106—JohH 205
- General Chemistry**  
4, 6—CofH 225 for AFHE, E 136 for IT,  
and JohH 205 for other students  
All other courses—E 136 for IT, and  
JohH 205 for other students
- General College**  
All courses—NH 20
- Geography**  
81—JohH 205
- Geology and Geophysics**  
1, 109C—E 136 for IT, and JohH 205  
for other students
- German**  
1A, 3A, 4, 5, 56A, 74, 77—JohH 205
- History and Philosophy of Education**  
90—Bu 206
- Home Economics**  
24A, 49, 69, 76, 86, 86A, 87, 144, 172,  
184—CofH 225
- Home Economics Education**  
196C—CofH 225
- Humanities**  
1, 132—JohH 205
- Industrial Relations**  
52, 152—BA(W) 225
- Library**  
All courses under 295—JohH 205
- Mathematics**  
All IT—E 136  
All Arts—JohH 205
- Mechanical Engineering**  
All courses—E 136
- Mechanics and Materials**  
All courses under 200—E 136
- Mechanized Agriculture**  
4—CofH 225

**Metallurgical Engineering**  
All courses over 200—E 136

**Methods and Student Teaching**  
52—Bu 206

**Mortuary Science**  
All courses—VH 114

**Music**  
4—JohH 205

**Music Education**  
56—Bu 206

**Natural Science**  
1—JohH 206

**Organic Chemistry**  
61—CofH 225 for AFHE, E 136 for IT,  
and JohH 205 for other students  
All other courses under 200—E 136

**Personal Orientation**  
1—JohH 205

**Philosophy**  
2A—JohH 205

**Physical Chemistry**  
All courses—E 136

**Physical Education for Men**  
5A, 7A, 15A, 29A, 36A, 36B—JohH 205

**Professional Education for Men**  
4B—JohH 205

**Physical Education for Women**  
5A, 13A, 15A, 20A, 23A, 28A, 29A, 36A,  
36B—JohH 205

**Physics**  
1A—CofH 225 for AFHE, E 136 for IT,  
and JohH 205 for other students  
All other courses—E 136

**Political Science**  
All courses—JohH 205

**Professional Education for Men and Women**  
4C, 45, 160—JohH 205  
46, 70—Bu 206

**Psychology**  
4-5—JohH 205

**Quantitative Analysis**  
52—BA(W) 225

**Rhetoric**  
1, 22, 41, 51—CofH 225  
47—CofH 225 for AFHE, and JohH 205  
for other students

**School Health Education**  
25, 70, 119—Bu 206

**Soil Science**  
See Itasca Biology Session, page 28

**Speech**  
6, 50, 65, 81, 105—JohH 205

**Studio Art**  
All courses under 193—JohH 205

**Theatre Arts**  
11, 18, 21, 24, 34, 75, 118, 171, 211—  
JohH 205

**Zoology**  
See Itasca Biology Session, page 28

### TWIN CITIES CAMPUS—SECOND TERM

**Accounting**  
24, 25, 26—JohH 205

**Analytical Chemistry**  
All courses under 200—E 136

**Architecture**  
All courses—E 136

**Art Education**  
10C, 17C, 80C, 184—Bu 206

**Biology**  
2—CofH 225 for AFHE, and JohH 205  
for other students

**Botany**  
See Itasca Biology Session, page 28

**Civil Engineering**  
All courses—E 136

**Curriculum and Instruction**  
60, 61, 62, 63, 64, 65, 100A, 100B,  
101A, 101B, 107, 109, 143A, 144, 145,  
159, 193B—Bu 206

**Ecology and Behavioral Biology**  
See Itasca Biology Session, page 28

**Economics**  
1, 2, 66—JohH 205

**Education**  
55B—Bu 206

**Educational Administration**  
128, 239—Bu 206

**Educational Psychology**  
110, 116, 148, 150, 159, 161, 161A,  
165, 193, 208, 217A, 218, 218A, 257,  
283—Bu 206

**Electrical Engineering**  
All courses—E 136

**English**  
55, 56—JohH 205

**English Composition**  
1, 2—JohH 205

**Entomology, Fisheries, and Wildlife**  
See Itasca Biology Session, page 28

**Family Studies**  
1—JohH 205

**Forestry**  
See Itasca Biology Session, page 28

**General Chemistry**  
5—CofH 225 for AFHE, E 136 for IT,  
and JohH 205 for other students  
All other courses—E 136 for IT, and  
JohH 205 for other students

**General College**  
All courses—NH 20

**Geology and Geophysics**  
2, 122C—E 136 for IT, and JohH 205  
for other students

**German**  
2A, 4, 5, 56A, 70, 75, 78, 80—JohH 205

**History and Philosophy of Education**  
90—Bu 206

**Home Economics**  
21, 24B—CofH 225

**Humanities**  
54—JohH 205

**Industrial Education**  
106—Bu 206

**Industrial Engineering**  
All courses—E 136

**Industrial Relations**  
52, 152—BA(W) 225

**Inorganic Chemistry**  
All courses under 200—E 136

**Library Science**  
All courses under 295—JohH 205

**Management**  
60—BA(W) 225

**Marketing**  
57, 157—BA(W) 225

**Mathematics**  
All IT—E 136  
All Arts—JohH 205

**Mechanical Engineering**  
All courses—E 136

**Mechanics and Materials**  
All courses under 200—E 136

**Mortuary Science**  
All courses—VH 114

**Music**  
4—JohH 205

**Music Education**  
56—Bu 206

**Natural Science**  
2—JohH 205

**Organic Chemistry**  
62—CofH 225 for AFHE, E 136 for IT,  
and JohH 205 for other students  
All other courses under 200—E 136

**Personal Orientation**  
1—JohH 205

**Philosophy**  
2A—JohH 205

**Physical Chemistry**  
All courses—E 136

**Physical Education for Men**  
5B, 19A, 29B, 36A—JohH 205

**Physical Education for Women**  
5B, 13A, 19A, 29A, 36A—JohH 205

**Physics**  
2A—CofH 225 for AFHE, E 136 for IT,  
and JohH 205 for other students  
All other courses—E 136

**Plant Pathology**  
See Itasca Biology Session, page 28

**Political Science**  
All courses—JohH 205

**Psychology**  
4-5—JohH 205

**Quantitative Analysis**  
53—BA(W) 225

**Rhetoric**  
22, 51—CofH 225  
47—CofH 225 for AFHE, and JohH 205  
for other students

**Speech**  
6, 65, 69, 81, 82, 107—JohH 205

**Studio Art**  
All courses under 133—JohH 205

**Theatre Arts**  
21, 24, 34, 54, 112, 114, 131—JohH 205

**Zoology**  
See Itasca Biology Session, page 28

## ITASCA BIOLOGY SESSION

### FIRST TERM

**Botany**  
116, 155—CofH 225

**Ecology and Behavioral Biology**  
119, 135, 136, 162—CofH 225

**Entomology, Fisheries, and Wildlife**  
59, 124—CofH 225

**Soil Science**  
137—CofH 225

**Zoology**  
72, 115, 135—CofH 225

### SECOND TERM

**Botany**  
112, 116, 155—CofH 225

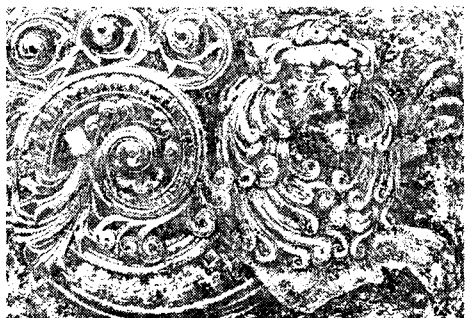
**Ecology and Behavioral Biology**  
119, 152, 162—CofH 225

**Entomology, Fisheries, and Wildlife**  
129—CofH 225

**Forestry**  
158—CofH 225

**Plant Pathology**  
156—CofH 225

**Zoology**  
72, 115—CofH 225



## General Information

On its Twin Cities Campus the University of Minnesota makes available to Summer Session students the facilities of the schools and colleges comprising this great educational institution—their faculties, libraries, laboratories, observatory, and museums.

In addition a program of recreational activities is offered, including concerts and lectures, swimming, golf, tennis, billiards, and folk and ballroom dancing.

Interurban bus lines connect the Twin Cities Campus with the cities of Minneapolis and St. Paul, providing the added cultural advantage of these large metropolitan centers—an attraction for the Summer Session student that is unique with the University of Minnesota.

### Dates of Summer Session

The Summer Session consists of two terms of 5 weeks each—June 17 to July 20, and July 22 to August 24. Students may register for subjects of their choice in either or both terms. Payment of fees for the First Term closes at 3:30 p.m. on Monday, June 17. First Term classes in Minneapolis (East and West Banks) will begin Tuesday, June 18, at 8 a.m. Classes in St. Paul will begin at 7:30 a.m., Tuesday, June 18.

Payment of fees for the Second Term closes at 3:30 p.m. on Monday, July 22. Classes for Second Term will open Tuesday, July 23.

Most individual courses are planned for completion in a single term.

## **General Offices**

The Office of the Dean of Summer Session is in 135 Johnston Hall. The Office of Admissions and Records and the Bursar's Office are in Morrill Hall. For the convenience of students registered in colleges located in St. Paul, branch offices are established on the second floor of Coffey Hall. The offices of the several schools and colleges together with the Office of Student Affairs function during the Summer Session just as during any other quarter of the year.

## **Library Facilities and Services**

The University library system, with over 2 million volumes, is one of the 10 largest of its kind in the United States. Most of the publications which students need to consult, in addition to the required reading assignments for individual courses, are available in the University's libraries.

### **WALTER LIBRARY**

The major portion of the library's resources are housed here. In addition to the thousands of books, periodicals, and reference works in the general collection, there are several noteworthy special collections. The James Ford Bell collection of rare volumes deals with exploration and trade, with major emphasis on the 16th through 18th centuries. The Ames Library of South Asia is one of the notable specialized libraries on South Asia in the United States. The Department of Special Collections has custody of rare books and unique collections.

Other specialized resources in Walter Library are the newspaper and microfilm collection, which contains extensive holdings of foreign and domestic newspapers in either original format or on microfilm and the Education Library, a subject collection which contains the works on education, psychology, and library science.

### **FRESHMAN-SOPHOMORE LIBRARY**

Students in their first 2 years of study will find most of their course-related materials on the open shelves of this library, which is located on the ground floor of Johnston Hall. The patrons of this library are encouraged to use the Walter Library when they have need of more specialized information or services.

## **WEST BANK BRANCH LIBRARY**

This library houses class-related materials for courses taught on the West Bank. It is located on the third floor of Blegen Hall.

## **DEPARTMENTAL LIBRARIES**

The library needs of students in some of the specialized scientific and professional fields generally are met through the collections of the various departmental libraries on both the East and West Banks in Minneapolis. On the East Bank are the Art, Architecture, Math-Physics, Chemistry, Music, Mines and Metallurgy, Journalism and Mass Communication, Geology, and Pharmacy Libraries. Also on the East Bank are the more extensive collections of the Law, Bio-Medical, and Engineering Libraries. The Public Administration Library and the Map Library are both located on the West Bank.

## **ST. PAUL LIBRARIES**

A modern central library houses publications relating to agriculture and home economics. Outlying specialized collections in forestry, biochemistry, plant pathology, entomology, and veterinary medicine form a departmental library system for this area of the campus.

The central library on the St. Paul Campus will be open from 7:45 a.m. to 10 p.m., Monday through Friday; from 7:45 a.m. to 12 noon on Saturday; and from 2 p.m. to 10 p.m. on Sunday.

## **LIBRARY HOURS**

Library hours of service during the Summer Session are posted in all of the libraries and are published in the Official Daily Bulletin. In general, except for holidays and the vacation period following Second Term, the Walter Library is open from 7:45 a.m. to 11 p.m. on weekdays; from 7:45 a.m. to 5 p.m. on Saturdays; and from 1 p.m. to 11 p.m. on Sundays.

A pamphlet containing more detailed information about the use of the library and its collections is available at any of the service desks in Walter Library.

Full library privileges are available to all Summer Session students.

## **University Health Service**

The University Health Service provides an outpatient and a hospital service during the Summer Session on a basis similar to that of any other quarter of the year, the same staff of physicians, dentists, and nurses being on duty. Through the University Health Service, the University makes available to students medical care, health consultations, and hospitalization. General service is provided without further charge to all students who have paid the incidental fee. For certain services such as dentistry, drugs, prolonged hospitalization, surgical operations, etc., special fees are charged. Surgical care for preexisting conditions is not provided.



## **Student Employment Office**

If you are a student on the Twin Cities Campus and need a job to help meet school expenses, the Student Employment Service, 30 Wulling Hall, will help you find part-time work either on or off campus. Apply in person at the office after you have enrolled and know your class schedule. Your chances of being placed depend on the supply of jobs, your qualifications, your need, and the hours you have available. Very frequently a job will provide valuable experience as well as financial assistance. Work for board and room is usually available for girls, and sometimes for men or married couples.

## **Student Counseling Bureau**

The services of the Student Counseling Bureau, 101 Eddy Hall, are provided for those who wish to learn more about themselves as they develop in an educational setting. These services include counseling, testing, assistance in the development of reading and study skills, and an occupational library. About one-third of our University students will talk at some time with a professional and experienced counselor about courses they wish to take, vocations they are considering, personal stress situations, reading, study skills, and spelling improvement, personal or family relations, and the like.

A student is urged to seek these services early and not to delay until grades are seriously affected. If you wish to review your progress or obtain assistance in planning your future, you are urged to talk with a counselor at the bureau.

Precollege counseling is available at a small fee to those who have not yet entered the University (no fees are charged University of Minnesota students). When you consider applying for admission to the University, you are encouraged to come to the Student Counseling Bureau for information about the different colleges in the University, courses available to you, and various University services for students.

## **Intracampus Bus**

All students and staff desiring transportation between the Minneapolis and St. Paul areas of the campus may ride the intracampus bus free. Passengers boarding or exiting at any of the stops can purchase tickets at the bursar's office in Minneapolis or the cashier's office in St. Paul.

## **University Post Office**

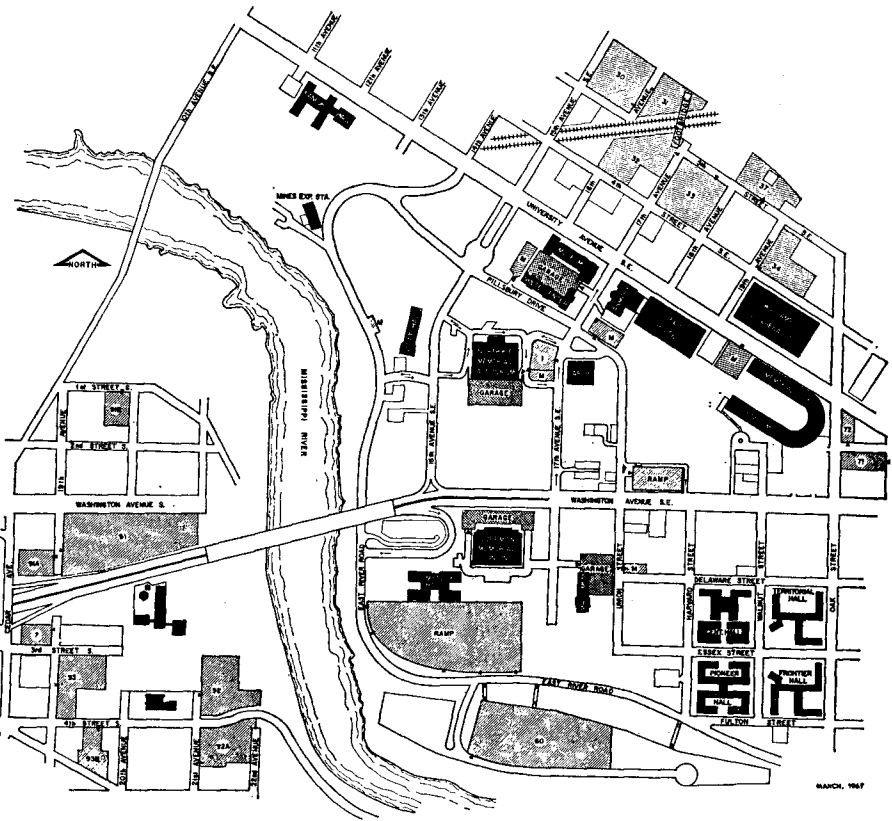
The University post offices are located on the ground floor of Coffman Memorial Union in Minneapolis, and in Coffey Hall in St. Paul. All regular post-office services are available at these stations.

All students registered in colleges located in St. Paul are assigned a post-office box in Coffey Hall in which they will receive all mail, announcements, and University communications.

# Parking Facilities

For the summer, some space will be available in the University garages and lots at Summer Session rates for either or both terms. Reservations may be made in advance by writing to the Department of Police, Parking Facilities, 2030 University Avenue S.E., University of Minnesota, Minneapolis, Minnesota 55455.

Parking is also available on a daily basis and at reasonable rates in the University's outdoor parking lots which are located on and adjacent to the campus.



**PARKING FACILITIES**  
**(Minneapolis Campus)**

## Official Daily Bulletin

Throughout the Summer Session an Official Daily Bulletin is published in the *Minnesota Daily*, the University student newspaper. Each morning that the *Daily* is published, it is delivered to boxes strategically placed on the campus. Students and staff members are urged to read the Official Daily Bulletin and are held accountable for notices that affect them.

## Religious Activities

Thirty-nine student religious organizations, representing 36 faiths and denominations, function on the Twin Cities Campus. There are 12 religious center buildings in the University area which maintain programs of study, discussion, worship, and recreation. Information may be secured from the office of the Coordinator of Students' Religious Activities, 211 Eddy Hall (telephone 373-4076).

## Housing and Food Service

### MINNEAPOLIS RESIDENCE HALLS

*Ada Comstock Hall* for women is a modern residence hall reserved for the use of Summer Session students and will offer comfortable living in large double and single rooms with well-planned and tasty meals prepared and served under the direction of a trained food manager. Meals will be served in Comstock Hall every day of the week. Meals will not be served in either term until the first day of regularly scheduled classes.

Applications for residence will be filled in order of date received. To assure a choice of rooms, applications should be made as early as possible. For additional information and application forms write to: Director of Comstock Hall, University of Minnesota, Minneapolis, Minnesota 55455.

*Centennial Hall*, an ultramodern men's residence, offers comfortable living in large double and single rooms. A room and 5-day board contract will be offered. Meals will not be served in either term until the first day of regularly scheduled classes. Early application is suggested. For application forms and additional information, write to: Director of Centennial Hall, University of Minnesota, Minneapolis, Minnesota 55455.

### ST. PAUL RESIDENCE HALL

*Bailey Hall* is a new attractive residence hall offering comfortable accommodations in large double rooms. It has one wing for men and a separate wing for women, joined by a common lounge. A room and 7-day board contract will be offered, provided there is a sufficient number of residents. Meals will not be served until the first day of regularly scheduled classes. For application forms and information, write to: Director of Bailey Hall, University of Minnesota, St. Paul, Minnesota 55101.

## OFF-CAMPUS HOUSING—PRIVATE RESIDENCES

Rooms in private homes, rooming houses, fraternities, sororities, and a newly remodeled private coeducational residence hall, Andrew House, are available. Rooms in Andrew House may be arranged in advance, but vacancy listings for the other types of off-campus housing are generally secured after arrival on campus. Upon request, lists of summer sublets in housekeeping units such as apartments and houses are available beginning in May. Residences of regularly enrolled students are inspected throughout the year for health, safety, and study conditions.

Information about housing facilities and assistance in locating residence accommodations may be secured from the Student Housing Bureau, 209 Eddy Hall in Minneapolis, and 101 Coffey Hall in St. Paul.

## FOOD SERVICE

Cafeterias, lunchrooms, and a soda fountain are available to students in Coffman Memorial Union. The main cafeteria is located on the ground floor. Also there are commuters' lunchrooms for students who bring their lunches. Banquet, party, and private dining room facilities are available. Limited cafeteria service is offered in the St. Paul Dining Center and snack bar and vending facilities are available in the St. Paul Student Center.

A lunchroom with a full line of vending machines is located in the basement of each classroom building on the West Bank in Minneapolis, as well as in the Science Classroom Building on the East Bank. Milk and other vending machines are located in many of the other academic buildings on the Twin Cities Campus.

Privately operated restaurants are located near all areas of the campus.

## Recreation

The University of Minnesota, aware of the need for relaxation during the intensive accelerated summer academic program, has planned a variety of recreational and cultural activities on campus at very little or no cost to the student.

The location of the University makes possible the use of the many cultural and recreational facilities of a large metropolitan area. Lakes and lagoons . . . swimming beaches . . . picnic grounds in parks and along roadsides . . . evening concerts on lakeshores and in parks . . . art centers, museums, libraries . . . excellent stores for shopping and browsing . . . a wide choice of places for dining, as well as the many professional entertainments provided by a large city . . . all are within easy access by public or private transportation. Trips to the famous North Shore of Lake Superior or to one of the many lakeside resorts for fishing or relaxing are possible on weekends.

## SPORTS PROGRAM

Summer Session students may participate in a variety of recreational activities such as archery, badminton, golf, swimming, table tennis, and volleyball at Cooke Hall, Norris Gymnasium, and the St. Paul Gymnasium.

Tournaments for men in bowling, golf, horseshoes, fast and slow pitch softball, and tennis are arranged each summer.

Special clinics are held for men and women students in selected activities such as archery, golf, swimming, and tennis.

Most of the activities included in the program involve no extra charge with the exception of locker-towel service.

## **SPORTS FACILITIES**

Facilities offered by the University include:

*Gymnasiums and swimming pools* for men and women in Cooke Hall, Norris Gymnasium for Women, and the St. Paul Gymnasium. Swimming pools are open Monday through Friday at scheduled hours.

*Baseball and softball* facilities on Bierman Field.

One *18-hole golf course* and *tennis courts* may be used by regularly enrolled Summer Session students upon presentation of a fee statement and a small fee. The golf courses can be reached by intracampus bus.

## **University Gallery**

The University Gallery, located on the third and fourth floors of Northrop Memorial Auditorium, stresses a program of frequently changing major exhibitions which provide the opportunity to both students and staff to have contact with large numbers of original works of art from all periods and in all media.

For the student who seeks a liberal education in the arts, the University Gallery with its exhibition program and growing permanent collection provides a unique opportunity to supplement experiences in the lecture room, studio, and library. For the student who seeks training in the arts, the gallery provides research facilities and specialized exhibitions.

The University Gallery also maintains a rental program of framed prints to students and a loan program to provide original art works for public spaces on campus.

During the summer months, the exhibition areas of the University Gallery are open from 8:30 a.m. until 4 p.m., Mondays through Fridays; the rental program for students is open during the first week of each summer term; the selection of art work for public areas is by appointment only. For further information, please inquire at the offices of the University Gallery, 316 and 306 Northrop Memorial Auditorium, or call 373-3424 or 373-5685.

## **St. Paul Campus Student Center**

The St. Paul Student Center will be open throughout the Summer Session. Complete information about the Student Center and campus activities may be obtained at the Program Information Center on the ground floor of that building and at the Information Desk on the first floor.

Facilities include lounges, a ballroom, a craft shop, television, magazines, conference rooms, and a games area which includes bowling lanes, table tennis, and billiards tables.

The Rouser Room is open for those who wish breakfast, a light lunch, or a between-meal snack.

## Coffman Memorial Union

Summer Session students will find an informal, friendly spirit in the Coffman Memorial Union which offers a pleasant respite from the rigors of classroom activities. Quiet and comfortable lounges, efficient dining rooms, and varied recreation rooms give the union a pleasant setting for informal, social, and recreational activities. Rooms can be reserved for group meetings or luncheons. The Coffman Information Center, on the first floor, is open from 8 a.m. to 4:30 p.m. daily to assist you.

### FACILITIES

Facilities include billiards and table tennis . . . modern bowling lanes with automatic pinspotters . . . an Art Craft Studio for general hobby craft (woodworking, leather work, ceramics, jewelry, photography) . . . a large cafeteria and fountain grill for dining . . . a commuter's lunchroom with vending machines . . . men's, women's, and coeducational lounges for resting and studying . . . an outdoor terrace for lounging or dining . . . the Terrace Reading Room for recreational reading . . . a spacious ballroom for informal dancing, parties, lectures, and special activities . . . the University Post Office and Union Bookstore . . . and barber and beauty shops. There are enclosed walkways to the parking ramp and garage.

### UNION PROGRAM

Coffman Memorial Union provides a diversified program during the summer which includes instruction in bowling, billiards, crafts, and sailing. Art exhibits, band concerts, jazz programs, student-faculty coffee hours, Friday night dances, and weekend trips are some of the events for the summer student. Consult the *Minnesota Daily* for specific program events.

Students are encouraged to serve on planning committees and provide leadership for events. Visit the program director's office, room 229, for committee opportunities and information on programs.

### WEST BANK UNION

West Bank Union committees sponsor a series of cultural and recreational activities throughout the Summer Session. Schedules and information may be obtained in the West Bank Union office, 102 Anderson Hall.

Facilities of the West Bank Union include lounge rooms in Anderson Hall and the Business Administration Building.

## Excursions

Conducted excursions may be taken to points of historical, industrial, educational, and recreational interest. The transportation fee is the only cost of these tours.

## Concerts and Lectures

Through the Department of Concerts and Lectures, the Summer Session provides a program covering a wide field of musical features . . . symphonies . . . chamber music . . . piano and vocal soloists. Convocations and numerous lectures are also features in this program. Addresses are by outstanding scientists, literary figures, artists, and observers of national and international affairs.

## James Ford Bell Museum of Natural History

Nearly 100 lifelike displays of Minnesota plants and animals mounted in their typical environments are open to the public without charge in the James Ford Bell Museum of Natural History, located at 17th and University Avenues S.E. in Minneapolis. In addition, many thousands of specimens of reptiles, amphibians, fishes, birds, and mammals are available for those interested in more careful study in these fields.

A guide will be furnished, upon appointment, to a visiting group of 15 or more. Teachers or discussion leaders can indicate to the guide those topics or biological factors of particular concern to the group.

A bookstore is located off the lobby with books, prints, and recorded bird call albums selected to meet the needs of museum patrons, both young and old.

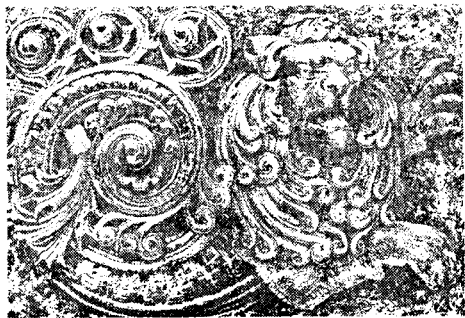
The museum's modern auditorium is widely used by many campus departments. The exhibition corridors are open to the public from 9 a.m. to 5 p.m., Monday through Saturday, and from 2 to 5 p.m. on Sundays.

## University Theatre

The University Theatre has won world-wide acclaim with its presentation of exceptionally fine plays on campus, its International Touring Companies, and the Minnesota Centennial Showboat. The Showboat will again be operated on the Mississippi River by the University Theatre, producing two plays—tentatively selected are Sheridan's, *The Rivals*, and Aristophanes' *The Birds*.

Presentations in the newly air-conditioned Scott Hall auditorium during the coming summer will include two original plays under the auspices of the Office for Advanced Drama Research.

A gala season of three plays for children's audiences is also being developed for presentation by the Peppermint Tent Players on the Mississippi River bank beside the Showboat. Tentatively selected are *Hansel and Gretel*, *Puss in Boots*, and *Aladdin*.



## Course Descriptions

*First Term*



# College of Agriculture, Forestry, and Home Economics

*For general information on the College of Agriculture, Forestry, and Home Economics, see section on Schools, Colleges, and Special Programs.*

## Agricultural Economics (AgEc)

### 111 AGRICULTURAL ECONOMIC ANALYSIS

The economic behavior of households, firms, and industries with special applications to agriculture; competition and monopoly power; factors affecting pricing and production decisions. (3 cr; prereq 3; I-II MTWThF [meets first 3 wks only]; HH 100) Staff

### 200 GENERAL SEMINAR: AGRICULTURAL ECONOMICS

Special problems for individual work by qualified students. (3 cr; prereq 4 in advance of regis; hrs and rm ar) Staff

## Agricultural Engineering (AgEn)

### Mechanized Agriculture (MeAg)

#### 4 AGRICULTURAL SHOP-METAL WORK

Arc and oxyacetylene welding, soldering, use and conditioning of metal working tools, and the identification and characteristics of metals used in farm machinery. (4 cr; prereq GeCh 4 or 8; I-III MTWTh, I-IV F; AgEng 35 and 20) Royer

#### 130 INSTRUCTIONAL METHODS IN FARM MECHANICS

Planning high school farm shops including building layouts, equipment organization, tool and supply selection, and storage methods. Administering farm mechanics programs, demonstrations, job records, and farm mechanics problems related to the student's farming program. (3 cr; prereq 10 cr in mechanized agriculture, AgEd 91 or ¶AgEd 91 or 8) Bear

#### 131 PROBLEMS AND FIELD STUDIES IN ADVANCED FARM MECHANICS

Principles and practices pertaining to the implementation of an instructional program in farm mechanics. (3 cr per term [9 cr max]; prereq 130; VI-VIII M, VI-IX TWTh, VI F; AgEng 35 and 20) Bear

## Agronomy and Plant Genetics (Agro)

### Agronomy

#### 201\* RESEARCH IN FARM CROPS

Problems in physiology, production, and classification of crop plants. (Cr and hrs ar) Staff

## Plant Breeding

- 241° RESEARCH IN PLANT GENETICS**  
May be taken as major or minor work. (Cr and hrs ar) Staff
- 244 LABORATORY METHODS IN PLANT BREEDING**  
Field study of plant breeding programs and techniques. (1 cr total for both terms; prereq 132 or §) Lambert

## Animal Science (AnSc)

- 166 DAIRY FARM MANAGEMENT**  
Status and characteristics of the dairy industry; application of the principles of animal breeding, nutrition, physiology, and economics to management of dairy cattle and to planning and operating a dairy farm. (3 cr, §DyHu 123; prereq 44 or 54 or §...56 rec; III-IV MTWThF; PetH 108) Williams
- 209° RESEARCH IN MUSCLE CHEMISTRY AND PHYSIOLOGY**  
Individual, original research under staff direction on selected problems involving the chemical, biochemical, and physiological aspects of muscle and meat technology. The topic may be a specialized aspect of a thesis problem or an individual problem of mutual interest to graduate student and adviser. (Cr ar; prereq §; hrs ar) Staff
- 210° RESEARCH IN ANIMAL SCIENCE**  
Research including experimental studies in the disciplines associated with animal production and research with special emphasis on interdisciplinary studies embracing environmental and managerial considerations. (Cr ar; prereq §; hrs ar) Staff
- 211° RESEARCH IN ANIMAL GENETICS**  
Research in quantitative genetics, cytogenetics, and other areas related to animal breeding. (Cr ar; prereq §; hrs ar) Staff
- 212° RESEARCH IN ANIMAL NUTRITION**  
Research in selected areas of animal nutrition. Research topics and animal species determined by consultation. (Cr ar; prereq §; hrs ar) Staff
- 231° RESEARCH IN ANIMAL PHYSIOLOGY**  
Individual research under faculty direction. Topics to be determined by consultation and may be a specialized aspect of a thesis problem or an independent problem of mutual interest to graduate student and adviser. (Cr ar; prereq §; hrs ar) Staff

## Entomology, Fisheries, and Wildlife (Ent)††

Ample opportunity for research work in various phases of entomology, fishery biology, and wildlife biology will be afforded properly qualified students. This work will be on an individual basis.

- 243° RESEARCH IN ENTOMOLOGY**  
(Cr ar) Hodson, Chiang, Cook, Cutkomp, Harein, Peterson, Richards, Brooks, Furgala, Kulman, Price, Radcliffe
- 267° RESEARCH IN FISHERY BIOLOGY**  
(Cr ar) Smith, Waters
- 280° RESEARCH IN WILDLIFE BIOLOGY**  
(Cr ar) Marshall, Beer, Tester, Mackie

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†† For additional courses, see index for Biology Session.

## Food Science and Industries (FSci)

- 170° SPECIAL PROBLEMS IN FOOD MANUFACTURING**  
Individual laboratory or library research on chemical, physical, and engineering problems involved in processing and utilization of food products. (1-3 cr; prereq sr or ‡; hrs ar) Staff
- 180° SPECIAL PROBLEMS IN DAIRY AND FOOD MICROBIOLOGY**  
Laboratory or library research on problems related to the microbiology of dairy products. (1-3 cr; prereq sr or ‡; hrs ar) Staff

## Forestry (For)

### Offered on the St. Paul Campus

- 200° RESEARCH PROBLEMS IN SILVICULTURE**  
(Cr ar) Hansen, B Brown, Bakuzis
- 203° RESEARCH PROBLEMS IN FOREST MANAGEMENT**  
(Cr ar) Irving, B Brown, Winsness, Meyer, Hughes
- 205° RESEARCH PROBLEMS IN FOREST ECONOMICS**  
(Cr ar) Skok, Hughes
- 207° RESEARCH PROBLEMS IN FOREST PRODUCTS ENGINEERING**  
(Cr ar) Hossfeld, Kaufert, Haygreen, Gertjensan, Erickson
- 213° RESEARCH PROBLEMS IN FOREST UTILIZATION**  
(Cr ar) Hossfeld, Kaufert, Haygreen, Gertjensan, Thompson, Erickson
- 215° RESEARCH PROBLEMS IN FOREST TREE PHYSIOLOGY**  
(Cr ar) Sucoff
- 218° RESEARCH PROBLEMS IN FOREST MEASUREMENTS AND PHOTOCGRAMMETRY**  
(Cr ar) Meyer, John
- 219° RESEARCH PROBLEMS IN FOREST RECREATION**  
(Cr ar) Merriam, Hughes, Hansen, Skok
- 220° RESEARCH PROBLEMS IN FOREST TREE GENETICS**  
(Cr ar) Pauley
- 221° RESEARCH PROBLEMS IN FOREST INFLUENCES**  
(Cr ar) Mace
- 222° RESEARCH PROBLEMS IN FOREST POLICY**  
(Cr ar) Irving, Skok, Winsness, Merriam, Hughes

## Home Economics (HE)

- FamS 15 THE HOME AND ITS FURNISHINGS**  
Present-day housing problems; choice of location; house plans as they affect family living; exterior and interior design; choice of appropriate furnishings and accessories; building furnishing cost. (3 cr, but cr added to CLA req; II MTWThF; rm ar) Ludwig
- 3 CLOTHING CONSTRUCTION I**  
Principles of fit and pattern alterations. Study of various basic clothing construction methods. (3 cr; prereq 1; III-IV MTWThF; 328 McNH) Hendricks
- 21 COLOR**  
Study of color theory and its application to problems in dress and interiors; experiments in paint mixing, color in light, color illusion. Emphasis on development of sensitivity and awareness. (3 cr; prereq 20, 21, 24A; III-IV MTWThF; McNH 342) Abell

- 24A HOME PLANNING AND FURNISHINGS I**  
Problems involved in choosing location and in planning or selecting a dwelling unit and its furnishings. Emphasis on design and appraisal of individual and family needs. (3 cr, §FamS 15 or GC 3D; prereq soph; VI MTWThF; 227 McNH) Ludwig
- 49 HOUSEHOLD EQUIPMENT**  
The principles that should guide in the selection, operation, care, and convenient arrangement of equipment in the home. (3 cr; prereq soph, GC 7A or NSci 4 or Phys 1 or #; II-III MTThF; 128 McNH) Ehrenkranz
- 58B FIELD EXPERIENCES**  
Supervised work-study program in display design and/or crafts. (3 cr; prereq completion of at least one half of professional sequence and #; hrs and rm ar) Esteros
- 69 ADMINISTRATIVE FOOD SERVICE EXPERIENCE**  
Planned experience in selected type of food service including menu planning, purchasing and storage of food, supervision and preparation, serving and maintenance of high sanitary conditions, and accounting and bookkeeping. (5 cr; prereq 67; hrs ar; 148 DC) Hitchcock
- 76 CURRENT PROBLEMS IN NUTRITION**  
A study of the major nutritional problems facing the world today. Included are considerations of protein-calorie malnutrition, obesity, the nutritional status of adolescents, and special nutritional problems of infants and the aged. (3 cr, §170, §171; prereq 31, physiology or human biology; V MTWThF; 144 McNH) Rey
- 86 HOME MANAGEMENT LABORATORY**  
(Students should not register for a first-period class) Residence for 5 weeks in one of the two home management houses, with direct experience in management and sharing of various activities and responsibilities involved in group living of the students in residence. (4 cr; limited to 12 students; prereq 85 or §85...40, 41 recommended; deposit of \$10 required) Ar
- 86A HOME MANAGEMENT LABORATORY**  
(4 cr; prereq #; VIII-IX TTh and ar; 144 McNH) Ar
- 87 FAMILY RELATIONSHIPS**  
Analysis of the family as an institution and system of relationships. Survey of current developments in study of family. Analysis of changes in American society and their influence on family life. (3 cr; prereq Psy 2, or Soc 1 or IA; VIII MTWThF; 201 McNH) Tester
- 100 HOMES OF THE WORLD**  
Study of home design in selected regions of the world. (3 cr; prereq 24 or 29 or equiv; concentrated course, July 1-20; II-III MTWThF; 360 McNH) Esteros
- 121C COLOR II**  
Intensive study of color; consideration of visual, emotional, and symbolic aspects; color theory. (3 cr; prereq 12 cr hrs or equiv in art; concentrated course, July 1-20; VI-VII MTWThF; 433 McNH) Nagle
- 137 MODERN FOOD PREPARATION PRINCIPLES AND PRACTICES**  
Experimental bases of principles underlying present-day food preparation practices; development of experiences illustrative of such principles in high school teaching, dietetics, and foods in business. (3 cr; prereq 15 cr in food and nutrition, organic chemistry; concentrated course, July 1-20; IV-V MTWThF; 48 McNH) Trammell
- 144 TOPICS IN EXPERIMENTAL FOODS**  
Assigned readings, reports, and discussions of topics in experimental foods. (2-3 cr per qtr [6 cr max]; prereq OrCh 62, 15 cr in food nutrition; hrs and rm ar) Noble
- 155 EXPERIMENTAL STUDIES IN CLOTHING CONSTRUCTION (WORKSHOP)**  
The comparative study of selected procedures in clothing construction, with evaluation of suitability for use of teaching at secondary, college, and adult levels. Individual experimental problems and class reports. (3 cr; prereq 53, tech exper, #; 327 McNH) Ar
- 172 CURRENT DEVELOPMENTS IN NUTRITION**  
Fundamental facts and techniques for solving current nutrition problems. (3 cr; prereq sr, 31, 40, BioC 1A, Phsl 51, or #; concentrated course, July 1-20; IV-V MTWThF; 239 McNH) Swan

- 179 **READINGS IN NUTRITION**  
Survey of literature in the field; oral and written reports. (2 cr; prereq 170; hrs and rm ar) Sirny
- 184 **HOME MANAGEMENT PRINCIPLES**  
A study and discussion of managerial aspects of homemaking; work simplification of household activities; financial records and budget making for the individual and the family. (3 cr; prereq 40, 41 advised; concentrated course, July 1-20; VI-VII MTWThF; 201 McNH) Jeary
- 295-296 **HOME ECONOMICS PROBLEMS**  
Food, nutrition, textiles and clothing, home management and family relationships, household equipment, related art. Independent study and written reports. (1-5 cr per qtr; prereq #; hrs and rm ar) Graduate faculty in Family Economics, Foods, Household Equipment, Nutrition, Related Art, Textiles and Clothing

## Horticultural Science (Hort)

- 190-191-192 **SPECIAL PROBLEMS**  
Written report based on library, laboratory, or field research. (1-4 cr per qtr; prereq #) Staff
- 251° **ADVANCED PROBLEMS IN HORTICULTURAL CROP BREEDING**  
Written report based on library, laboratory, or field research. (3-9 cr; prereq #) Staff
- 252° **ADVANCED PROBLEMS IN PHYSIOLOGY OF HORTICULTURAL CROPS**  
Written report based on library, laboratory, or field research. (3-9 cr; prereq #) Staff

## Plant Pathology (PIP)

- 201° **RESEARCH IN NEMATOLOGY**  
Taxonomy (or ecology) of plant parasitic and freeliving terrestrial or aquatic nematodes. (Cr ar; prereq 101 or #) Kernkamp, MacDonald
- 203° **RESEARCH IN PLANT PATHOLOGY**  
Special assignment of work in laboratory and field problems in pathological research. (Cr ar) Kernkamp, Christensen, Eide, French, King, Kommedahl, Wilcoxson, Anderson, Kennedy, Mirocha, Rowell, Bantari, Calpouzos, MacDonald, Moore
- 207° **PROBLEMS IN MYCOLOGY**  
Research along lines such as taxonomy of natural groups, fungus flora of particular regions, localities, or habitats; investigation of fungi involved in industrial or natural processes; morphology or physiology of special forms. (Cr ar; prereq 105, 106, 107) Christensen, Anderson

## Rhetoric (Rhet)

- 1 **COMMUNICATION I**  
Written communication. Writing from observation and experience. Attention to grammar, sentence, and paragraph construction, punctuation, spelling. Progress tests. (3 cr; limited to 25 students; I MTWThF; AgEng 307) White
- 22 **PUBLIC SPEAKING**  
A practical course in the fundamentals of speech making. Particular emphasis upon organizing the speech and projecting it to the audience. (3 cr; limited to 20 students; prereq satisfaction of freshman communication requirements; IV MTWThF; AgEng 307) McBride
- 41 **HUMANITIES; THE ENLIGHTENMENT**  
An introduction to the humanities. The development of rationalism and humanism. Readings in Pope, Voltaire, Locke, Rousseau, Tolstoy. (3 cr; limited to 40 students; V MTWThF; AgEng 307) Price

**47 EFFICIENT READING**

Designed for students, teachers, business or professional people of average reading ability wishing to improve speed, comprehension, and vocabulary. Techniques valuable in achieving or maintaining superior scholastic or professional status. Maximum use of recently developed visual aids. Of special value to teachers interested in laboratory-type experience in adult reading techniques. Not a remedial course. (3 cr [1 cr for Arts College students]; limited to 30 students; secs 1-4 meet on Mpls Campus) Wright, Price, King

- Sec 1, I MTWThF, ForH 115
- Sec 2, II MTWThF, ForH 115
- Sec 3, III MTWThF, ForH 115
- Sec 4, IV MTWThF, ForH 115
- Sec 5, III MTWThF, AgEng 315

**51 EXPOSITION**

Essays and articles, technical writing, application letters, review of English usage. (3 cr; limited to 25 students; prereq jr; II MTWThF; AgEng 307) McBride

## **Soil Science (Soil)**

**130° SPECIAL PROBLEMS IN SOILS**

Research, readings, instruction. (1-5 cr per qtr [10 cr max]; prereq 18 or 19 or 119) Martin, Burson, Blake, Arneman, Rust, Farnham, Grava, Caldwell, MacGregor, Schmidt, Adams, Baker

**137° SOILS AND THE ECOSYSTEM**

The formation and distribution of soils in relationship to vegetation, climate, and other soil-forming factors. The interrelationships of soils in the ecosystem. (5 cr; limited to 20 students; prereq course in ecology; taught at Itasca Biology Session) Farnham

**202° RESEARCH PROBLEMS IN SOILS**

Individual laboratory or field work on special problems in a phase of soils other than student's major thesis. Arrangements must be made in advance. (2-5 cr; hrs ar) Martin, Burson, Blake, Arneman, Rust, Farnham, Grava, Caldwell, MacGregor, Schmidt, Adams, Baker

# College of Biological Sciences

*For general information on the College of Biological Sciences, see section on Schools, Colleges, and Special Programs.*

## Biochemistry (BioC)

### 204 TRACER TECHNIQUES

Laboratory work on the application of radioisotopes to the study of metabolic processes. (3 cr; prereq # and 143 or MdBc 144, 146...MeAg 127 recommended; hrs and rm ar) Kirkwood

### 221 ADVANCED CARBOHYDRATE CHEMISTRY

Lectures and assigned reading on composition, structure, chemical and physical properties, and biochemical functions of carbohydrates. (2 cr; prereq 143 or MdBc 144)

### 298 GRADUATE SEMINAR

Reports on recent development in biochemistry and on research projects in the department. (1 cr; prereq Δ; hrs ar) Staff

### 299 GRADUATE RESEARCH

Research problems in various fields in biochemistry represented by staff interests. (2-5 cr; prereq #; hrs ar) Dagley, Henderson, Jenness, Kirkwood, Liener, Schultze, Gander, Glass, Anderson, Chapman, Klein, Lovrien, Warner

## Biology (Biol)

### 1 GENERAL BIOLOGY

See section on 10-week courses, page 137.

### 110 GENERAL PHYSIOLOGY

A quantitative approach to the study of cell function with an emphasis upon those cellular properties which are common to all biological systems. (3 cr; prereq 50, 51, 52, 60, Math 44 or 31, Phys 9 or equiv) Rhea

### 111 LABORATORY IN GENERAL PHYSIOLOGY

(2 cr; prereq 110 or ¶110) Rhea

## Botany (Bot)††

### 118 GENERAL CYTOLOGY

Introductory analysis of structure and related functions of intact cells and protoplasmic systems. The nature of cytoplasm, nuclei, and cell walls. Relationship of cytological data to life cycles, cytogenetics, cytotaxonomy, and cytochemistry. (5 cr, §CB 118, §Zool 165; limited to 12 students; prereq 10 cr in biology, botany or zoology, elementary genetics or #; lect II MTWThF, HS W-30; lab III-IV MTWThF, Bo 4) Stetler

†† For additional courses, see index for Biology Session.

**127 MORPHOLOGY OF VASCULAR PLANTS**

Vegetative and reproductive structure of living and fossil vascular plants. Their evolutionary relationships based on phylogenetic principles. (5 cr; limited to 15 students; prereq 104 or §; lect II MTWThF, Bo 3; lab III-IV MTWThF, Bo 5) Abbe

**299 RESEARCH PROBLEMS**

(Cr ar; prereq §) Staff

## Genetics (Gen)

**66 PRINCIPLES OF GENETICS**

The mechanisms of heredity; their implications for biological populations and application to practical problems. (3 cr, §Zool 66; prereq Biol 2 or equiv or 10 cr in botany or zoology; II MTWThF; one 2-hr quiz section, hrs ar; Bo B-6) Ar

**101 BASIC GENETICS**

For correction of deficiencies in background course work. (Cr ar; prereq grad only) Ar

## Zoology (Zool)††

**99 INDIVIDUAL WORK ON SOME SPECIAL DISCIPLINE**

(Cr ar; prereq Biol 2 or 50 and §) Staff

**101 BASIC ZOOLOGY**

(Cr ar; prereq grad only; hrs ar) Staff

**299 RESEARCH**

(Cr ar)

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†† For additional courses, see index for Biology Session.



# Biology Session

Held at Lake Itasca Forestry and Biological Station

For general information on the Biology Session at Lake Itasca, see section on Schools, Colleges, and Special Programs, or write for Biology Session bulletin: Summer Session, 135 Johnston Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## Botany (Bot)

- 116 **SUMMER FLORA OF MINNESOTA**  
(5 cr; limited to 20 students; prereq 52 or equiv or #; TF) Thomson
- 155 **FRESHWATER ALGAE**  
(5 cr; limited to 20 students; prereq 10 cr in botany, biology, or zoology, or #; MTh) Brook
- 99 **RESEARCH PROBLEMS**  
(5 cr; prereq maj biol sci, #) Staff
- 299° **RESEARCH PROBLEMS**  
(Cr ar; prereq grad) Staff

## Ecology and Behavioral Biology (Ecol)

- 119 **AQUATIC ECOLOGY**  
(5 cr; limited to 20 students; prereq 15 cr in biology or #; WS) Underhill
- 135 **ECOLOGY OF THE ITASCA REGION**  
(5 cr; limited to 20 students; prereq 50 or 130 or #; MTh) Buell
- 136 **AVIAN BEHAVIOR**  
(5 cr; limited to 15 students; prereq Zool 76 or 135 or #; WS) Mehner
- 162 **VERTEBRATE ECOLOGY**  
(5 cr; limited to 20 students; prereq Biol 80, or equiv; MTh) Seabloom, Marshall
- 196 **PROBLEMS IN ECOLOGY AND BEHAVIORAL BIOLOGY**  
(Cr ar; prereq #) Staff

## Entomology, Fisheries, and Wildlife (Ent)

- 59 **FIELD ENTOMOLOGY**  
(5 cr; limited to 15 students; prereq Biol 2 or equiv; WS) Berner
- 124 **THE BIOLOGY OF IMMATURE INSECTS**  
(5 cr; limited to 15 students; prereq 59 or 74 or equiv or #; TF) Berner
- 196° **SPECIAL PROBLEMS IN ENTOMOLOGY, FISHERIES, AND WILDLIFE**  
(Cr ar; prereq #) Staff

## Soil Science (Soil)

- 130° **SPECIAL PROBLEMS IN SOILS**  
(Cr ar; prereq #) Farnham

- 137° **SOILS AND THE ECOSYSTEM**  
(5 cr; limited to 20 students; prereq Bot 50 or equiv or #; TF) Farnham

## **Zoology (Zool)**

- 72 **NATURAL HISTORY OF INVERTEBRATES**  
(5 cr; limited to 10 students; prereq Biol 2 or #; MTh) Cole
- 115 **ADVANCED NATURAL HISTORY OF INVERTEBRATES**  
(5 cr; limited to 10 students; prereq 15 cr in zoology or #; MTh) Cole
- 135 **FIELD ORNITHOLOGY**  
(5 cr; limited to 15 students; prereq 15 cr in zoology or #; TF) Warner
- 195° **PROBLEMS IN ORNITHOLOGY, ECOLOGY, AND LIMNOLOGY**  
(Cr ar; prereq Biol 2 or equiv, and #) Staff

# School of Business Administration

*For general information on the School of Business Administration, see section on Schools, Colleges, and Special Programs.*

## Accounting (Acct)

### 24 PRINCIPLES OF ACCOUNTING

Recording, reporting, and interpreting business events. Use of accounting as a tool of business management. (3 cr, §55A; prereq 3rd qtr fr)

- Sec 1, I MTWThF, BlegH 145, Gray
- Sec 2, II MTWThF, BlegH 145, Zulauf
- Sec 3, III MTWThF, BlegH 145, Ar
- Sec 4, IV MTWThF, BlegH 145, Ar

### 25 PRINCIPLES OF ACCOUNTING

Continuation of Acct 24. (3 cr, §55B; prereq 24)

- Sec 1, II MTWThF, BlegH 205, Simmons
- Sec 2, III MTWThF, BlegH 205, Ar

### 55D ANALYSIS OF FINANCIAL STATEMENTS

Interpretation and analysis of financial statements for credit, investment, and managerial purposes. (3 cr, §105C; prereq 26 or equiv; IV MTWThF; BlegH 225) Simmons

### 105C INTERMEDIATE ACCOUNTING III

Accounting for equities, including creditors' equity and owners' equity for corporations, proprietorships, nonprofit organizations, and consolidated entities. Analysis and interpretation of financial statements. (3 cr, §55D; prereq 105A; 7:30-8:50 MTWF; BlegH 255) Zulauf

### 125 AUDITING PRINCIPLES AND PROCEDURES

Analysis of the audit function including both internal and external applications. Emphasis upon use of computer and statistics to assist in performance of the audit. (4 cr; prereq 105C or §105C and 105B; III-IV MTWTh; BlegH 430) Smith

### 185A ADVANCED ACCOUNTING

Consolidated statements, fiduciary and fund accounting, partnership accounting, foreign exchange. (3 cr; prereq 105C or §105C; 7:30-8:50 MTWTh; BlegH 430) Abramson

## Business Law (BLaw)

### 58 BUSINESS LAW: CONTRACTS

Law of contracts. Case methods used. (3 cr, §158; prereq Econ 2 or equiv)

- Sec 1, I MTWThF, BlegH 130, Wright
- Sec 2, II MTWThF, BlegH 130, Wright

### 158 BUSINESS LAW: CONTRACTS

(See BLaw 58) (3 cr, §58; prereq grad or #)

- Sec 1, I MTWThF, BlegH 130, Wright
- Sec 2, II MTWThF, BlegH 130, Wright

## Business Finance (BFin)

### 56 FINANCE FUNDAMENTALS

Deals with the problems of acquiring, allocating, and managing funds within the firm. The following concepts of internal financial management are considered in depth: determining financial goals of the firm; analyzing and controlling fund flows through the firm; measuring the expected return on individual investment projects; selecting optimal "portfolios" of projects; determination of capital costs, and the way these costs vary with financing mix; and evaluating the performance of the firm and its components. (3 cr, §156; prereq Acct 26; I MTWThF; BlegH 125) Nelson

### 57 FINANCIAL MANAGEMENT

Financial problems of business concerns presented in case materials. Applications of principles to such situations as budgeting, short- and long-term funds, needs and equity choices, mergers, and reorganization. (3 cr, §276; prereq 56 or Acct 105B; II MTWThF; BlegH 115) Ar

### 66 INVESTMENT FUNDAMENTALS

An introduction into the appraisal of securities and the management of investment funds, essentially from the viewpoint of an individual investor. Stresses principles of value determination and risks associated with investment in the various types of securities. Includes appraisal of bonds, and preferred stocks, with main attention to appraisal of common stocks. Coverage includes industrials, utilities, financial institutions and investment companies, and government units. (3 cr; prereq 56; IV MTWThF; BlegH 125) Ar

### 156 BUSINESS FINANCE FUNDAMENTALS

Study of the financial management of firms. Principles governing the planning, raising, and control of short- and long-term funds. Attention directed to capital structures, valuation situations, capital budgeting, dividend policy. Presented through text, problem, and case material. (3 cr, §56; prereq grad, Acct 26 or 155B; I MTWThF; BlegH 125) Nelson

### 257 FINANCIAL MANAGEMENT

Analysis of financial problems of business enterprises, including the planning, raising, and control of short- and long-term funds. Application of principles to case situations, supplemented with reading covering fund flows, debt-equity choices, valuation, capital budgeting, mergers. Discussions and written reports. (3 cr, §57, §old 76; prereq 56 or 156; II MTWThF; BlegH 115) Ar

### 266 INVESTMENT FUNDAMENTALS

Introduction to the appraisal of securities and the management of investment funds, essentially from the viewpoint of the individual investor. Stresses principles of value determination and risks associated with various types of securities, including bonds, preferred stocks and common stocks and their use in portfolios. Coverage includes industrials, utilities, financial institutions, and government issues. Lectures, readings, and student projects. (3 cr, §66; prereq 56 or 156; IV MTWThF; BlegH 125) Ar

## Insurance (Ins)

### 53 RISK MANAGEMENT AND INSURANCE

The nature and economic significance of risk. The recognition, measurement, and treatment of risk with particular emphasis upon insurable risks and insurance. Application of these concepts to the property, liability, and personnel risks faced by a business firm or by a family. The risk management function in business and its relationship to other business management functions. Public policy and risk management with special emphasis on the problem of the uncompensated automobile accident victim, social insurance, and government regulation of insurance. (3 cr, §153; prereq Econ 2 or equiv; III MTWThF; BlegH 135) Williams

### 93 PROPERTY AND LIABILITY INSURANCE I

Nature and relative importance of insurable property and liability risks; analysis of property and liability insurance contracts; insurance surveys—optimum property

and liability insurance protection. (3 cr, §223; prereq 53; I MTWThF; BlegH 135) Whitman

**153 RISK MANAGEMENT AND INSURANCE I**

The nature and economic significance of risk. The recognition, measurement, and treatment of risk with particular emphasis upon insurable risks and insurance. Application of these concepts to the property, liability, and personnel risks faced by a business firm or by a family. The risk management function in business and its relationship to other business management functions. Public policy and risk management with special emphasis on the problem of the uncompensated automobile accident victim, social insurance, and government regulation of insurance. (3 cr, §53; prereq Econ 2 or equiv; III MTWThF; BlegH 135) Williams

**223 PROPERTY AND LIABILITY INSURANCE I**

Nature and relative importance of insurable property and liability insurance contracts; insurance surveys—optimum property and liability insurance programs. (3 cr, §93; prereq 53 or 153; I MTWThF; BlegH 135) Whitman

## Industrial Relations (IR)

**52 SYSTEMS OF INDUSTRIAL RELATIONS: LABOR MARKETING**

Introduction to current employment relationships; and economic approach and analysis. The application and conservation of human resources in employment, related social and economic problems. Labor marketing, collective bargaining, unions and employer associations, industrial unrest and conflict, employment and unemployment, wage problems. (3 cr, §152; prereq Econ 2 or equiv)

Sec 1, I MTWThF, BlegH 150, Zaidi

Sec 2, II MTWThF, BlegH 125, Mahoney

**72 SYSTEMS OF INDUSTRIAL RELATIONS: MANPOWER MANAGEMENT**

Personnel management and labor relations, the development and application of effective work teams within firms and agencies. Overview of policy and practice in major manpower management functions of staffing, training, communications, motivation, compensation, and morale maintenance. (3 cr, §172; prereq Econ 2 or §; II MTWThF; BlegH 150) Weitzel

**152 SYSTEMS OF INDUSTRIAL RELATIONS: LABOR MARKETING**

(See IR 52) (3 cr, §52; prereq Econ 2 or equiv; I MTWThF; BlegH 150) Zaidi

**172 SYSTEMS OF INDUSTRIAL RELATIONS: MANPOWER MANAGEMENT**

(See IR 72) (3 cr, §72; prereq Econ 2; II MTWThF; BlegH 150) Weitzel

**182A INTERMEDIATE LABOR MARKETING**

Advanced discussion and analysis of labor marketing concepts, structures, and processes. Examination of sources of information and different approaches to study, analysis, and resolution of problems in the labor market. (3 cr; prereq 52 or 152; III-IV TTh; BlegH 440) Zaidi

**222 COMPENSATION AND REWARD THEORY**

Analysis of theories of reward and compensation as they influence labor force and employment behavior—labor demand, labor force participation, occupational choice, labor mobility, and productivity of labor. Draws upon relevant theories from economics, psychology, and sociology. (3 cr; prereq 152 or 172 or §; III-IV MWF; BlegH 150) Mahoney

## Management (Mgmt)

**70 FUNDAMENTALS OF MANAGEMENT**

The principal functional areas of management: planning, organizing, staffing, directing, and controlling. Examines attributes of good organization; establishment of goals, policies, and procedures; control systems and techniques; providing necessary factors and relationships to achieve organizational objectives. (3 cr; III MTWThF; BlegH 425) Wickesberg

**150A FUNDAMENTALS OF MANAGEMENT**

A first course in management at the graduate level; functions of manager—planning, organization, staffing, direction, and control. Activities, problems, and

common remedies under each of these functional headings. Case analysis designed to bring out specific points and develop insight into management problems. (3 cr, §70; IV MTWThF; BlegH 425) Wickesberg

## Marketing (Mktg)

### 57 PRINCIPLES OF MARKETING

The social, economic, legal, and other environmental aspects of marketing. Special emphasis on the changing environment and the resulting impact on marketing strategy and marketing policies including product development, pricing, marketing channels, and promotion. (3 cr, §157; prereq Econ 2 or equiv; III MTWThF; BlegH 250) Ar

### 97 MARKET ANALYSIS AND RESEARCH I

Techniques used in marketing research. Emphasis on marketing information which can aid in the solution of marketing problems and on survey research techniques. (3 cr, §217; prereq 57, QA 52 or equiv; I MTWThF; BlegH 240) Ar

### 107 RETAIL MANAGEMENT I

Retailing principles and methods; relations of retailing to other parts of the economy; problems associated with operation of stores of various types. (3 cr, §227 [available for grad cr only by §]; prereq 57; II MTWThF; BlegH 240) Ar

### 217 MARKET ANALYSIS AND RESEARCH I

Techniques used in marketing research. Emphasis on marketing information which can aid in the solution of marketing problems and on survey research techniques. (3 cr, §97; prereq QA 52 and 57 or 157; I MTWThF; BlegH 240) Ar

## Production (Prod)

### 50 PRODUCTION MANAGEMENT

The techniques, the managerial problems and the decision-making processes in planning and controlling the production activity. Production as a function of the enterprise rather than as a strictly manufacturing activity. Research and development, the role of standards, physical facilities, systems and procedures analysis, work measurement, materials control, quality control, and production planning and control. (3 cr, §150B; prereq QA 53; 7:30-8:50 MTWTh; BlegH 140) Hoffmann

### 150B ADMINISTRATION OF PRODUCTION

Fundamentals of production from management point of view. Techniques, managerial problems, and decision-making processes in administration of production function. Limited use of case material and/or field study to observe practical difficulties in utilizing operating principles. (3 cr, §50; prereq Mgmt 150A or §; 11:15-12:30 MTWTh; BlegH 105) Hoffmann

## Quantitative Analysis (QA)

### 52 QUANTITATIVE METHODS FOR ADMINISTRATION I

Introduction to quantitative models; measurement and statistical description; probability and probability distributions; sampling and sampling distribution. (3 cr; prereq Math 40A, or Math 43, or §)

Sec 1, II MTWTh, BlegH 110, Willis  
Lab 1, III MTWTh, BlegH 240, Ar  
Lab 2, II MTWTh, BlegH 240, Ar

### 62 BASIC COMPUTER SYSTEMS

See section on 10-week courses, page 137.

### 151 ELEMENTS OF STATISTICS

Statistical description, frequency distributions, probability, sampling, introduction to statistical estimation and decision making. (3 cr, §51; prereq Math 10 or equiv; IV MTWThF; BlegH 140) Ar

# College of Education

*For general information on the College of Education, see section on Schools, Colleges, and Special Programs.*

## Agricultural Education (AgEd)

- 145 THE HIGH SCHOOL CURRICULUM IN AGRICULTURE**  
Philosophy, organization, and administration of instruction in agriculture departments in secondary schools. (3 cr; prereq 10 cr in education; III-IV MTWThF; Hr 301) Ar
- 232° RESEARCH IN AGRICULTURAL EDUCATION**  
Selecting research problems, preparing bibliographies, analyzing and interpreting data, and preparing manuscripts. (Cr ar; prereq 15 cr in education) Persons

## Art Education (ArEd)

- 10C SURVEY OF ART ACTIVITIES**  
Introduction to pictorial expression, design, and the function of art in the social environment. (3 cr; each section limited to 30 students)  
Sec 1, I-II MTWThF, WuH 240, Salome  
Sec 2, III-IV MTWThF, WuH 220, Hegg
- 53C INTRODUCTION TO WEAVING**  
Equipment, design, setting up, and operation of table and floor looms. (3 cr, limited to 30 students; I-II MTWThF; WuH 340) Smits
- 153 CURRICULUM BUILDING IN ART EDUCATION**  
Programs for exceptional children. Selection, evaluation, and organization of material for teaching units and projects. (3 cr; I MTWThF; WuH 130) Hastie
- 158 ART EDUCATION IN EUROPE**  
Current practices, problems, and achievements in art education in western Europe compared with practices in American art education. (3 cr; IV MTWThF; WuH 110) Gayne
- 184 IMPROVING ART PROGRAMS IN THE ELEMENTARY SCHOOL**  
Evaluating research findings and introducing new materials; developing cooperation between classroom teachers and art education specialists. (3 cr; limited to 36 students; prereq tchg exper or #; III MTWThF; WuH 240) Salome
- 189 APPLICATION OF AESTHETIC THEORY IN EDUCATION**  
Contemporary theories of art, their psychological and philosophical foundations. Open to teachers, supervisors, and administrators concerned with art in general education at all levels. (3 cr; III MTWThF; WuH 130) Hastie
- 284 RESEARCH IN ART EDUCATION**  
(3 cr; II MTWThF; WuH 110) Gayne
- 295° PROBLEMS: ART EDUCATION**  
(Cr ar; prereq #) Gayne, Hastie, Salome
- 296 SEMINAR: ART EDUCATION**  
(1 cr; VI Th; WuH 130) Salome

# Institute of Child Development

## Child Psychology (CPsy)

- 80 CHILD PSYCHOLOGY**  
Introduction to the science of child behavior. Emphasis is placed upon a critical review of theories and research in child psychology. (3 cr; prereq Psy 2; II MTWThF; Arch 5) Turnure
- 132 ADOLESCENT DEVELOPMENT**  
Physical, personal, and social changes occurring during adolescent years. (3 cr, §81; prereq sr, 12 cr in psychology, child psychology, or educational psychology; III MTWThF; WuH 230) Shelton
- 140 BEHAVIOR PROBLEMS**  
Types, origin, development, and treatment of behavior difficulties in normal children. (3 cr; prereq 80 or equiv; II MTWThF; CD 218) Gallese
- 143 PROBLEMS OF MENTAL DEFICIENCY**  
Diagnosis, care, training; social and vocational problems. (3 cr; prereq 80 or equiv; III MTWThF; CD 218) Best
- 179 CLINICAL PROCEDURES WITH CHILDREN**  
Survey of methods of clinical psychology emphasizing basic concepts and research problems in clinical work with children. Primarily for students not majoring in clinical psychology. (3 cr; prereq 12 cr in psychology, educational psychology, sociology, or child psychology; I MTWThF; CD 218) Gross
- 180 PERSONALITY DEVELOPMENT**  
Development of personality in children. Emphasis on psychoanalytic and behavior theory formulations and related research literature. (3 cr; prereq 80; IV MTWThF; AH 350) Ar
- 183 LANGUAGE DEVELOPMENT**  
Development of the structure and function of language; methodological problems, speech and language development; language scales; theories of language development. (3 cr; prereq 80; IV MTWThF; CD 218) Templin
- 186 COGNITIVE DEVELOPMENT**  
Development of cognitive processes; theories of intelligence and intellectual functioning; related research literature. (3 cr; prereq 80 or equiv; II MTWThF; CD 105) Gelman
- 190 TOPICS: CHILD PSYCHOLOGY**  
Independent reading or research. (Cr and hrs ar; prereq #) Staff
- 223 SEMINAR: DEVELOPMENTAL PSYCHOLOGY**  
(Cr and hrs ar; limited to 15 students; prereq #) Gibson
- 250 PRACTICUM: CLINICAL CHILD PSYCHOLOGY**  
Supervised experience in psychodiagnostic work with emotionally disturbed children and their families. (3 cr; prereq #; hrs ar) Gallese

## Educational Administration (EdAd)

- 201 FOUNDATIONS OF EDUCATIONAL ADMINISTRATION**  
Foundation for all students preparing for administrative positions in schools. Sources, meaning, and application of administrative theory, organizational structure, human relations, and leadership roles as they relate to the conduct of school organizations. (3 cr; II MTWThF; Arch 15) Sederberg
- 202 FOUNDATIONS OF EDUCATIONAL ADMINISTRATION**  
Foundation for all students preparing for administrative positions in school organizations. Aspects of federal, state, and local relationships as they relate to the coordination and operation of public elementary and secondary schools. (3 cr; IV MTWThF; Arch 25) Mueller



- 210 PUBLIC SCHOOL FINANCE**  
Current practices; sources of revenue, types of taxes, theory of taxation, and formulas used for distribution of school aids. Federal, state, and local support of education. (3 cr; I MTWThF; Arch 30) Domian
- 211 SCHOOL BUSINESS MANAGEMENT**  
Administration of school business affairs. (3 cr; prereq 210 or #; II MTWThF; Arch 20) Mueller
- 215 THE ELEMENTARY SCHOOL PRINCIPALSHIP**  
Specific problems in elementary school administration and the principal's role of leadership. (3 cr; prereq 201 and 202 or #; III MTWThF; Bu 125) Cross
- 217 SEMINAR: ELEMENTARY SCHOOL ADMINISTRATION**  
Problems of administration and organization of instruction. (3 cr, §200; prereq 216 or #; I MTWThF; NH 107) Lambert
- 218 SEMINAR: SECONDARY SCHOOL ADMINISTRATION**  
Problems in school units treated in a tridimensional framework of social system theory, structural functional analysis, and institutional perspective. Focus on the interrelation of values, roles, technical functions, and goal attainment in the school organization. (3 cr; limited to 15 students; prereq 201 and 202 or #; III MTWThF; NH 107) Popper
- 224 LEGAL ASPECTS OF PUBLIC SCHOOL ADMINISTRATION**  
Constitutional, statutory, and common law bases of school administration; principles growing out of fundamental legal procedures. (3 cr; II MTWThF; Arch 30) Hooker
- 228° PROBLEMS: EDUCATIONAL ADMINISTRATION**  
For superintendents and principals qualified to make intensive studies of specific problems of the administration of a school system. (1-3 cr; hrs ar) Domian, Hooker, Popper, Mueller, Nickerson, Cross
- 235 SEMINAR: EDUCATIONAL ADMINISTRATION**  
Decision making through case method. Cases and concepts covering human relations, curriculum, school community relations, instructional problems; students analyze processes involved and use research and writings in the fields covered. (1-3 cr; prereq MA in educational administration or #; IV MTWThF; NH 107) Popper
- 236 FIELD STUDY**  
Required for the specialist in education certificate. The 10 credits will be based on a written report covering an approved field study. Students may register for the general planning and organization of their study without credit. (0-10 cr; prereq #; hrs ar) Curtin, Domian, Hooker, Popper, Lambert, Mueller, Nickerson, Cross
- 239†† LABORATORY IN DECISION MAKING**  
Emphasizes decision making, recent research and theory related to everyday school problems, participants' self-evaluation as administrators, relation of human behavior to administration. Using the technique of "simulation" the workshop participants will be placed in the role of the principal. During the workshop each person will make more than 110 decisions relative to operation of the simulated school. (1-4 cr; limited to 25 students; V-VII MTWThF; July 3-19; FraH 120) Cross
- 264 THE SECONDARY SCHOOL PRINCIPALSHIP**  
The principal's role in the secondary school, his qualifications, duties, and problems, including current issues, and factors of staff and student relationships. (3 cr; I MTWThF; Arch 20) Nickerson
- 265 ADMINISTERING THE HIGH SCHOOL PROGRAM**  
Practices and procedures in scheduling, improving the curriculum, community relations, records and reports, school services, and program evaluation. (3 cr; III MTWThF; Arch 30) Nickerson

†† Graduate students planning to register for any workshop should consult their advisers concerning the possibility of using credit for the workshop in their graduate program.

- 270° **PROBLEMS: ELEMENTARY SCHOOL ADMINISTRATION**  
(Cr and hrs ar; prereq #) Curtin, Lambert, Cross
- 270B° **PROBLEMS: SECONDARY SCHOOL ADMINISTRATION**  
(Cr and hrs ar; prereq #) Domian, Hooker, Popper, Mueller, Nickerson

## Educational Psychology (EPsy)

### GENERAL COURSES

- 110 **EDUCATIONAL MEASUREMENT IN THE CLASSROOM**  
Principles and methods for construction, evaluation, and improvement of classroom instruction. (3 cr; each section limited to 35 students)  
Sec 1, IV MTWThF, Bu 123, Becklund  
Sec 2, VI MTWThF, Bu 123, Archer
- 116 **INTRODUCTORY STATISTICAL METHODS**  
Basic statistical techniques; comprehension of literature using elementary statistical concepts and methods. (Not equivalent to EPsy 216, 216A) (3 cr; each section limited to 60 students) Terwilliger  
Sec 1, I MTWThF, WuH 230  
Sec 2, III MTWThF, Arch 35
- 117 **BASIC PRINCIPLES OF MEASUREMENT**  
Principles underlying construction of achievement examinations; developments in educational and psychological measurement; theory and practice related to statistical methods; types and uses of derived scores; factors influencing reliability and validity. (3 cr; prereq 116 or 216 or Psy 70 or equiv; VI MTWThF; Bu 125) Merwin
- 125 **SOCIAL PSYCHOLOGY OF EDUCATION**  
Concepts and theories from social psychology in areas such as socialization, group dynamics, social perception, conflict resolution, organizational behavior, and social change. Laboratory sessions to make applications and develop skills in group behavior. (3 cr; each section limited to 50 students) David W Johnson  
Sec 1, I-II MWF, Arch 60  
Sec 2, III-IV MWF, Arch 60
- 133 **INTRODUCTION TO GUIDANCE**  
Philosophy, principles, and practices in development and operation of pupil personnel services; role of counselor, teacher, principal, and specialized personnel; guidance techniques and case studies. (3 cr; prereq 9 cr in education; II MTWThF; WuH 130) Tennyson
- 140 **INSTRUMENTS AND TECHNIQUES OF MEASUREMENT**  
Measuring intelligence, achievement, interests, attitudes, and personality traits; use in educational guidance, personnel work, administration, and supervision. (3 cr; prereq 110 or 117; III MTWThF, IV TTh; FraH 20) Archer
- 148 **CLINICAL DIAGNOSIS OF READING DIFFICULTIES**  
Relationship to psychological factors and clinical remedial correction. (3 cr; limited to 35 students; prereq EdCI 145; II MTWThF; Pt 102) Balow
- 150 **CLINICAL PRACTICE IN REMEDIAL TEACHING**  
Remedial tutoring of individual children who have difficulty in school learning. (3 cr; each section limited to 10 students; prereq EdCI 145 or 151 and #) Ar  
Sec 1, II-IV MTWThF, Ar  
Sec 2, I-II, MTWThF, Pt 215  
Sec 3, I-II MTWThF, Pt 110
- 159 **PERSONALITY DEVELOPMENT AND MENTAL HYGIENE**  
Examines theory and research in personality development and mental functioning in the light of knowledge concerning the psychology of stress and the concept of

mental health as constructive behavior in response to change and stress. (3 cr; each section limited to 50 students) Kaul

Sec 1, IV MTWThF, WuH 230

Sec 2, V MTWThF, WuH 230

- 160 DIAGNOSIS AND REMEDIATION OF LEARNING DISABILITY I**  
Survey, evaluation, and demonstration of special techniques for diagnosis and remediation of severe learning deficits appearing in reading and written language (including dyslexia) and basic quantitative concepts. (3 cr; limited to 30 students; prereq 110 and EdCI 145 or ‡; I MTWThF; Pt 102) Deno, Gallistel
- 160A PRACTICUM IN DIAGNOSIS AND REMEDIATION OF LEARNING DISABILITY I**  
Clinical practice in prescriptive teaching and using a selected range of the techniques presented in EPsy 160. (3 cr; each section limited to 10 students; prereq ¶EPsy 160 or ‡) Deno, Gallistel
- Sec 1, II-IV MTWThF, St. Paul Learning Center  
Sec 2, III-IV MTWThF, Pt 215  
Sec 3, III-IV MTWThF, Pt 110
- 165 SEMINAR: PROBLEMS AND ISSUES IN THE EDUCATION OF LEARNING-DISABLED CHILDREN**  
Exploration of issues involved in design and conduct of services for learning-disabled children. (3 cr; prereq experience and continuing professional responsibility in the SLD field and ‡; VI MTWThF; Pt 102) Deno
- 177 CHILDHOOD LANGUAGE DEVELOPMENT: CLASSROOM IMPLICATIONS**  
Recent trends and findings in the study of language acquisition; classroom implications for the education of exceptional children. (3 cr; II MTWThF; NH 107) Moores
- 182 EDUCATION OF EXCEPTIONAL CHILDREN**  
Introduction to the field of special education for classroom teachers and other school personnel. (3 cr; VI MTWThF; Pt 111) Force
- 184 INTRODUCTION TO EDUCATION OF THE MENTALLY RETARDED**  
Issues which relate to educational practices; community planning; educational philosophy, administration, organization, and programming. (3 cr; prereq 182; II MTWThF; Arch 140) Rynders
- 186 EDUCATION OF EMOTIONALLY DISTURBED AND SOCIALLY MALADJUSTED CHILDREN**  
Discussion and evaluation of curriculum, materials, and methods for instruction of disturbed and delinquent children in hospital, training school, and public school settings. (3 cr; prereq grad or ‡; I MTWThF; Pt 204) Wilderson
- 187 EDUCATION OF CRIPPLED CHILDREN**  
Characteristics and abilities; methods and materials for training; observation of teaching situations involving these groups. Personal consultation scheduled in addition to class hours. (3 cr; prereq 182 or ‡; I MTWThF; CD 105) Force
- 188 EDUCATION OF THE CULTURALLY DISADVANTAGED CHILD**  
Educational needs of children handicapped by behavior related to deficiencies of physical and/or cultural environment; adaptations of educational programs. (3 cr; prereq 12 cr in psychology, educational psychology, or sociology; II MTWThF; WuH 230) Wood
- 193 PSYCHOLOGICAL ANALYSIS OF INSTRUCTION**  
Use of psychological concepts and principles in analysis of instructional problems and development of teaching strategies; consideration of behavior modification; behavioral objectives; task analysis. (3 cr; each section limited to 60 students)
- Sec 1, II MTWThF, FraH 120, Murray  
Sec 2, III MTWThF, FraH 101, Neale  
Sec 3, IV MTWThF, FraH 101, Neale
- 203\* METHODS IN EDUCATIONAL RESEARCH**  
Methods and techniques employed in the investigation and report of educational problems. (3 cr; II MTWThF; NH 209A) Hoyt

- 209 SEMINAR: RESEARCH PLANNING**  
A functional approach to planning empirical research projects appropriate for the basis of a Ph.D. thesis. Students develop outlines of projects and present these for critical review of members of the seminar. (1 cr; limited to 12 students; VI MWF; CD 105) Hoyt
- 216 STATISTICAL METHODS**  
Foundations of statistical theory; practice in applying theories to solution of educational and psychological problems. (3 cr; prereq 116 or Psy 70; I MTWThF; Arch 35) MacEachern
- 216A STATISTICAL METHODS—LABORATORY**  
For students who wish more experience in solution of problems and use of machines than is obtained in EPsy 216. (2 cr; limited to 22 students; prereq ¶216; II-III TWTh; WuH 330) Proshek
- 218 STATISTICAL METHODS (PART I)**  
See section on 10-week courses, page 137.
- 218A STATISTICAL METHODS—LABORATORY (PART I)**  
See section on 10-week courses, page 137.
- 225° COUNSELING THEORY AND PROCEDURE I**  
Definition of counseling; theoretical approaches to counseling and vocational choice theories; measurement versus appraisal; diagnostic principles utilized. (3 cr; prereq 113 or 250, 259 or ¶259; II MTWThF; Bu 125) Blocher
- 233° PROBLEMS: GUIDANCE AND PERSONNEL WORK**  
Independent study. (1-9 cr) Blocher, Borow, Parker, Tennyson, Hansen, A. Anderson
- 248 SEMINAR: SCHOOL PSYCHOLOGY**  
One year of continuous enrollment required of all students in the specialist and Ph.D. programs in school psychology. (1 cr per qtr, total 3; limited to 15 students; prereq ¶; II MTWThF; Pt 111) Duker, Hall
- 253° RESEARCH PROBLEMS**  
(Cr and hrs ar; prereq ¶) Balow, Deno, Hoyt, Merwin, Reynolds, Duker, Force, Hall, MacEachern, Neale, Terwilliger, Wilderson, Gallistel, David W. Johnson, Moore, Murray, Rynders, Turnure, Wood
- 257 CLINICAL PRACTICE IN EDUCATIONAL DIAGNOSIS**  
Supervised work with children referred to the Psycho-Educational Clinic for diagnosis of learning disabilities and school-related problems. Parent and child interviewing, testing, and preparation of case reports. (3 cr, §151; limited to 4 students; prereq 210 or equiv, EdCI 145, ¶; hrs ar) Deno
- 261 SURVEY OF THEORY AND RESEARCH IN MENTAL RETARDATION**  
Critical review of research and theories of mental retardation in the context of relevant developmental theories. Important contributions in primary sources concerning principles of behavior and applied problems. (3 cr; prereq ¶; IV MTWThF; CD 105) Turnure
- 268 SEMINAR: THE CULTURALLY DISADVANTAGED**  
Psychological theory and research with implications for educational planning and procedures. (3 cr; prereq ¶; VII-VIII TTh; Pt 102) Wood
- 270 SEMINAR: COGNITION, CURRICULUM, AND PEDAGOGY**  
Critical issues in the relationship between cognitive development and curriculum structure and between cognitive processes and pedagogy; discussion of research literature. (3 cr; limited to 10 students; prereq 171 or ¶; III MTWThF; ForH 261) Murray
- 288 PRACTICUM IN SPECIAL EDUCATION**  
Supervised experience in supervision, administration, or coordination, teaching, and related work in schools, agencies, institutions, and other facilities for exceptional children. (3-9 cr; prereq ¶; hrs ar) Wilderson, Wood, Force

## SECONDARY EDUCATION

- 134 COUNSELING PROCEDURES**  
For persons whose professional work includes counseling and interviewing, not for persons seeking certification as school counselors. Emphasis on counseling re-

relationship and principles of interviewing. Utilizes case studies, role playing, and demonstration. (3 cr; prereq #: IV MTWThF; Bu 125) Blocher

**282 COUNSELING PRACTICUM: INTRODUCTORY**

Laboratory experience in interviewing and counseling. (1-3 cr [total 6], §282A; limited to 12 students; prereq #: VI-IX MTWThF; West High School) Parker, A Anderson

## General Education

### Curriculum and Instruction (EdCI)

#### GENERAL COURSES

**105 AUDIO-VISUAL MATERIALS IN EDUCATION**

(3 cr; prereq sr; I MTWTh and 2 hrs lab ar; NH 211) Pearson

**106 COORDINATING AN AUDIO-VISUAL EDUCATION PROGRAM**

(3 cr; prereq 105 or #: III MTWThF; WeH 202) Pearson

**108 NONPROJECTED AUDIO-VISUAL MATERIALS AND EQUIPMENT LABORATORY**

(3 cr; each section limited to 15 students; prereq 105 or ¶105; lect IV MTWThF; WeH 206) Ar

Sec 1, VI MW, WeH 206

Sec 2, VI TTh, WeH 206

**115 INTRODUCTION TO EDUCATION OF VISUALLY HANDICAPPED CHILDREN**

Educational programs, services, and resources for blind and partially seeing children; historical background; philosophy; sociological and psychological problems. (3 cr; prereq #: IV MTWThF; NH 122) Martin

**118 METHODS OF TEACHING VISUALLY HANDICAPPED CHILDREN**

(3 cr; I MTWThF; NH 122) Martin

**128 INTRODUCTION TO THE EDUCATION OF HEARING-IMPAIRED CHILDREN**

Education programs, services, and resources; historical background; philosophy; sociological and psychological problems. (3 cr; prereq #: III MTWThF; Pt 102) Moores

**133 CONSUMER EDUCATION IN THE SCHOOLS**

Objectives, content, and curriculum organization at elementary and secondary levels. (3 cr; I MTWThF; Bu 123) Price

**145 READING DIFFICULTIES**

(3 cr; each section limited to 50 students; prereq 143A or 144 or equiv)

Sec 1, III MTWThF, AH 150, Manning

Sec 2, IV MTWThF, Arch 35, Ar

**151 DIAGNOSIS AND TREATMENT OF LEARNING DIFFICULTIES**

Evaluation of the results of teaching; diagnosis of pupil difficulties; development and prevention; tests as aids to teaching; following up a testing program. (3 cr; IV MTWThF; Pt 102) Ar

**174-175-176 CLINICAL METHODS AND PRACTICE IN SPEECH PATHOLOGY**

(See course listing under Speech Science, Pathology, and Audiology, page 104) Case history and analysis; testing and diagnosis of speech defects; techniques and work programs for treatment; practical clinical work. (3 cr each; limited to students attending full time spring qtr 1968; prereq SSPA 141, 142, 143, and #: hrs ar) Starr, Gaines

**189 MATERIALS AND CURRICULUM CONSTRUCTION IN MODERN LANGUAGES**

Curriculum development, preparation of units, testing techniques; materials for classroom, language laboratory, televised instruction, and programmed learning. (3 cr; prereq 185 and #: I MTWThF; PeikH 225) Lange

- 201° PROBLEMS: TEACHING SOCIAL STUDIES**  
Individual research. (Cr and hrs ar; prereq 102 or 155 or 168, 204 or #) F Johnson
- 205° PROBLEMS: AUDIO-VISUAL EDUCATION**  
(Cr and hrs ar; prereq #) Pearson
- 207° PROBLEMS: RADIO-TELEVISION EDUCATION**  
(1-3 cr; prereq 107; hrs ar) Pearson
- 232° PROBLEMS: TEACHING MATHEMATICS**  
(Cr and hrs ar; prereq 230 or 231 or 291) Donovan Johnson, Jackson, Stochl, David C Johnson, Post
- 271° PROBLEMS: CURRICULUM CONSTRUCTION**  
(Cr and hrs ar; prereq #) Boeck, Donovan Johnson, Chase, Manning, Lange, Hill
- 273° PROBLEMS: READING**  
(Cr and hrs ar; prereq 143A, or 144 or #) Balow, Kegler, Chase, Dykstra, Manning, Odland
- 288° SEMINAR: RESEARCH IN MODERN LANGUAGE LEARNING**  
Criteria for evaluating major studies with implications for language teachers; needed research, planning, and design of individual study. (3 cr; prereq 185 and #; III MTWThF; PeikH 225) Lange
- 296° PROBLEMS: TEACHING ENGLISH**  
(Cr ar; VI MTWThF; Bu 129) Chase, Dykstra, Piche

## ELEMENTARY EDUCATION

- 60 TEACHING READING IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; prereq Ed 75A; III MTWThF; Pt 214) Dykstra
- 61 TEACHING SOCIAL STUDIES IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; prereq Ed 75A; IV MTWThF; Pt 214) Ar
- 62 TEACHING MATHEMATICS IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; prereq Ed 75A, Math 5A-B; I MTWThF; Pt 111) Jackson
- 63 CHILDREN'S LITERATURE**  
(3 cr; each section limited to 50 students) Peterson  
Sec 1, III MTWThF, Bu 120  
Sec 2, IV MTWThF, Bu 120
- 64 TEACHING ENGLISH IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; prereq Ed 75A, Engl 60; IV MTWThF; AH 150) Dykstra
- 65 TEACHING SCIENCE IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 48 students; prereq Ed 75A, 10 cr in natural science; II MTWThF; Pt 204) Humphreys
- 102 TEACHING AND SUPERVISION OF SOCIAL STUDIES IN THE ELEMENTARY SCHOOL**  
The class is planned for graduate students and for summer students who already hold a Bachelor's degree. Undergraduate students should register for EdCI 61. (3 cr; limited to 50 students; prereq Ed 75B or equiv; II MTWThF; Pt 214) Ar
- 103 TEACHING SCIENCE IN THE ELEMENTARY SCHOOL**  
The class is planned for graduate students and for summer students who already hold a Bachelor's degree. Undergraduate students should register for EdCI 65. (3 cr; limited to 48 students; prereq sr, Ed 75B or tcbg exper; III MTWThF; Pt 204) Humphreys
- 119 ELEMENTARY SCHOOL CURRICULUM**  
(3 cr; prereq Ed 75B or equiv; I MTWThF; Arch 5) Ar
- 121 LITERATURE FOR THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; I MTWThF; Bu 120) Odland

- 143A TEACHING AND SUPERVISION OF READING IN THE ELEMENTARY SCHOOL**  
The class is planned for graduate students and for summer students who already hold a Bachelor's degree. Undergraduate students should register for EdCI 60. (3 cr; each section limited to 50 students; prereq 9 cr in education)  
Sec 1, I MTWThF, Arch 10, Manning  
Sec 2, II MTWThF, Bu 120, Ar
- 149A TEACHING AND SUPERVISION OF MATHEMATICS IN THE ELEMENTARY SCHOOL**  
Present practices and trends in methods, evaluation, and diagnosis; objectives, psychology, and philosophy related to improvement of instruction. (3 cr, §149; limited to 50 students; prereq 62 or equiv; IV MTWThF; Pt 111) Post
- 149C CURRENT DEVELOPMENTS IN ELEMENTARY SCHOOL MATHEMATICS INSTRUCTION**  
Contemporary literature, trends and experimentation with content, criteria for program evaluation. (3 cr; prereq 62 or 149A or §; III MTWThF; Pt 111) Jackson
- 150 SUPERVISION AND IMPROVEMENT OF INSTRUCTION**  
(3 cr; limited to 50 students; prereq 9 cr in education; III MTWThF; Bu 123) Curtin
- 153 TEACHING AND SUPERVISION OF ENGLISH IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; prereq 64 or elementary school tchg exper; II MTWThF; Arch 35) Chase
- 165B MATHEMATICS FOR SLOW-LEARNING CHILDREN**  
Units of instruction emphasizing mathematical concepts essential for vocational competence; experimental materials and methods designed to improve performance of low achievers. (3 cr; prereq 62 or 149A or §; I MTWThF; Pt 214) Post
- 179 EDUCATION OF MENTALLY RETARDED CHILDREN IN THE ELEMENTARY SCHOOL**  
Curriculum content, materials, and methods of instruction for educable mentally retarded children. Preparation of units and development of teaching aids. (3 cr; prereq EPsy 184; IV MTWThF; NH 209) Rynders
- 186 LABORATORY IN ELEMENTARY INSTRUCTIONAL PRACTICE**  
Daily observation of elementary classes with discussion of techniques; emphasis on activity units, visual aids, materials, and individual differences. Students enrolling in this class must carry at least one other course in the College of Education. (2 cr; prereq experienced teachers only; observation 4 hrs per wk ar MTWThF, Tuttle School; lect VI TTh, Bu 120) Jensen
- 261\* PROBLEMS: IMPROVEMENT OF INSTRUCTION**  
(Cr and hrs ar; prereq §) Curtin, Chase, Dykstra, Humphreys, Jackson, Lambert, Manning, Odland, Post

## SECONDARY EDUCATION

- 51 DISTRIBUTIVE OCCUPATIONAL EXPERIENCE**  
Observation and practice in distributive businesses combined with weekly seminars on application to the teaching and guidance of high school and post-high school students. (3-9 cr; prereq jr, sr, dist ed majors only, §; hrs ar) Meyer, Ashun
- 101A†† DRIVER EDUCATION I**  
Materials and methods of driver education, building a plan for driver education for a specific school; behind-the-wheel training. Valid Minnesota driver license required. (4 cr; limited to 32 students; prereq Δ; 1:00-2:20 MTWThF; Arch 135) Ar
- 101B†† DRIVER EDUCATION II**  
(4 cr; limited to 32 students; prereq 101 or 101A and Δ; 2:30-3:50 MTWThF; Arch 135) Ar

†† Advance application required; for information write to Dean's Office, College of Education, 204 Burton Hall, University of Minnesota, Minneapolis, Minnesota 55455.

- 112 FAMILY LIFE EDUCATION**  
Sources and types of materials available; techniques; preparation and evaluation of instructional materials. (3 cr; limited to 30 students; III MTWThF; BlegH 105) Hey
- 113 PRINCIPLES OF SECONDARY SCHOOL CURRICULUM**  
Fundamental principles; curricular concepts, special services, student activity programs, instructional instruments, administrative systems and future trends. (3 cr; limited to 50 students; prereq Ed 55B or equiv; II MTWThF; AH 350) Kimpston
- 122A TEACHING LITERATURE IN SECONDARY SCHOOLS**  
(3 cr; prereq Ed 55B or jr-sr high school tchg exper; II MTWThF; Arch 135) Kemp
- 122B TEACHING RHETORIC AND COMPOSITION IN SECONDARY SCHOOLS**  
(3 cr; limited to 30 students; III MTWThF; PeikH 345) Piche
- 124 FOUNDATIONS OF CAREER DEVELOPMENT**  
Vocational theory and career development research; occupational analysis and industrial structure; methods of classifying the world of work; analysis of labor force and employment trends; basic concepts and principles for effective work in educational and vocational planning and development. (3 cr; III MTWThF; NH 122) Borow
- 125 OCCUPATIONAL INFORMATION LABORATORY**  
Using, reviewing, and evaluating occupational information; sources and types of material, occupational filing plans, and practical techniques at the secondary school level. (3 cr; prereq #; VI-VII MWF; PeikH 155) Hansen
- 135 GROUP PROCEDURES IN GUIDANCE**  
Content and materials for homeroom groups, occupations units, and other guidance courses in junior and senior high school. (3 cr; prereq 9 cr in education, EPsy 133 or #; VIII-IX MWF; PeikH 155) Hansen
- 139 COORDINATION TECHNIQUES**  
Problems of coordinators in the cooperative part-time program; guidance and selection; placing students in work stations, assisting job adjustments, developing the training program. (3 cr; I MTWThF; Bu 105) Ashmun
- 140 TEACHING OF SPEECH**  
(3 cr; prereq Spch 5 or 2 and 6 or #; II MTWThF; FolH 103) Borchers
- 141 COOPERATIVE PART-TIME WORK EXPERIENCE PROGRAMS**  
Planning, organizing, curriculum building, plant and equipment, promoting and evaluating cooperative part-time distributive, office, miscellaneous trades, and diversified occupations programs. (3 cr; II MTWThF; Bu 105) Meyer
- 142 BUSINESS AND DISTRIBUTIVE PROGRAMS FOR ADULTS**  
Selection and training of evening school instructors; planning and promoting evening school distributive education classes. (3 cr; II MTWThF; Bu 123) Ashmun
- 144 TEACHING READING IN SECONDARY SCHOOLS**  
(3 cr; prereq 9 cr in education; I MTWThF; Arch 40) Chase
- 146 ISSUES AND TRENDS IN DISTRIBUTIVE EDUCATION**  
(3 cr; prereq sr or grad, #; I MTWThF; Bu 125) Meyer
- 155 MATERIALS LABORATORY FOR SOCIAL STUDIES TEACHERS**  
(3 cr; prereq #; II MTWThF; PeikH 165) F Johnson
- 157 ORGANIZATION AND SUPERVISION OF BUSINESS EDUCATION**  
(3 cr, §200; prereq #; III MTWThF; Bu 105) Driska
- 158 MATERIALS AND METHODS IN OFFICE AND STENOGRAPHIC PROCEDURES**  
Recent research and developments in teaching of office practice, clerical practice, and office machines. (3 cr; IV MTWThF; Bu 105) Driska
- 172 SUPERVISION OF SECONDARY INSTRUCTION**  
Achievement of appropriate teaching expectations focusing on problems of personnel responsible for their improvement. (3 cr; prereq 113; IV MTWThF; PeikH 175) Hill



- 191 ADVANCED TEACHING AND SUPERVISION OF SECONDARY MATHEMATICS**  
Methods, materials, and curriculum development, principles of learning, review of research, preparation and evaluation of units, tests, and materials of instruction. (3 cr; II MTWThF; PeikH 315) David C Johnson
- 192B COMPUTER-ASSISTED MATHEMATICS INSTRUCTION**  
Trends and practices in methods, materials, and curriculum developments in computer science; utilization and evaluation of apparatus; instruction in a simple algorithmic computer language; development of materials. (3 cr; limited to 20 students; prereq 149A or 191 or #; IV-V MWTh; PeikH 315) David C Johnson
- 193A METHODS AND MATERIALS FOR TEACHING THE PHYSICAL SCIENCES**  
Individualized instruction in laboratory techniques and equipment with application to classroom use. (3 cr; limited to 20 students; prereq EdT 68C or 68M or equiv; IV TTh; lab ar MWF; PeikH 375) Boeck
- 195A CURRICULUM DEVELOPMENTS IN SECONDARY ENGLISH AND SPEECH**  
Analysis and evaluation of curricula and trends; emphasis on articulation. (3 cr; prereq EdT 75C or equiv; I MTWThF; PeikH 275) Kemp
- 237 SEMINAR: RESEARCH IN BUSINESS, DISTRIBUTIVE, AND ECONOMIC EDUCATION**  
(No cr; prereq #; hrs ar) Meyer, Price
- 238° PROBLEMS: DISTRIBUTIVE EDUCATION**  
(Cr and hrs ar; prereq #) Meyer, Ashmun
- 239° PROBLEMS: BUSINESS EDUCATION**  
(Cr and hrs ar; prereq #) Price, Driska
- 287° RESEARCH FOUNDATIONS OF SECONDARY SCHOOL SCIENCE TEACHING**  
(3 cr; II MTWThF; PeikH 375) Boeck
- 295 READINGS IN ENGLISH AND MODERN LANGUAGE EDUCATION**  
(1-3 cr; VI MTWThF; Bu 129) Piche, Lange

## HIGHER EDUCATION

- 228° PROBLEMS: HIGHER EDUCATION AND TEACHER EDUCATION**  
Selected topics on college programs, instruction, organization, and administration. (Cr and hrs ar; prereq #) Corcoran, Eckert
- 250 HIGHER EDUCATION IN THE UNITED STATES**  
Development, present status, and outlook for American colleges; purposes; current and projected programs; trends in curriculum instruction and administration; evaluation of outcomes. (3 cr; limited to 30 students; prereq yr of grad study in any field or 18 cr in education; 1:15-3:30 MW; Bu 105) Corcoran
- 252 EFFECTIVE COLLEGE TEACHING**  
Teaching-learning relationship; study and appraisal of methods employed to encourage, guide, and appraise students' learning. (3 cr; prereq yr of grad study in any field or 18 cr in education; II MTWThF; FolH 110) Eckert

## Education (Ed)

- 55A INTRODUCTION TO SECONDARY SCHOOL TEACHING**  
Open only to those students accepted for the regular degree program in the College of Education. Those not previously registered as regular students should apply for admission to the College of Education not later than May 8 in order to allow time for tests, interviews, and approval by the major department. The course is designed principally for those who have finished the junior year with sufficient work in the teaching major to permit their entrance in the fall. (5 cr; each section limited to 30 students; prereq Psy 2; lect I MTWThF; SciCB 175) Kimpston
- Sec 1, II MTWThF, Ph 143, Lindbloom  
Sec 2, II MTWThF, Ph 145, Ar  
Sec 3, III MTWThF, Ph 143, Ar  
Sec 4, III MTWThF, Ph 145, Ar  
Sec 5, IV MTWThF, Ph 143, Ar

**75A INTRODUCTION TO ELEMENTARY SCHOOL TEACHING**

Limited to students accepted for the Bachelor's degree with a major in elementary education in the College of Education. Those not previously registered as regular students should apply for admission to the College of Education not later than May 8 in order to allow time for tests, interviews, and approval by the major department. (5 cr; each section limited to 30 students; prereq Psy 2; lect I MTWThF; Arch 25) Becklund

Sec 1, II MTWThF, Arch 55, Ar  
Sec 2, II MTWThF, Arch 145, Ar  
Sec 3, II MTWThF, Arch 40, Ar

## **History and Philosophy of Education (HEd)**

**90 THE SCHOOL AND SOCIETY**

(3 cr; each section limited to 75 students; prereq sr)

Sec 1, I MTWThF, AH 150, Harkins  
Sec 2, II MTWThF, AH 150, Travisano  
Sec 3, III MTWThF, Arch 40, Travisano

**101 HISTORICAL FOUNDATIONS OF MODERN EDUCATION**

Analysis and interpretation of important elements in modern education derived from the Greeks, Romans, the Middle Ages, and the Renaissance. Background for all other courses in the history and philosophy of education. (3 cr; II MTWThF; NH 122) Beck

**131 COMPARATIVE EDUCATION**

European, Asiatic, and American systems and philosophies of education; explores possibilities of international education. (3 cr; 1:15-3:30 TTh; Bu 105) Corcoran

**141 CRITICAL ISSUES IN CONTEMPORARY EDUCATION**

Introduces graduate students to ideas involved in current theory and practice. (3 cr; III MTWThF; NH 207) Beck

**241° PROBLEMS: HISTORY AND PHILOSOPHY OF EDUCATION**

For graduate students interested in research and work in these areas. (Cr and hrs ar; prereq #) Beck, Corcoran, Bagley

## **Home Economics Education (HEEd)**

**160B HOME ECONOMICS CURRICULUM: COLLEGE LEVEL**

Examination of research and literature; course and program development in home economics in higher education; analysis of current college programs; production and evaluation of curriculum materials. (3 cr, §193B; prereq #; II MTWThF; McNH 102) Whiteford

**161 METHOD IN TEACHING HOME ECONOMICS: THEORY AND TECHNOLOGY**

Derivation of theory for educational method from relevant research; application to the educational objectives of home economics; analysis of technology related to the teaching method. (3 cr, §191; prereq 61, 63, or #; 12:00-2:30 MTWThF; July 1-July 17; McNH 102) Ar

**190 READINGS IN HOME ECONOMICS EDUCATION**

Independent study under tutorial guidance. (1-3 cr; prereq #; hrs ar) Brown, Whiteford

**196C WORKSHOP: FOODS AND NUTRITION (June 10-June 26)**

Problems in teaching at high school and adult levels; use of new materials and techniques; group and individual projects for experienced teachers. (4 cr; limited to 25 students; prereq grad; 8:30-11:30 MTWThF, afternoon ar; McNH 144) Anderson

**201° PROBLEMS: HOME ECONOMICS EDUCATION**

Independent study of current educational problems. (1-9 cr, §293; prereq 200A and #; hrs ar) Brown, Whiteford

**266 SEMINAR: HISTORY AND PHILOSOPHY OF HOME ECONOMICS EDUCATION**

Examination of primary and secondary sources of data to trace the meaning of home economics as a field of study; relation of developments in the field of intellectual forces in society; critical examination of conceptual foundations. Emphasis during any 1 quarter may be on any one of these three areas. (2 cr; prereq 166, 200B; 1:15-3:30 TTh; McNH 103) Brown

**Industrial Education (Ind)****105 ADMINISTRATION OF INDUSTRIAL EDUCATION**

General and vocational phases; objectives, programs, and practices; laws, rulings, and standards for aid; significant literature. (3 cr; prereq 35 or #; II MTWThF; TNCD 113) Nelson

**109 CONFERENCE LEADING FOR INDUSTRY**

Purposes, advantages, and limitations of conference method; techniques of conference procedure; experience in planning, leading, and evaluating conferences and in writing summaries. (3 cr; prereq #; I MTWThF; TNCD 116) Miletich

**115 SUPERVISION OF INDUSTRIAL EDUCATION**

Principles of creative supervision; duties, organization for supervision. (3 cr; prereq 35 or 105; IV MTWThF; TNCD 113) Miletich

**155 CRITICAL ISSUES IN INDUSTRIAL EDUCATION**

Identification, analysis, and discussion of major current problems in the field. (3 cr; III MTWThF; TNCD 113) Moss

**200° RESEARCH PROBLEMS**

Independent work for the degrees, master of arts, Plan B and master of education, Plan Y. Individual conferences. (3, 6, or 9 cr; prereq approval of candidacy for Master's degree; hrs ar MTWThF; TNCD 103) Nelson, Moss

**251 RESEARCH**

Critical analysis of existing research; selection of problems; organization and presentation of projects. (3 cr; prereq #; I MTWThF; TNCD 113) Moss

**Methods and Student Teaching (EdT)****50 JUNIOR PRACTICUM IN SPECIAL EDUCATION**

Supervised observation and participation in classroom and related school activities for exceptional children. A pre-student teaching exploratory experience. (Cr and hrs ar; prereq #) Reynolds

**52†† STUDENT TEACHING**

Open only to students who need a limited number of credits in student teaching to graduate at the end of the First Term. (Cr and hrs ar; limited to 20 students) Mork

**53A TEACHING HANDICAPPED CHILDREN**

Observing work with special classes; teaching under direction. (3 cr; prereq #) Reynolds

**69J†† STUDENT TEACHING IN THE SOCIAL STUDIES**

(1 cr; prereq jr, †Ed 55A) Ar

**77†† STUDENT TEACHING IN THE NURSERY SCHOOL**

Five half days per week in supervised classroom participation. (3 cr; prereq sr, #; hrs ar) McWilliams

†† Student teaching is open only to students in the College of Education regular degree programs. Application must be made prior to May 15. Forms and instructions are available in the Student Teaching Office, 227 Burton Hall.

## Music Education (MuEd)

*See also Music in the section on College of Liberal Arts*

### 56 TEACHING MUSIC IN THE ELEMENTARY SCHOOL

For nonmusic majors. Methods and materials in teaching singing, rhythm, music reading, creativity, classroom instruments, fundamentals, appreciation in K-6. (3 cr; each section limited to 20 students; prereq Mus 4 or exemp)

- Sec 1, I MTWThF, WuH 320, Swanson
- Sec 2, II MTWThF, WuH 320, Swanson
- Sec 3, IV MTWThF, WuH 320, Byrne
- Sec 4, V MTWThF, WuH 320, Byrne

### 61†† STUDENT TEACHING AND SUPERVISION OF MUSIC

(3-12 cr; prereq sr, 53, Ed 55B, §; hrs ar) Caswell, Borg, Turrentine

### 101 PHILOSOPHIES OF MUSIC EDUCATION

Analysis and interpretation of philosophies in music and education; objectives, trends, curriculum evaluation. (3 cr; II MTWThF; ScH 104) Borg

### 114 READING AND STYLISTIC INTERPRETATION OF CHORAL MUSIC

Defining means of teaching choristers to read and interpret music of representative periods and styles of compositions. (3 cr; prereq 104 or §; III MTWThF; ScH 104) Caswell

### 115 ADVANCED STRING TECHNIQUES

Research reports, lecture-demonstrations, and performance by class members and by school age laboratory groups. (3 cr; prereq Bachelor's degree in music education or §; V MTWThF; MusEd 200) Fischer

### 118 ADVANCED WIND AND PERCUSSION TECHNIQUES

Research reports, practical performances, and lectures. (3 cr; prereq Bachelor's degree in music education or §; VII MTWThF; NMA 4) Turrentine

### 125 SELECTION, INSTRUMENTAL MUSIC MATERIALS

Analytical survey of wind instrument literature from the 18th century to the present and a comparative analysis of transcriptions for modern band. (3 cr; prereq sr; IV MTWThF; NMA 5) Turrentine

### 153 SUPERVISION AND ADMINISTRATION OF HIGH SCHOOL MUSIC

Materials, scheduling, and teaching of performance ensembles; courses in theory and literature; individual and class lessons; extracurricular activities. (3 cr; prereq major or minor in music or music education; I MTWThF; ScH 3) Borg, Caswell

### 224\* RESEARCH PROBLEMS

(3-9 cr; prereq knowledge of elementary statistics; hrs ar; ScH 214) Caswell, Borg, Turrentine

## Physical Education

For Special Fees—See page 23

**Professional Physical Education**—Courses are offered for men and women in the undergraduate major and minor in physical education and also at the graduate level that apply toward meeting the certification requirements for teaching physical education in the state of Minnesota. Courses are offered for men that will apply toward the athletic coaching credential requirements. Courses offered this summer that apply toward meeting the requirements in the various programs are as follows:

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†† Student teaching is open only to students in the College of Education regular degree programs. Application must be made prior to May 15. Forms and instructions are available in the Student Teaching Office, 227 Burton Hall.

1. Minor in Physical Education for Women—PEW 5A, 13A, 20A, 23A, 29A and 36A; PEWP 46 and 55; and PE 102.
2. Minor in Physical Education for Men—PEMP 4B, 4C, 50, and 68.
3. Undergraduate Major in Physical Education for Women—PEW 2A, 13A, 20A, 23A, 29A, and 36A; PEWP 22A, 45, 46, and 55; and PE 102.
4. Undergraduate Major in Physical Education for Men—PEMP 4B, 4C, 50, and 68.
5. State of Minnesota Coaching Credential—PEMP 50, 67, 68, and 71, and Hlth 25.
6. An Advanced Degree in Physical Education for Men and Women—PE 102, 106, 115, 118E, 135, 136, 137, 160, 171, 224A, 224B, and 261A.

**Required Physical Education**—Students interested in meeting a college requirement in physical education or in taking activity courses for elective credit may register for PEW 5B, 13A, 15A, 19A, 20A, 23A, 28A, 29A, 36A and 36B; for PEWP 46A; for PEM 5A, 5B, 7A, 15A, 19A, 19B, 23A, 28A, 29A, 36A, and 36B.

**Elementary School Majors**—PEWP 45 and 70 are being offered this summer to accommodate elementary school education majors and also classroom teachers wishing help with the planning and selection of appropriate units of instruction and methods in health and physical education for children of elementary school age.

## **Physical Education for Men (PEM, PEMP, PE)**

### **ACTIVITY COURSES (PEM)**

- 5A†† SWIMMING**  
(1 cr; limited to 24 students; VI MTWTh; CH Pool) Walker
- 7A†† WATER SAFETY INSTRUCTOR**  
(2 cr; limited to 24 students; prereq current American Red Cross Life Saving Certificate; VI-VII MWF; NGW 58; co-ed, see PEWP 46) Stower
- 15A†† FOLK AND SQUARE DANCE**  
(1 cr; limited to 35 students; IV MTWTh; NGW 153; co-ed, see PEW 15A) Piper
- 23†† ARCHERY**  
(See PEW 23A)
- 28A†† FENCING**  
(See PEW 28A)
- 29A†† GOLF**  
(1 cr; each section limited to 24 students)  
Sec 1, 12:30-1:45 MW, Golf Course, Bolstad  
Sec 2, 12:30-1:45 TTh, Golf Course, Bolstad
- 36A†† TENNIS**  
(1 cr; each section limited to 24 students)  
Sec 1, 12:30-1:45 MW, CH 215, Piper  
Sec 2, 12:30-1:45 TTh, CH 215, Piper

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†† Health Service approval must be secured for participation in this course.

- 36B†† TENNIS**  
(1 cr; limited to 24 students; prereq 36A or equiv; 1:45-3:00 TTh; CH 215; co-ed, see PEW 36B) Piper

#### PROFESSIONAL COURSES OPEN TO MEN ONLY (PEMP)

- 4B†† BASKETBALL FUNDAMENTALS**  
Demonstration and practice; individual and team offensive and defensive tactics. (1 cr; limited to 24 students; II MTWThF; CH 214) Hanson
- 50 HUMAN ANATOMY**  
Emphasizes bones, nerves, and muscles and their significance in physical education. (3 cr; I MTWThF; CH 206) Osell
- 68 BASKETBALL COACHING**  
Theory, styles of offense and defense, the conditioning and handling of players. (2 cr; prereq 4B or equiv; III MTWThF; CH 214) Kundla
- 71 PHYSIOLOGICAL APPLICATIONS TO SPORTS**  
Consideration of muscular contraction with applications for strength development programs; contributions of training to endurance speed and skill acquisition; influence of training on the cardiovascular system; fatigue and recovery; early season training, pregame meals and ergogenic aids in athletics. Required for the Minnesota Coaching Certificate. (3 cr, §PubH 91, 92; prereq 50 or Anat 27; V MTWThF; CH 420) Donnelly

#### PROFESSIONAL COURSES OPEN TO MEN AND WOMEN (PEMP)

- 4C†† TRACK FUNDAMENTALS**  
Demonstrations and practice in all track and field events. (1 cr; limited to 24 students; IV MTWThF; CH 214) Griak
- 45†† INTRODUCTION TO PHYSICAL EDUCATION ACTIVITIES FOR THE ELEMENTARY SCHOOL**  
(See PEWP 45)
- 70 TEACHING HEALTH AND PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL**  
(See PEWP 45)

#### PROFESSIONAL COURSES OPEN TO MEN AND WOMEN (PE)

- 106 CURRICULUM DEVELOPMENT**  
Trends, issues, and problems at selected levels of interest: elementary, secondary, junior college. For experienced teachers. (3 cr; prereq 102 or equiv; II MTWThF; CH 206) Torpey
- 115 ADVANCED KINESIOLOGY**  
(See PEW)
- 118E PROBLEMS**  
Focus on teaching of physical education. (Cr and hrs ar; prereq MEd candidate, §) McAdam
- 136 INTRODUCTION TO RESEARCH**  
(See PEW)
- 137 READINGS: PHYSICAL EDUCATION**  
Independent study under tutorial guidance. (1-3 cr; prereq grad. §; hrs ar) McAdam
- 160 PRACTICUM: PREVENTION AND CARE OF ATHLETIC INJURIES**  
An overview of problems (recognition, principles, responsibilities) related to athletic injuries in girls' and in boys' secondary and college programs. Demonstration and practice in training technique and familiarity with the use of instruments for athletic rehabilitation. (3 cr; prereq §; limited to 50 students; 1:30-5:00 MTWThF, July 1-12; CH 215) McAdam, Stein

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†† Health Service approval must be secured for participation in this course.

- 224A° RESEARCH PROBLEMS**  
Designing, reporting on individual problems. Required of all M.A. and Ph.D. candidates. (3 cr; prereq 136, EPsy 116 or §; V MTWThF; CH 214) Donnelly
- 224B° RESEARCH PROBLEMS**  
Individual problems. (Cr and hrs ar; prereq 224A or §) McAdam
- 236 LABORATORY RESEARCH TECHNIQUES**  
(See PEW)
- 261A SEMINAR: CONTEMPORARY PROBLEMS IN PHYSICAL EDUCATION**  
Individual presentation and class discussion of studies and contemporary problems selected by class members. (3 cr; prereq 136 and §; III MTWThF; CH 206) McAdam

## Physical Education for Women (PEW, PEWP, PE)

### ACTIVITY COURSES (PEW)

- 5A†† SWIMMING**  
For nonswimmers. Course includes aquatic breathing, floating, bobbing, treading, finning, human stroke, elementary back stroke, side stroke, front crawl. (1 cr; limited to 24 students; V MTWThF; NGW 58) Mero
- 13A†† POSTURE AND INDIVIDUAL EXERCISE**  
Individually selected exercises for various purposes such as: general muscle toning, correction of functional posture deviations, weight control, relaxation. (1 cr; limited to 22 students; I MTWThF; NGW 153A) Shick
- 15A†† FOLK AND SQUARE DANCE**  
(1 cr, PEWP 22A; limited to 35 students; IV MTWTh; NGW 153; co-ed, see PEM 15A) Piper
- 20A†† TUMBLING, FLOOR EXERCISE, AND TRAMPOLINE**  
Development of basic skills in tumbling, floor exercise, and trampoline. Attention given to composing and performing individual routines within the limits of own skill. (1 cr; limited to 24 students; I MTWTh; NGW 153) Mero
- 23A†† ARCHERY**  
Instruction in target shooting covers the fundamentals of shooting; safety; terminology; rules and scoring; selection and care of equipment. (1 cr; limited to 22 students; VI MTWTh; NGW 60; co-ed, see PEM 23A) Shick
- 28A†† FENCING**  
Instruction in the basic techniques of fencing, offense, and defense with experience in fencing bouts. (1 cr; limited to 22 students; V MTWTh; NGW 153; co-ed, see PEM 28A) Shick
- 29A†† GOLF**  
Class and individual instruction in the fundamentals of golf, rules, etiquette, and terminology. (1 cr, §PEWP 22B; each section limited to 24 students)  
Sec 1, I MTWTh, NGW 60, Plack  
Sec 2, II MTWTh, NGW 60, Plack  
Sec 3, III MTWTh, NGW 60, Shick
- 36A†† TENNIS**  
Course includes fundamental strokes such as service, forehand and backhand drives, and volley; court positions and strategy for singles and doubles; rules, terminology, and etiquette. (1 cr, §PEWP 22C; each section limited to 24 students)  
Sec 1, I MTWTh, NGW 151, Ost  
Sec 2, II MTWTh, NGW 151, Ost  
Sec 3, III MTWTh, NGW 151, Salmi  
Sec 4, IV MTWTh, NGW 151, Salmi

†† Health Service approval must be secured for participation in this course.

- 36B†† TENNIS**  
(1 cr; limited to 24 students; prereq 36A or equiv; 1:45-3:00 TTh; CH 215; co-ed, see PEM 36B) Piper

#### PROFESSIONAL COURSES OPEN TO WOMEN ONLY (PEWP)

- 55†† TEACHING OF INDIVIDUAL AND TEAM SPORTS**  
General methods of teaching sports; techniques for class organization; skill analysis; individual and group guidance; evaluations; applications of methods to badminton, golf, tennis, ball team sports, volleyball, basketball, and softball, observations and practical experience. (3 cr; prereq 20A, 20B, 21A, 22B, 22C, 22D; V MTWThF; NGW 60, 151, 201) Hauptfuehrer

#### PROFESSIONAL COURSES OPEN TO MEN AND WOMEN (PEWP)

- 4C†† TRACK AND FIELD**  
(See PEMP 4C)
- 45†† INTRODUCTION TO PHYSICAL EDUCATION ACTIVITIES FOR THE ELEMENTARY SCHOOL**  
Laboratory course for PEW 70. Experience with graded activities for the elementary school child; problems of organization and teaching progressions considered. (2 cr; each section limited to 30 students; prereq soph)
- Sec 1, III MTWThF, CH 421, Torpey  
Sec 2, IV MTWThF, CH 215, Torpey
- 46†† WATER SAFETY INSTRUCTOR'S COURSE**  
Methods and procedures related to organization, content, and teaching of swimming and life saving; opportunity to qualify for the American Red Cross Water Safety Instructor's Certificate. Pool control and sanitation. (2 cr, §PEW 7A; limited to 24 students; prereq current American Red Cross Life Saving Certificate; VI-VII MWF; NGW 58; co-ed, see PEM 7A) Stoner
- 70 TEACHING HEALTH, PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL**  
Methods of instruction in health and physical education for the elementary education major. (3 cr, §Hlth 70; each section limited to 40 students)
- Sec 1, II MTWThF, NGW 201, Hauptfuehrer  
Sec 2, IV MTWThF, NGW 201, Plack

#### PROFESSIONAL COURSES OPEN TO MEN AND WOMEN (PE)

- 106 CURRICULUM DEVELOPMENT**  
(See PEM)
- 115 ADVANCED KINESIOLOGY**  
Techniques of mechanics and kinesiology of movement; skills; evaluation of pertinent research methods and devices; application to individual projects. (3 cr; prereq undergrad course in kinesiology or §; I MTWThF; NGW 3) Wilson
- 118E PROBLEMS**  
Focus on teaching of physical education. (Cr and hrs ar; prereq MEd candidate, §) Jaeger, Slocum, Wilson
- 136 INTRODUCTION TO RESEARCH**  
Methods and design for research in health, physical education, and recreation. (3 cr; prereq §; V MTWThF; NGW 3) Wilson
- 137 READINGS: PHYSICAL EDUCATION**  
Independent study under tutorial guidance. (1-3 cr; prereq sr, honor, grad, §; hrs ar) Jaeger, Wilson
- 160 PRACTICUM: PREVENTION AND CARE OF ATHLETIC INJURIES**  
(See PEM)

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†† Health Service approval must be secured for participation in this course.



- 224A° RESEARCH PROBLEMS**  
Designing, reporting on individual problems. Required of all M.A. and Ph.D. candidates. (3 cr; prereq 136, EPsy 116 or ‡; V MTWThF; CH 214) Donnelly, Jaeger
- 236 LABORATORY RESEARCH TECHNIQUES**  
Demonstration and student participation in laboratory procedures involving assessments of exercise parameters. (3 cr; prereq 136 or ¶136; IV MTWThF; CH 206) Stoner
- 261A SEMINAR: CONTEMPORARY PROBLEMS IN PHYSICAL EDUCATION**  
(See PEM)

## **Recreation and Park Administration (Rec)**

Courses for the summer terms include offerings in recreation program planning, therapeutic recreation, recreation for the aging, and supervised field work.

- 90 FIELD EXPERIENCE**  
(1-9 cr [9 cr req for majors, 3 cr req for minors] §84-85; prereq sr, recreation major or minor) Chapman, Scott
- 112 RECREATION PROGRAM PLANNING**  
Principles of program planning for an organized offering of recreation opportunities. (3 cr; prereq 20 or ‡; I MTWThF; CH 215) Schultz
- 118E PROBLEMS**  
Focus on conduct of recreation programs. (Cr and hrs ar; prereq MED candidate, ‡) Chapman
- 137 READINGS: RECREATION**  
Independent study under tutorial guidance. (1-3 cr; prereq ‡; hrs ar) Schultz, Scott
- 141 INTRODUCTION TO THERAPEUTIC RECREATION**  
General field of recreation in hospitals as background for the recreation leader, hospital administrator, and other personnel. (3 cr; prereq ‡; IV MTWThF; CH 206) Scott
- 145 RECREATION FOR THE AGING**  
Examination of leisure problems of the aging citizen; modification of program activities; investigation of community resources; trends and developments in recreation planning. (3 cr; prereq ‡; III MTWThF; CH 215) Schultz
- 224B° RESEARCH PROBLEMS**  
Individual problems. (Cr and hrs ar; prereq 224A or ‡) Chapman
- 251 PRACTICUM—THERAPEUTIC RECREATION**  
Supervised experiences in program operation; administrative and supervisory duties. (3-9 cr; prereq 12 grad cr in recreation; hrs ar) Chapman

## **School Health Education (Hlth)**

**Teaching Requirements for School Health Education**—Those interested in teaching school health education in the state of Minnesota may qualify through one of the following professional programs.

1. Courses offered this summer which apply to the minor in school health education are Hlth 25, 103, and 114.
  2. Courses offered this summer which apply to advanced and graduate degrees in school health education are Hlth 103, 114, 137, 224,\* 224B.\*
- 25 AMERICAN RED CROSS STANDARD ADVANCED FIRST AID**  
Lectures, demonstrations, and practice in emergencies and first aid treatment. American Red Cross Standard and Advanced Certificate in First Aid received

upon successful completion of the course. (2 cr; limited to 35 students; V MTWThF; NGW 201) Ost

- 70 TEACHING HEALTH AND PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL**  
Methods of instruction for elementary education majors. (3 cr, §PEWP 70; prereq elementary education majors; each section limited to 45 students)  
Sec 1, II MTWThF, NGW 201, Hauptfuehrer  
Sec 2, IV MTWThF, NGW 201, Plack
- 103 ROLE OF THE SCHOOL HEALTH EDUCATOR IN HEALTH APPRAISAL**  
Role of school medical and dental advisers, nurse, teachers, health educator, and other school personnel in health protection and maintenance phases. (3 cr; prereq #; IV MTWTh; NGW 3) Slocum
- 114 ADMINISTRATION OF THE SCHOOL HEALTH EDUCATION PROGRAM**  
Coordination of total program; health supervision and guidance; relationships between public schools and government health organizations and agencies; evaluation; guidance in the solution of individual professional problems. (3 cr; prereq 83, PubH 50 or equiv or #; II MTWThF; NGW 3) Slocum
- 118E PROBLEMS**  
Focus on teaching of school health education. (Cr and hrs ar; prereq MED candidate, #) Slocum
- 119 SAFETY EDUCATION**  
The scope and nature of the accident problem in our society and the study of curricular areas leading to accident prevention. (4 cr; prereq sr; limited to 50 students; 10:15-11:45 MTWThF; Arch 145) Guthmann
- 137 READINGS: HEALTH EDUCATION**  
Independent study under tutorial guidance. (1-3 cr; prereq sr, honor, grad, #; hrs ar) Slocum
- 224° RESEARCH PROBLEMS**  
Designing, reporting on individual problems. Required of all M.A. and Ph.D. candidates. (3 cr; prereq PE 136, EPsy 116 or #; V MTWThF; CH 420) Donnelly
- 224B° RESEARCH PROBLEMS**  
Individual problems. (Cr and hrs ar; prereq 224A or #) Slocum

# General College (GC)

*For general information on the General College, see section on Schools, Colleges, and Special Programs.*

## 2B FIELDS OF APPLIED PSYCHOLOGY

This survey examines the contributions of psychology, as a technology of behavior to areas such as teaching and learning, vocational guidance, mental health, personnel selection and training in industry, law and crime, and consumer research and advertising. (3 cr; III MTWThF; NH 213) Eichinger

## 3A HOME LIFE: MARRIAGE AND FAMILY LIVING

The particular values of family life for the individual and for society are traced by study of biological, psychological, and sociological foundation of the family. Study is made of adjustment and human relationships in the student's present and future home life, preparation for marriage, factors associated with success or failure in marriage, problems of parenthood, and problems of old age. (3 cr; III MTWThF; NH 216) W Anderson

## 5B FUNCTIONS AND PROBLEMS OF LOGIC

The student studies and attempts to apply the rules and procedures of sound argument and valid inference. He is shown the relationship of formal patterns of reasoning to such uses of ordinary language as argument, propaganda, and persuasion. (3 cr; IV MTWThF; NH 213) Pavlos

## 9B BASIC CONCEPTS IN MATHEMATICS

Designed to familiarize the student with newer trends in mathematical thinking, the course deals with set theory, structure of mathematical systems, systems of numeration, the number systems of elementary mathematics, function concepts, and space concepts. In the context of the modern approach, the student should improve his knowledge and skill in algebra, graphical representation, and geometry. (5 cr; I-II MTWThF; NH 207) Denny

## 10A PRINCIPLES OF BIOLOGY

A study of the variety and relationships of living organisms illustrates the general principles of biology as to man, animals, and plants. These principles are drawn from fields such as the study of cells, relationships of organisms in nature, heredity, chemical and physical properties of living organisms, evolution, and reproduction. Films and demonstration laboratories supplement the lectures. (5 cr; I-II MTWThF, SciCB 125; lab hrs ar) Dearden

## 11A MAN AND HIS ENVIRONMENT: SCIENCE IN CONTEXT

In dealing with the interdependence of man and his environment, this course brings the biological sciences to bear on problems arising from changes made by man in the balance of nature. Study centers around such topics as the history of biology, human evolution, population explosions, contamination of food chains, pollution of water and atmosphere, nuclear fallout, and space ecology. (5 cr; III-IV MTWThF; SciCB 125) Liston

## 15 INTRODUCTION TO MODERN BUSINESS

Provides an overview of the major functions of a business organization, including production, marketing, finance, and personnel. It is a useful introductory course for students planning to do more work in business, but it is also recommended for those who want a brief survey of the business field. Lectures supplemented by cases, business games, and films. (5 cr; I-II MTWThF; NH 216) Hower

## 17A CONSUMER PROBLEMS

Provides an understanding of our economic system from the viewpoint of the consumer. Emphasis is on financial planning and personal economic decision making, and the application of these concepts to specific problems of buying insurance, saving and investing, using credit facilities, and obtaining and evaluating consumer information. (3 cr, §17A or B; IV MTWThF; NH 207) Roger Larson

**31 GENERAL ARTS**

An opportunity is given the student to examine the basic similarities which underlie all art forms, and to investigate these art forms in terms of human needs. The arts concentrated on are painting, sculpture, music, architecture, and literature. (3 cr; II MTWThF; NH 111) Byrne

**29A WORLD LITERATURE I**

Seeks to integrate life and literature and to relate the student's experience to certain universal themes concerning personal relationships and spiritual values of mankind. Readings are in both ancient and modern Oriental and Western literature. (3 cr; II MTWThF; NH 213) Wyvell

**30A READING AND VOCABULARY DEVELOPMENT**

Reading films, slides, programmed learning texts, and reading and vocabulary exercises help the student enlarge his vocabulary, increase his reading speed, and expand his comprehension. Reading material varies from the level of the popular magazine to the college textbook. (3 cr; III MTWThF; FoH 109) Kurak

**31A WRITING LABORATORY: PERSONAL WRITING**

To increase awareness of himself, his surroundings, and his relationships with friends and family, the student reads and writes descriptions, incidents, character and autobiographical sketches. He works on his own writing difficulties, dictionary usage, and brief study of the history and development of language. (3 cr)

Sec 1, I-II MTWTh, NH 201, Reisman

Sec 2, III-IV MTWTh, NH 201, Rathburn

**41A MAN IN SOCIETY: HIS PERSONAL ROLE**

The nature of social problems is probed by application of methods from several social science disciplines. A study of the American value system stresses the conflicts in values which contribute to the development of specific social problems. There is intensive study of a particular social problem; race relations within American society. The role of the individual is emphasized. (5 cr; III-IV MTWThF; JohH 122) Wold

**43A BACKGROUND OF THE MODERN WORLD**

Dealing primarily with the history of modern Europe, three major themes are studied: the nation state, industrialism, and modern science. The student learns how each of these originated in Europe, in what direction they have developed, and how they have spread to other parts of the world. (3 cr; IV MTWThF; NH 216) D Jones

**46A PROBLEMS OF AMERICAN GOVERNMENT**

The general principles, procedures, and problems of government are studied. Among the problems considered are federal-state relations; conduct of foreign relations; the relations of government to agriculture, labor, and business; taxation; and the relationship of the individual citizen with his government. (3 cr; I MTWThF; NH 213) Hathaway

# College of Liberal Arts

*For general information on the College of Liberal Arts, see section on Schools, Colleges, and Special Programs.*

## American Studies (AmSt)

(See section on Special Programs)

- Hum 23 AMERICAN LIFE III**  
The rise of American intellectual and cultural nationalism and its place in the modern world. (3 cr; I MTWThF; VH 6) Norberg
- 101-201 INTRODUCTION TO AMERICAN STUDIES**  
Exposition of interdisciplinary methods and of the concept of American Studies; reading of classics in American civilization. (3 cr; limited to 12 students; open to MA candidates in American Studies and other qualified students; prereq  $\Delta$ ; V-VI MTh; VH 6) Herreshoff
- 251 INDEPENDENT READINGS IN AMERICAN CIVILIZATION**  
(Cr ar; prereq consent of program chairman) Staff

## Anthropology (Anth)

- 2A INTRODUCTION TO ANTHROPOLOGY; CULTURAL ANTHROPOLOGY**  
Varieties and range of human behavior as revealed through study of primitive societies in all parts of the world. Scientific analysis of the ways in which primitive men organize their lives, directed toward a deeper and broader understanding of human capacities and purposes. (3 cr; III MTWThF; ForH 155) Spencer
- 68 RELIGION AND CULTURE**  
Introduction to comparative study of religion in its cultural context. (3 cr; prereq 2A or 100; especially suitable for nonmajors; II MTWThF; ForH 185) Hermitte
- 80 INDIANS OF NORTH AMERICA**  
Survey: aboriginal cultures of North America. Effects of culture contact. Contemporary problems of Indian reservations and communities. (3 cr; prereq 2A or 100; IV MTWThF; ForH 55) Spencer
- 101 PRINCIPLES OF BIO-CULTURAL EVOLUTION**  
Intensive survey; human biological and cultural origins and evolution. Emphasis on interpretation of paleontological and archaeological record. (3 cr, §1A; may be taken in lieu of 1A; I MTWThF; ForH 155) Peterson
- 117 INDIANS OF SOUTH AMERICA**  
Ethnographic survey. Prehistory of various areas. Spanish and Portuguese contact and adjustment of various tribes to modern conditions. (3 cr; prereq 2A or 100; IV MTWThF; ForH 40) Hermitte
- 140 FIELD RESEARCH IN ARCHAEOLOGY**  
Archaeological field excavation, survey, and research in the excavation of various prehistoric sites in the state of Minnesota. Intensive training in excavation techniques, recordation, analysis, and interpretation of archaeological materials. (6 cr [may be taken for cr only once]; limited to 20 students; prereq 90 and  $\Delta$ ) Johnson
- 173 HUMAN BIOLOGY**  
Evolutionary processes in the differential development of races. Physical characteristics, distribution, and relationships of living races of mankind. Human

genetics, particularly of blood types in racial analysis. Influence of various environments on man. (3 cr; prereq 1A, 101, or  $\Delta$ ; III MTWThF; ForH 55) Peterson

190, 191, 192 **DIRECTED RESEARCH**  
(Cr and hrs ar; prereq sr,  $\Delta$ ) Staff

## Art History (ArtH)

### 1 **PRINCIPLES OF ART**

Lecture course on basic problems of art. Examples from the painting, sculpture, and architecture of various periods will be used to illustrate general cultural factors that influence the production of art as well as basic problems of design and of technique. (3 cr, §50; II MTWThF; Arch 25) Torbert

### 2 **SURVEY: HISTORY OF ART**

Expression of Western civilization in architecture, sculpture, and painting; from prehistory including Egypt, Mesopotamia, Crete, Persia, Greece, and Rome. (3 cr, §56; IV MTWThF; Arch 25) Waldfogel

### 4 **SURVEY: HISTORY OF ART**

From 15th to 18th century, including Renaissance, 16th century, baroque and rococo periods. (3 cr, §58; III MTWThF; Arch 25) Canedy

### 50 **INTRODUCTION TO THE VISUAL ARTS**

Similar to Art 1 in organization and basic content. Expanded program of reading and more extensive contact with works of art. (3 cr, §1; II MTWThF; Arch 25) Torbert

### 56 **SURVEY: HISTORY OF ART**

Similar to ArtH 2 in organization and basic content. Expanded program of reading and contact with works of art. (3 cr, §2; IV MTWThF; Arch 25) Waldfogel

### 58 **SURVEY: HISTORY OF ART**

Similar to ArtH 4 in organization and content. Expanded program of reading and contact with works of art. (3 cr, §4; III MTWThF; Arch 25) Canedy

### 59 **SUMMER TRAVEL COURSE IN EUROPEAN ART**

Conducted by Department of Art History under auspices of Summer Session. Main phases of ancient, medieval, Renaissance, baroque, and modern art. Guided visits and discussions at important cultural centers, museums, and cathedrals. Cities and sites usually visited: Athens, the Greek Islands, Delphi, Corinth, Mycenae, Rome, Assisi, Siena, Florence, Ravenna, Venice, Salzburg, Innsbruck, Munich, Copenhagen, London, Stonehenge, Winchester, Paris, Versailles, Chartres. (6 cr; prereq §; about June 28 to August 12, approx 6 wks in Europe; may be taken as 159) Michels

### 108 **LATE FIFTEENTH-CENTURY ART IN ITALY AND NORTHERN EUROPE**

Survey of painting, sculpture, and architecture in central and northern Italy. Emphasis on painting including Piero della Francesca, Botticelli, Ghirlandaio, Mantegna, Antonello da Messina, and Giovanni Bellini. Northern European painting including Hugo van der Goes and Bosch. (3 cr; prereq sr, grad or §; V MTWThF; J 207b) Canedy

### 148 **MODERN AMERICAN AND EUROPEAN ARCHITECTURE**

Development of modern architecture on international scene. Later works of pioneers. Wright, Berlage, Behrens, Gropius, Mies, Le Corbusier and their influence. Modern uses of concrete; Wright, Perret, Nervi, Torroja, Candella, Tange, Saarinen. (3 cr; prereq sr, grad or §; IV MTWThF; J 207b) Torbert

### 157 **NINETEENTH-CENTURY FRENCH PAINTING, IMPRESSIONISM AND POST-IMPRESSIONISM, 1860-1900**

Realism of Manet and Degas, impressionist idea and its evolution, multiple styles of postimpressionists, and aestheticism, symbolism, and mysticism of the 1890's. (3 cr; prereq sr, grad or §; II MTWThF; J 207b) Waldfogel

## Classics

### Classics (Clas)††

- 45 GREEK AND ROMAN MYTHOLOGY**  
 Classical myths which acquaint the student with the stories of the gods, demi-gods, and heroes which are a basic component of the European cultural heritage, with attention to their artistic, religious, psychological, and anthropological interpretations. (3 cr, §42, §42A, §145; V MTWThF; Ph 133) Kraabel
- 80 CLASSICAL EPIC IN TRANSLATION**  
 Reading of Homer's *Iliad*, *Odyssey*, Virgil's *Aeneid*, with attention to the cultural context of epic, the heroic character, epic formulas, and poetic techniques. (3 cr, §180; prereq 9 cr in English literature, English beyond C, or in foreign literature, or Δ; IV MTWThF; Pt 204) Schork
- 145 GREEK AND ROMAN MYTHOLOGY**  
 Same class work as Clas 45 but with special independent reading and research assignments in consultation with the instructor. (3 cr, §42, §42A, §45; V MTWThF; Ph 133) Kraabel
- 180 CLASSICAL EPIC IN TRANSLATION**  
 Meets with Clas 80 but students do additional work for advanced credit. (3 cr, §80; prereq grad or §; IV MTWThF; Pt 204) Schork

### Greek (Grk)

- 63 HOMER**  
 (3 cr; prereq 1 yr Greek; II MTWThF; FolH 108) Schork
- 121 GREEK TEXT COURSE**  
 Meets with Grk 63 but students will do supplementary work at discretion of instructor. (3 cr; prereq grad in field other than classics; II MTWThF; FolH 108) Schork
- 174D DIRECTED READING**  
 Meets with Grk 63 but students will do extra work for graduate credit. (3 cr; prereq grad in classics; II MTWThF; FolH 108) Schork

### Latin (Lat)

- 64 SILVER LATIN: POEMS OF MARTIAL**  
 (3 cr; prereq 1 yr college Latin or 3 yrs high school Latin; III MTWThF; CD 105) Sonkowsky
- 121 LATIN TEXT COURSE**  
 Meets with Lat 64 but students will do supplementary work at discretion of instructor. (3 cr; prereq grad in field other than classics; III MTWThF; CD 105) Sonkowsky
- 174D DIRECTED READING**  
 Meets with Lat 64 but students will do extra work for graduate credit. (3 cr; prereq grad in classics; III MTWThF; CD 105) Sonkowsky

†† No knowledge of Latin or Greek is required.

# Economics (Econ)

## 1 PRINCIPLES OF ECONOMICS

Principles underlying economic activity and the economic institutions within which economic units function. National income, money and banking, business cycles, and international trade. Econ 1-2 or equivalent are prerequisite for most advanced courses in business administration and economics. (3 cr, †1-2, §1T, §C, §50A; prereq 3rd qtr fr)

- Sec 1, I MTWThF, BlegH 230, Staff
- Sec 2, II MTWThF, BlegH 230, Staff
- Sec 3, III MTWThF, BlegH 230, Coen
- Sec 4, IV MTWThF, BlegH 230, Staff
- Sec 5, V MTWThF, BlegH 230, Staff

## 2 PRINCIPLES OF ECONOMICS

(Continuation of Econ 1) Demand and supply, competition and monopoly, and the distribution of income. (3 cr, †1-2, §2T, §C, §50B; prereq 1 or equiv)

- Sec 1, II MTWThF, BlegH 120, Staff
- Sec 2, III MTWThF, BlegH 120, Staff

## 65 INTERMEDIATE ECONOMIC ANALYSIS I

Behavior of firms and industries under competitive and monopolistic conditions; factors influencing production, price, and advertising decisions. (3 cr, §65T, §165; prereq 1-2 or †)

- Sec 1, II MTWThF, BlegH 135, Coen
- Sec 2, III MTWThF, BlegH 220, Richter

## 66 INTERMEDIATE ECONOMIC ANALYSIS II

Determinants of national income, employment, and price level; attention given to aggregate consumption and investment. (3 cr, §66T, §166; prereq 1-2 or †; II MTWThF; BlegH 140) Foster

## 67 MONEY AND BANKING

Historical development, present pattern, and economic role of financial institutions, with special emphasis on commercial banks, the money supply, and the Federal Reserve System. (3 cr; prereq 66 or equiv; II MTWThF; BlegH 415) Wallace

## 68 ELEMENTS OF PUBLIC FINANCE

Survey of government expenditures, budgeting, fiscal policy, debts, and taxes in terms of fiscal institutions, impact on business and the economy, and policy issues. (3 cr; prereq 66 or equiv; III MTWThF; BlegH 130) Foster

## 69 GOVERNMENT REGULATION OF BUSINESS

Economic aspects of public policy affecting the market process. Relations between market structure and economic efficiency and welfare; economic origins of monopoly and other business limitations on free competition; purposes and effect of antitrust laws and laws relating to "unfair business practices." (3 cr; prereq 65 or equiv for business or economics majors, suitable background in law or political science for others, or †; IV MTWThF; BlegH 415) Buttrick

## 103 ECONOMIC DEVELOPMENT

Conditions necessary for increasing income; capital formation, measurement of economic growth, and problems of underdeveloped areas. (3 cr, §103A; not open to economics majors; prereq 2 or equiv; III MTWThF; BlegH 125) Buttrick

## 103A ECONOMIC DEVELOPMENT

Conditions necessary for increasing income; capital formation, measurement of economic growth, and problems of underdeveloped areas. (3 cr, §103; prereq 65, 66 or equiv or †; III MTWThF; BlegH 125) Buttrick

## 165 ELEMENTS OF ECONOMIC ANALYSIS: FIRM AND HOUSEHOLD

Individual decision making by households and by firms under conditions of monopoly, competition; some welfare economics. (3 cr, §65; prereq grad or †; III MTWThF; BlegH 220) Richter

## 166 ELEMENTS OF ECONOMIC ANALYSIS: INCOME AND EMPLOYMENT

Determinants of national income, employment, and price level; aggregate consumption, investment, and asset holding. (3 cr, §66; prereq grad or †; II MTWThF; BlegH 140) Foster



- 176A **ECONOMIC ANALYSIS II: INCOME THEORY**  
General equilibrium models from which may be determined the real output, employment, price level, and rate of interest. Effects of government fiscal and monetary policies on these equilibrium values. (3 cr; prereq 166 or equiv or §; IV MTWThF; BlegH 120) Wallace
- 185A **ECONOMIC ANALYSIS I: PRICE THEORY**  
Theories of choice as applied to consumers, firms and resource owners, economic behavior in competitive and monopoly market situations. (3 cr; prereq 165 or equiv; II MTWThF; BlegH 225) Richter
- 190 **READINGS IN ECONOMICS**  
Areas useful to individual programs and objectives not available in regular course offerings. (Cr ar; prereq consent of adviser and §) Staff
- 290 **INDIVIDUAL GRADUATE RESEARCH**  
(Cr ar) Staff

## English (Engl) §§

- 1 **FRESHMAN ENGLISH**  
(3 cr, §Engl A or §1A or §1B or §10H or §Comm 1; each section limited to 28 students; prereq assignment to Category 1, or 1A, or 2)  
Sec 1, I MTWThF, VH 205, Haga  
Sec 2, II MTWThF, VH 205  
Sec 3, III MTWThF, VH 205, Haga  
Sec 4, IV MTWThF, VH 205  
Sec 5, IV MTWThF, VH 307
- 3 **FRESHMAN ENGLISH**  
(3 cr, §Engl C or §3A or §3B or §12H or §Comm 3; each section limited to 28 students; prereq 2)  
Sec 1, I MTWThF, VH 303  
Sec 2, I MTWThF, VH 307  
Sec 3, II MTWThF, VH 307
- 22 **INTRODUCTION TO LITERATURE**  
Milton, the Restoration and 18th century. (6 cr; prereq ††; I-II MTWThF; VH 207) Leyasmeyer
- 23 **INTRODUCTION TO LITERATURE**  
The Romantic movement and the Victorians. (6 cr; prereq ††; I-II MTWThF; VH 301) Haley
- 55 **SHAKESPEARE**  
The reading of plays from Shakespeare's early and middle periods: *Richard II*, *A Midsummer Night's Dream*, *The Merchant of Venice*, *Hamlet*, and two or three other plays from the early and middle periods. (3 cr; limited to 35 students; prereq ††, may not be taken concurrently with 56)  
Sec 1, III MTWThF, VH 301  
Sec 2, III MTWThF, VH 307, Durham
- 56 **SHAKESPEARE**  
The reading of plays from middle and late periods: *Twelfth Night*, *King Lear*, *Macbeth*, *The Tempest*, and two other plays from the middle and late periods. (3 cr; limited to 35 students; prereq 55, may not be taken concurrently with 55; III MTWThF; VH 207) Steinmann
- 72 **AMERICAN LITERATURE**  
The beginnings through Melville. (3 cr; prereq ††; IV MTWThF; VH 207) Alsen

†† 5 credits in literature, English or American, exclusive of Freshman English.

‡‡ Completion of or exemption from Freshman English requirement.

§§ Credit in English will be allowed for certain classics courses numbered between 40 and 82. Consult English Department for approval.

- 75 **CHAUCER**  
The reading of selections from *The Canterbury Tales* with an introduction dealing with the grammar and literary forms of 14th-century English. (6 cr; prereq ††; I-II MTWThF; VH 2) Joseph
- 90H **MAGNA HONORS THESIS**  
(3 cr; prereq candidate for magna cum laude and Δ)
- 91H **SUMMA HONORS THESIS**  
(3 cr; prereq candidate for summa cum laude and Δ)
- 92H **SUMMA HONORS THESIS**  
(3 cr; prereq 91H)
- 93H **HONORS THESIS**  
(3 cr; prereq honors candidacy in English and consent of English honors adviser)
- 104 **EMERSON AND THOREAU**  
(3 cr; prereq ††; III MTWThF; VH 2) Herreshoff
- 129 **DRAMA SINCE ca. 1920**  
Survey of the chief dramatists, English, American, and Continental. (3 cr; prereq 56; IV MTWThF; VH 6) Hurrell
- 136 **ADVANCED SHAKESPEARE**  
Special attention to two or three of the later plays and survey of some others. (3 cr; prereq 56; II MTWThF; VH 6) O'Brien
- 156 **AMERICAN DRAMA**  
Critical survey of American drama; primary emphasis upon American drama from 1914 to present; some attention to historical and cultural background; some representative American plays of 18th, 19th, and early 20th centuries. (3 cr; prereq ††; II MTWThF; VH 1) Kwiat
- 162 **MILTON**  
The minor poems: *Areopagitica*, *Paradise Lost*, and *Samson Agonistes*. (3 cr; prereq ††; I MTWThF; VH 1) Durham
- 165 **THE STRUCTURE OF MODERN ENGLISH**  
An introductory study of English phonemics, morphemics, and syntax. (3 cr; prereq ††; IV MTWThF; VH 1) Steinmann
- 186 **FORM AND IDEA IN DRAMATIC LITERATURE**  
Experimental and nonrealistic drama. (3 cr; prereq ††...55-56 recommended; III MTWThF; VH 6) Hurrell
- 197 **SEVENTEENTH-CENTURY LITERATURE**  
Prose and nondramatic poetry of the earlier part of the century. (3 cr; prereq ††; IV MTWThF; VH 2) O'Brien
- 299 **INDEPENDENT READING**  
(3 cr; prereq MA degree or equiv)

## Family Studies (FamS)

- 1 **DYNAMICS OF DATING, COURTSHIP, AND MARRIAGE**  
Application of principles from the behavioral sciences to dating, courtship, mate selection, engagement, mixed marriages, roles of men and women, interaction of marital spouses, and marital stability. (3 cr; limited to 40 students; I MTWThF; FolH 109) Torbett
- 1A **DYNAMICS OF DATING, COURTSHIP, AND MARRIAGE**  
(See FamS 1) Designed for Upper Division or engaged or married students. (3 cr, §1; limited to 40 students; II MTWThF; FolH 109) Torbett
- 15 **THE HOME AND ITS FURNISHING**  
Present-day housing problems; choice of location; house plans as they affect family living; exterior and interior design; choice of appropriate furnishings and

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†† 5 credits in literature, English or American, exclusive of Freshman English.

accessories; building furnishing costs. (3 cr, but cr does not count toward BA degree; limited to 40 students; II MTWThF; JohH 122) Ludwig

## 25 PARENTHOOD

Examination of differing concepts of family roles—the father, mother, son, daughter, sister, brother. Their implications for parent-child and sibling interaction. Effects of parenthood on husband-wife relations. (3 cr; limited to 40 students; II MTWThF; VH 113) Huyck

## Foreign Study (FS)

### 161 SEMINAR FOR FOREIGN STUDY I

See section on 10-week courses, page 137.

## Geography (Geog)

### 1 PHYSICAL GEOGRAPHY

Major features of distribution patterns of climate, relief, vegetation, and soils; regional differences in problems of physical development. (5 cr; II-III MTWThF; BlegH 10) Skaggs

### 64 AFRICA

Regional differentiation of human groups and environments with special emphasis on culture contact and problems of underdeveloped countries south of the Sahara. (3 cr, §118; prereq 5 cr in geography or §; II MTWThF; BlegH 235) Porter

### 71 MAPS AND MAP INTERPRETATION

Uses and abuses of maps. Interpretation of topographic and statistical maps. Survey of map sources, and air photo as a map. Emphasis on map analysis with minimum of drafting. (3 cr, §60; prereq soph, 5 cr or §; IV MTWThF; BlegH 455) Porter

### 81 INTRODUCTION TO CARTOGRAPHY

Principles of map design, compilation, specification, and drafting. Map symbols. History of cartography. Projections—analysis of construction, properties, and uses. (3 cr, §70; prereq 5 cr in geography or §; I-II MTWThF; BlegH 455) Brown

### 126 AUSTRALIA-NEW ZEALAND-OCEANIA

Physical and human geography of Australia, New Zealand, Polynesia, and Melanesia; modification of aboriginal land use after European contact, current land use trends in non-European societies, and use and modification of environment by Europeans. (3 cr; IV MTWThF; BlegH 235) Barrett

### 157 LANDFORM GEOGRAPHY

A detailed consideration of landform resources in a regional setting with emphasis on North America. (3 cr; prereq 1 or §; III MTWThF; BlegH 450) Brown

### 190 DIRECTED READINGS

(1-3 cr; prereq sr) Skaggs

## German (Ger)

### 1A BEGINNING GERMAN

(5 cr; I-II MTWThF; Aero 211) Staff

### 3A BEGINNING GERMAN

(5 cr; prereq 2A or 2 yrs high school German; I-II MTWThF; Aero 215) Staff

### 4 INTERMEDIATE GERMAN

Selected readings from literature. (3 cr; prereq 3A or 3B or 3 yrs high school German...§5 recommended; I-II MWF; FolH 107) Staff

### 5 INTERMEDIATE GERMAN

Elementary composition and conversation. (2 cr; prereq 3A or 3B or 3 yrs high school German . . . §4 recommended; I-II TTh; FolH 107) Staff

- 56A READING AND ANALYSIS OF LITERARY TEXTS**  
(3 cr; not open to students who have had course 70 or above; prereq 4 or 4 yrs high school German; III MTWThF; FolH 107) C Wood
- 74 NINETEENTH-CENTURY DRAMA**  
(3 cr; prereq 56 or 4 and §; I MTWThF; FolH 110) Menze
- 77 GERMAN PROSE OF NINETEENTH AND TWENTIETH CENTURIES: MODERN WRITERS**  
(3 cr; prereq 56A or §; II MTWThF; A202) Hamm
- 110†† MIDDLE HIGH GERMAN LANGUAGE**  
(6 cr for both terms after student completes 3rd qtr of 110-111-112 sequence [112 will be offered 1st term 1969]; prereq §; VI-VII MW; Arch 140) C Wood
- 149 DIRECTED READINGS**  
Readings will be confined to areas that represent the professor's major interests. A term paper is a requirement of the course. (3 cr; prereq §; first meeting IV W, June 12, FolH 217; individual consultations for remainder of course) Ramras
- 163 GOETHE**  
(3 cr; prereq 14 cr in courses 70 and above or equiv; III-IV TTh; FolH 110) Ramras

*Note*—The General Extension Division will offer German for Graduate Students (Ger 17A), First Term, MTh, 5:30-8:00 p.m.; and Ger 17B, Second Term, MTh, 5:30-8:50 p.m. Please address all inquiries to the General Extension Division.

**OFFERED ONLY IN DEUTSCHES HAUS††**

*All students who enroll in Deutsches Haus should register for Ger 100. After the ability of students enrolled in Deutsches Haus has been determined, they will then be assigned to one of the following courses:*

- 22\*\* INTERMEDIATE CONVERSATION AND ORAL PRACTICE**  
For students who understand German fairly well but need assurance in self-expression and basic active vocabulary. A thorough study will be made of the material to be used in the conversation sections for the day. Then students will subdivide into smaller groups and their entire time will be devoted to actual conversation under supervision of native teachers. (5 cr; prereq 2 or equiv) Staff
- 67\*\* ADVANCED ORAL PRACTICE AND SELF-EXPRESSION**  
Intended primarily to develop self-confidence in expressing ideas in German. It will consist of daily training in current German through discussions on assigned topics with definite vocabulary preparation, short debates, oral reports, and oral criticism of books and articles. (5 cr; prereq 4 or equiv) Staff
- 106\*\* GERMAN STYLISTICS**  
To enable advanced students and especially teachers of German to acquire a finer feeling for German style, a sense for shades of expression, and a complete mastery of certain grammatical and idiomatic difficulties. Model selections of prose will form the basis for imitative composition. Aims to strengthen the background and broaden the range of the American teacher of German. (4 cr; prereq §) Friedrichsmeyer

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†† To receive credit toward the philological requirement for an advanced degree the student must complete the whole sequence, 110-111-112.

†† See Modern Language Residence Houses under Special Programs. Permission of the German Department is required for registration.

## History (Hist)

- 1 CIVILIZATION OF THE MODERN WORLD, PART I**  
Rise of European state system as framework within which Western civilization developed; and economic, cultural, political, intellectual, and religious implications to the emerging system. (3 cr; III MTWThF; BlegH 5) Thayer
- 3 CIVILIZATION OF THE MODERN WORLD, PART III**  
Impact of industrialism upon Western and world civilization in the 20th century. (3 cr; II MTWThF; BlegH 5) Rudolph
- 16 ANCIENT CIVILIZATION, PART III**  
Roman Civilization to A.D. 305. (3 cr; IV MTWThF; BlegH 130) Staff
- 18 HISTORY OF ASIA, PART II**  
Asia, A.D. 1200-1800 (Chinese late imperial period; India: Muslim domination; Japanese feudalism; beginning of Western influence). (3 cr; II MTWThF; BlegH 155) Taylor
- 23 AMERICAN HISTORY, PART I**  
Colonial, early national period through the sectional crisis. (4 cr; 11:15-12:20 MTWThF; BlegH 5) Howe
- 24 AMERICAN HISTORY, PART II**  
Modern America. (4 cr; III MTWThF; SciCB 125) A Jones
- 52 ANCIENT CIVILIZATION, PART III**  
Roman Civilization to A.D. 305. (3 cr; IV MTWThF; BlegH 130) Staff
- 60 HISTORY OF ASIA, PART II**  
Asia, A.D. 1200-1800 (Chinese late imperial period; India; Muslim domination; Japanese feudalism; beginning of Western influence). (3 cr; II MTWThF; BlegH 250) Kopf
- 80 UNITED STATES IN THE TWENTIETH CENTURY, PART II**  
Political, economic, diplomatic, and social history of the United States from 1914 to 1932. (3 cr; IV MTWThF; SciCB 175) A Jones
- 87 AMERICAN COLONIES, PART II**  
In the 18th century. (3 cr; II MTWThF; BlegH 215) Rutman
- 87A ERA OF THE AMERICAN REVOLUTION, PART I**  
Causes and course of the Revolution. (3 cr; II MTWThF; BlegH 260) Howe
- 100B DIRECTED STUDY, PART I**  
Qualified senior and graduate students may register for 1 or more quarters with *consent of instructor* for work and training on a tutorial basis. (3 cr; prereq ‡) Staff
- 117E WORLD WAR II, PART III**  
Period 1943-1945. (3 cr; I MTWThF; BlegH 10) Deutsch
- 119F MODERN RUSSIA, PART II**  
The 19th century. (3 cr; II MTWThF; BlegH 450) Stavrou
- 119G MODERN NEAR EAST: OTTOMAN EMPIRE AND SUCCESSOR STATES, PART II**  
From Congress of Berlin to present. (3 cr; III MTWThF; BlegH 440) Stavrou
- 122C INTELLECTUAL AND CULTURAL HISTORY OF MODERN EUROPE, PART II**  
The early 19th century, romanticism and liberalism. (3 cr; V MTWThF; BlegH 235) Thayer
- 123A ECONOMIC HISTORY OF EUROPE, PART III**  
Modern European economic history. (3 cr; IV MTWThF; BlegH 240) Rudolph
- 139B PURITANISM IN AMERICAN HISTORY**  
Puritanism as a reality and as a concept for historical interpretation. (3 cr; limited to 12 students; IV-V MW; SocSci 860) Rutman
- 145A SURVEY OF LATIN-AMERICAN HISTORY, PART I**  
Colonial period. (3 cr; III MTWThF; BlegH 255) Schwartz

- 148A **HISTORY OF INDIA, PART I**  
Ancient India and early Muslim India, to 1526. (3 cr; IV MTWThF; BlegH 255) Kopf
- 149D **CHINESE HISTORY TO A.D. 1279, PART II**  
(3 cr; III MTWThF; BlegH 404) Taylor
- 169E **PROSEMINAR IN RECENT EUROPEAN HISTORY, PART I**  
(3 cr; III-IV MW; SocSci 628) Deutsch
- 190A **PROSEMINAR IN LATIN-AMERICAN HISTORY, PART I**  
(3 cr; IV-V TTh; BA 837) Schwartz
- 200 **HISTORICAL BIBLIOGRAPHY AND CRITICISM**  
(3 cr; IV-V TTh; SocSci 628) Wright

## Humanities (Hum)

- 1 **HUMANITIES IN THE MODERN WORLD I**  
The Old Regime, the Revolution, neoclassicism, and romanticism. Period from about 1740 to about 1820. Authors: Pope, Voltaire, Goethe. One historical novel, Tolstoy's *War and Peace*. (3 cr, §1A or §51)  
Sec 1, I MTWThF, ForH 120, Penn  
Sec 2, III MTWThF, ForH 120, Ramsland
- 2 **HUMANITIES IN THE MODERN WORLD II**  
The Industrial Revolution, liberalism, and socialism. Period from about 1776 to 1890. Authors: the classical economists, Marx, Mill, Ibsen, Dostoevski. (3 cr, §2A or §52; I MTWThF; JohH 122) Ramsland
- 4 **HUMANITIES IN THE MODERN WORLD IV**  
The humanities since World War I. Authors: Freud, Lenin, Koestler, T. S. Eliot, Kafka, and others. Background topics include civilization between two wars, impact of psychoanalysis, communism, and fascism. (3 cr, §54; II MTWThF; ForH 130) Todd
- 23 **AMERICAN LIFE III**  
The rise of American intellectual and cultural nationalism and its place in the modern world. (3 cr; I MTWThF; VH 6) Norberg
- 51 **HUMANITIES IN THE MODERN WORLD**  
(See Hum 1) (3 cr, §1 or §1A; IV MTWThF; ForH 130) Kwiat
- 53 **HUMANITIES IN THE MODERN WORLD**  
From about 1840 to about 1914. Authors: Darwin, Nietzsche, Kierkegaard, and Mann. (3 cr, §3 or §3A; III MTWThF; ForH 130) Todd
- 54 **HUMANITIES IN THE MODERN WORLD**  
(See Hum 4) (3 cr, §4; III MTWThF; ForH 150) Tembeck
- 55 **HUMANITIES IN THE MODERN WORLD V**  
The intellectual climate of the western world since World War II. The worlds of existentialism and "the absurd"; alienation, irrationalism; the anti-hero in literature; the new theology; the influence of Zen. Readings in Buber, Camus, Ionesco, Tillich, Hesse, etc. (3 cr; IV MTWThF; ForH 150) Tembeck
- 61 **GREEK HERITAGE**  
The Heroic Age: Homer. The Golden Age of Athens: Aeschylus, Sophocles. The philosophers: Plato, Aristotle. (3 cr, §11; II MTWThF; ForH 30) Erasm
- 63 **RENAISSANCE AND REFORMATION**  
The 15th to 17th centuries. The Age of Lorenzo the Magnificent in Florence; ideal of beauty in art, politics, and morals; universal man. The High Renaissance and the Reformation. Authors: Pico della Mirandola, Machiavelli, Luther, Montaigne, Pascal. Renaissance and baroque art and architecture. (3 cr, §13; IV MTWThF; ForH 30) Erasm

**99 SCIENCE AND THE HUMANITIES**

Examines the warfare between the "two cultures," the scientific and the humanistic, through a consideration of decisive documents from Ficino and Vives to the recent work of Polanyi, Koestler, Broncwski, A. Huxley. Selected topics include: humanistic scholarship and the methodological character of the sciences, creativity in the arts and sciences, and the problem of the scientist's moral responsibility. (3 cr; II MTWThF; ForH 55) Penn

**132 HUMANITIES PROSEMINAR**

Discussion of the relationships between history, literature, and the arts; exact area of concentration to be determined by the class after a discussion of alternatives offered by the instructor. Student reports, papers. Audio-visual aids available. (3 cr; limited to 15 students; prereq sr; III-IV TTh; VH 210) Ames

**Journalism and Mass Communication (Jour)****5 VISUAL COMMUNICATION**

Introduction to functions of visual communication in news and advertising in print and electronic media. Evaluation and criticism of visuals in creative typography, photography, and other visual techniques. Lectures, projects, and critiques. (3 cr; prereq 3rd qtr fr; II MWF, ForH 150; rec II TTh, MurH 311; CCTV) Schuneman

**16 MASS COMMUNICATIONS LAW**

Study of the origins and background of principles of press law. Libel and its defenses, penalties. Right of privacy; problems of fair trial. Law and self-regulation in advertising, in broadcast media. Copyright, obscenity statutes, and other legal problems of communications media. (2 cr; prereq 1 or 11; III MTWTh; MurH 302) Sim

**18 PRINCIPLES OF ADVERTISING**

Theory, principles, and functions of advertising; its role in social, economic, and marketing structure. Newspapers, magazines, and radio and television as advertising media. (3 cr; prereq soph, C avg; IV MTWThF; MurH 311) Peterman

**60 GRAPHIC ARTS: PROCESSES**

Letterpress, offset lithography, and gravure printing processes; engravings and copy preparation; significant graphic arts developments. (3 cr; prereq jr; I MTWThF; MurH 308) Wilson

**78 PUBLIC RELATIONS METHODS**

Publicity, external and internal communication, including use of company publications, institutional advertising, and trade journals. Projects and campaigns. (3 cr; prereq 51 or 56 and 73...or 41, 57, and 71...or #; III MTWThF; MurH 311) Lindsay

**121 MASS MEDIA IN A DYNAMIC SOCIETY**

Economic, political, and social determinants of the character and content of mass communications. Patterns of operations, their relative social utility. Government and mass communications. (3 cr; prereq 50 or 18 for journalism majors, # for others; IV MTWThF; MurH 308) Gerald

**124 INTERNATIONAL COMMUNICATIONS AND FOREIGN AFFAIRS**

Channels of international communication and news gathering agencies. Factors affecting flow of news throughout the world. Role of foreign correspondent. Relation of communications to foreign affairs and international understanding. (3 cr; prereq 15 cr in social sciences, with inclusion of an Upper Division course in history or political science...course in international relations recommended; I MTWThF; MurH 302) Lindsay

**140 INTERPRETATION OF CONTEMPORARY AFFAIRS**

Analysis of major political, economic, and social developments and their interpretation in the editorial, interpretative article, and commentary. (3 cr; prereq sr, 51 and 15 cr in social science; VI MTWThF; MurH 302) Gerald

**156 PSYCHOLOGY OF ADVERTISING**

Psychological analysis of basic principles underlying advertising and selling. Consumer research is stressed. Research techniques for investigating advertising prob-

lems and analysis of consumer wants are considered in detail. (3 cr, §Psy 156; prereq Psy 2 and principles of economics; II MTWThF; Ph 133) Peterman

## 182 PUBLICATIONS WORKSHOP

Intensive study of the role of the high school and college newspaper and yearbook; analysis of content; study of design and make-up, typography, photography, processes. Separate study sections for college newspaper or yearbook editors, and for school publication advisers. (3 cr; not open to U of Minn jour maj; prereq jr, sr and grad or §; 1:00-4:30 MTWThF, June 24-28; MurH 311) Wilson and others

## Library School (Lib)††

### 53 SCHOOL LIBRARY MANAGEMENT

A practical introduction to the management of the small school library. Understanding and organization of simple routines, methods, and records necessary for the operation of such a library. (3 cr; limited to 60 students; I MTWThF; Ph 170) Yuzna

### 101 LIBRARY ADMINISTRATION

Principles of library administration, organization, and management. A general course for all librarians. (3 cr; limited to 90 students; V MTWThF; Ph 170) Kittilson

### 102 REFERENCE I

Intensive study of some 150 outstanding and useful reference books and tools most frequently used by students and librarians. Landmark reference books, indexes, and periodical guides. Theory and practice of reference work. (3 cr; limited to 50 students; II MTWThF; Ph 210) King

### 103 CATALOGING AND CLASSIFICATION

Basic principles of descriptive cataloging, rules of entry, subject headings, and classification in libraries, for all types of libraries. (3 cr; limited to 35 students; III MTWThF; Lib 4B) Samanisky

### 104 SELECTION OF LIBRARY MATERIALS

Theory, principles, and techniques of selection; an introduction to the basic tools for selection of books, magazines, pamphlets, phonograph records, films, etc., for all types of libraries. (3 cr; limited to 60 students; IV MTWThF; Ph 170) Penland

### 105 HISTORY OF LIBRARIES AND LIBRARIANSHIP

Library development from ancient times to the present; library service in the United States in the 19th and 20th centuries. Libraries as social agencies. (3 cr; limited to 90 students; I MTWThF; Ph 210) Shove

### 171 READING GUIDANCE FOR CHILDREN

Reading interests of children and the various kinds of materials that meet these interests. Knowledge of the sources, selection, evaluation, and methods of introducing books to children. Required for minimum certification. (3 cr; limited to 35 students; prereq 104; IV MTWThF; Ph 210) Yuzna

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†† The graduate Library School is a professional school. Courses numbered above 200 are open only to graduate students and to librarians who hold a fifth-year degree from an A.L.A. accredited library school. Courses numbered below 200 are open to anyone who has been admitted to the Graduate School, to anyone who has been admitted to the minimum certification program, and to any undergraduate in the College of Liberal Arts or the College of Education. Students who do not fall in one of the preceding categories may register for library courses numbered below 200, but in order to avoid loss of credits, a letter requesting permission to register for library courses should be sent to the Library School before May 1 for the First Term and before June 1 for the Second Term. The Library School discourages registration of unadmitted students who have not sent transcripts before these dates, for it is not possible for us to give appropriate advice to students who appear on the last registration day.



- 173 READING GUIDANCE FOR ADULTS**  
Selection and evaluation of materials in terms of adult learning, reading ability, and interests; reading guidance techniques and programs used with adults in public libraries. (3 cr; limited to 35 students; prereq 104; VI MTWThF; Ph 210) Penland
- 194 NONPRINT MATERIALS IN LIBRARIES**  
Selection, organization, and administration of nonprint materials in library programs; emphasis upon the instructional and recreational use of nonprint materials. (3 cr; limited to 35 students; prereq 104; VII MTWThF; Ph 210) Kittilson
- 241 LIBRARY MECHANIZATION AND SYSTEMS ANALYSIS**  
Application of systems analysis to library operations; principles, problems, and examples of library mechanization. (3 cr; limited to 30 students; prereq 101 and 103 or #; IV MTWThF; Lib 4B) Brekhus
- 242 INTRODUCTION TO INFORMATION RETRIEVAL**  
Theory of various methods of subject analysis; methods of data representation, including coding; search strategies. (3 cr; limited to 30 students; prereq 103 or #; VI MTWThF; Lib 4B) Brekhus
- 253 HISTORY OF BOOKS AND PRINTING**  
Bookmaking in its various forms from earliest times to present. Evolution of the alphabet; the manuscript book; invention and spread of printing; design of the modern book. Emphasizes aesthetic and technical aspects. (3 cr; limited to 60 students; prereq 105; III MTWThF; Ph 210) Shove
- 255 THE COLLEGE AND UNIVERSITY LIBRARY**  
The place of the library in the college and university organization. Influence on the library of developments and trends in higher education. (3 cr; limited to 20 students; prereq 101; III MTWThF; ForH 30) McGrath
- 260 LITERATURE OF THE SOCIAL SCIENCES**  
Bibliographical and other reference sources. Development of knowledge, landmark books, and current trends in the subjects covered. (3 cr; limited to 20 students; prereq 102; II MTWThF; ForH 40) Turner
- 261 LITERATURE OF THE HUMANITIES**  
Bibliographical and other reference sources including reviewing media. Developments and trends in the subjects covered. (3 cr; limited to 20 students; prereq 102; V MTWThF; ForH 30) King
- 262 LITERATURE OF THE NATURAL SCIENCES**  
Bibliographical and other reference sources, with emphasis on indexing, abstracting, and reviewing media. Growth and development of scientific literature and its control and dissemination. Science background is not required for this course. (3 cr; limited to 20 students; prereq 102; I MTWThF; Lib 4B) McGrath
- 268 RESEARCH METHODS IN LIBRARIANSHIP**  
Purposes and principles of research with emphasis upon the distinctive characteristics of library science problems; critical examination of research studies; preparation of tentative research proposals. (3 cr; limited to 30 students; II MTWThF; Lib 4B) McDiarmid
- 277 HISTORY OF CHILDREN'S LITERATURE**  
A survey of children's literature through the 19th century. A search for significant qualities of a literature for children in the cultural context of the times. (3 cr; limited to 20 students; V MTWThF; Lib 4B) Turner
- 295,\* 296,\* 297\* LIBRARY RESEARCH**  
Graduate students may register for one or more of these courses with the approval of the professor who will guide the research paper. (3 cr; prereq #) Staff

August 5 to August 30 the Library School and the Extension Division will offer to 30 experienced librarians an institute on Library Methods Analysis, conducted by Miss Jewel C. Hardkopf. Send inquiries to the Library School, Room 3, Walter Library, University of Minnesota, Minneapolis, Minnesota 55455.

## Linguistics (Ling)

### 170 INTRODUCTION TO GENERAL LINGUISTICS

Synchronic, diachronic, and contrastive study of language; applications of linguistics. (3 cr [no cr for majors in linguistics]; II MTWThF; C 111) Lehn

## Middle Eastern Languages

### Arabic (Arab)

#### A-B BEGINNING INTENSIVE ARABIC

See section on 10-week courses, page 137.

### Hebrew (Heb)

#### A-B BEGINNING INTENSIVE HEBREW

See section on 10-week courses, page 137.

## Music (Mus)

(See also *Music Education under College of Education*)

### 4 FUNDAMENTALS OF MUSIC

(2 cr; for nonmusic majors—primarily child development students and elem tchrs)

Sec 1, II MTWThF, NMA 4, Lauritzen

Sec 2, III MTWThF, ScH 3, Lauritzen

Sec 3, IV MTWThF, ScH 3, Lauritzen

### 7A EAR TRAINING

Résumé of aural work included in Mus 1T-3T, with concentration on their application. (3 cr; prereq #: I MTWThF, ScH 103; IV MWF, ScH 103) Fetler

### 8B HARMONY

Résumé of part writing and harmonization of chorales which are included in Mus 4T-6T, with concentration on their application. (3 cr; prereq #: II MTWThF, ScH 103; IV TTh, ScH 103) Fetler

*Note*—Applied music courses 11 through 30 are offered as electives for nonmusic majors and as part of degree programs for Lower Division and Upper Division music majors. When taken for no credit, place the letter V after the appropriate number.

### 11°° PIANO

(2 cr; prereq entr exam; hrs ar; ScH 107) Weiser, Freed, Ivory

### 12°° VOICE

(2 cr; prereq entr exam; hrs ar; ScH 107) Knowles

### 13°° VIOLIN

(2 cr; prereq entr exam; hrs ar; ScH 107) Saslav

### 14°° VIOLA

(2 cr; prereq entr exam; hrs ar; ScH 107) Fischer

### 15°° CELLO

(2 cr; prereq entr exam; hrs ar; ScH 107) Jamieson

### 16°° BASS

(2 cr; prereq entr exam; hrs ar; ScH 107) Fitch

- 17°° **FLUTE**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Niosi
- 18°° **OBOE**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Angelucci
- 19°° **CLARINET, SAXOPHONE**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Fitch
- 20°° **BASSOON**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Ar
- 21°° **TRUMPET**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Chenette, Tetzlaff
- 22°° **FRENCH HORN**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Binstock
- 23°° **TROMBONE**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Weinman, Zellmer
- 24°° **TUBA**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Walton
- 25°° **PERCUSSION**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Brunelle, Fine
- 26°° **HARP**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Miller
- 27°° **ORGAN**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Fleischer
- 28°° **HARPSICHORD**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Ar
- 29°° **CLASSICAL GUITAR**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Ar
- 30°° **CLASSICAL ACCORDION**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Hane, Malmberg
- 46 **CONCERT BAND**  
(1 cr; prereq 3; V MTWThF; NMA 4, 5) Zdechlik
- 54 **INSTRUMENTAL ENSEMBLE**  
Performance of chamber music of great composers; sonatas, trios, quartets, quintets, etc. (2 cr; hrs ar; MusEd 101) Fischer
- 60 **INTRODUCTION TO ORCHESTRAL REPERTOIRE**  
Twice weekly in Northrop Auditorium a distinguished guest conductor delivers a half-hour lecture, then conducts the Minneapolis Symphony Orchestra in a 2-hour demonstration-concert of master works. Emphasis upon structure, elements of orchestral tone color, and roles of performer and conductor. (2 cr; primarily for nonmusic majors; VI-VII TTh; NMA)
- Note*—Applied music courses 61 through 80 are offered as electives for nonmusic majors and as part of degree programs for Lower Division and Upper Division music majors. When taken for no credit, place the letter V after the appropriate number.
- 61°° **PIANO**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Weiser, Freed, Ivory
- 62°° **VOICE**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Knowles
- 63°° **VIOLIN**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Saslav
- 64°° **VIOLA**  
(2 cr; prereq entr exam or placement test; hrs ar ScH 107) Fischer
- 65°° **CELLO**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Jamieson

- 66\*\* **BASS**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Fitch
- 67\*\* **FLUTE**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Niosi
- 68\*\* **OBOE**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Angelucci
- 69\*\* **CLARINET, SAXOPHONE**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Fitch
- 70\*\* **BASSOON**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Ar
- 71\*\* **TRUMPET**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Chenette, Tetzlaff
- 72\*\* **FRENCH HORN**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Binstock
- 73\*\* **TROMBONE**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Weinman, Zellmer
- 74\*\* **TUBA**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Walton
- 75\*\* **PERCUSSION**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Brunelle, Fine
- 76\*\* **HARP**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Miller
- 77\*\* **ORGAN**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Fleischer
- 78\*\* **HARPSICHORD**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Ar
- 79\*\* **CLASSICAL GUITAR**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Ar
- 80\*\* **CLASSICAL ACCORDION**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Malmberg, Hane
- 90 **ADVANCED INSTRUMENTAL ENSEMBLE**  
Performance of more difficult chamber music looking toward public presentation.  
(2 cr; prereq sr, 56; hrs ar; MusEd 101) Fischer
- 97 **COUNTERPOINT**  
Strict, 16th-century and Bach-style counterpoint in two and three parts; writing of canons, motets, inventions, fugues. (2 cr; prereq 6T; V MTWTh; ScH 103) Fetler
- 100\*\* **ADVANCED APPLIED MUSIC**  
Advanced literature in piano, voice, organ, and orchestral instruments. (2 cr; prereq entr exam; hrs ar; ScH 107) Staff
- 106A **AMERICAN MUSIC**  
From colonial times to the present through reading and record listening. American Indian music, European folk music on this continent, the origin and development of jazz and contemporary American music. (3 cr; prereq 36 or 9 cr in American history or American studies, §; I MTWThF; ScH 104) Riedel
- 107 **GEORG FRIEDRICH HANDEL: LIFE AND WORKS**  
Musical culture in middle and northern Germany during the 17th and 18th centuries. The oratorio in Italy, France, Germany, and England. G. F. Handel's work with emphasis on his oratorios. Handel and England. (3 cr; prereq sr, 36 or §; IV MTWThF; ScH 104) Riedel
- 110 **MUSIC BIBLIOGRAPHY**  
General reference sources. Music bibliographical materials in English, other languages; bibliographical drills in music history, theory and composition, music education, applied music. (3 cr; prereq 1 course from 36, 56, 99, or §; II MTWThF; ScH 3) Riedel

- 114 HISTORY OF VOCAL ART**  
Significant schools of singing from 1600 to the present. (2 cr; prereq 18 cr in 12 and 62 or §; VI MTWTh; ScH 103) Schuessler
- 127-128-129° COMPOSITION**  
Original work in various forms. (2 cr each; prereq 99 and 123; VII MTWThF; ScH 203) Fetler
- 140 INTERPRETATION OF CHORAL MASTERPIECES**  
Interpretation and analysis of choral compositions from Renaissance through the 20th century. (3 cr; prereq sr and grad, 6T or §; I MTWThF; NMA 4) Schwartz
- 161-162 BAND ARRANGING**  
Scoring for band instruments, creative arrangements for marching or concert bands. (3 cr each; prereq 6T, 143, or MuEd 65, or §; VI MTWThF; NMA 4, 5) Zdechlik
- 167 TECHNIQUE AND PRODUCTION OF OPERA AND OPERETTA**  
The singer prepares and performs roles in opera and operetta. Special projects, including stage direction, musical direction, and accompanying coaching, are offered for the nonsinger. (3 cr; offered during Summer Session only; prereq §; IV MTWThF; WuH 7) Knowles
- 175 TRAINING IN ADVANCED MUSICIANSHIP**  
Dictation of melodic, harmonic, rhythmic, and contrapuntal materials. Strong emphasis on 20th-century tone combinations, meters, and rhythms. Tonal, polytonal and atonal exercises. Training in tonal memory. (3 cr; prereq 6T; III MTWThF; ScH 103) Fetler
- 204\*\* GRADUATE APPLIED MUSIC**  
Individual lessons. (4 cr; prereq entr exam; hrs ar; ScH 107) Staff
- 212° SPECIAL PROBLEMS**  
(3-9 cr; prereq 110; hrs ar; ScH 107) Staff
- 227-228-229° SEMINAR: COMPOSITION AND ORCHESTRATION**  
(3 cr each; prereq §; VII MTWThF; ScH 203) Fetler

## Natural Science (NSci)

- 1 ORIENTATION IN THE NATURAL SCIENCES**  
See section on 10-week courses, page 137.

## Philosophy (Phil)

- 1A PROBLEMS OF PHILOSOPHY**  
Introduction; main fields of investigation; permanent problems; principal methods and schools of philosophy; historical and contemporary views. (3 cr; I MTWThF; ForH 55) Potter
- 2A LOGIC**  
Difference between logical and fallacious reasoning; functions and uses of language; rules of good definition and sound argument. (3 cr)  
Sec 1, II MTWThF, ForH 155, Lewis  
Sec 2, IV MTWThF, ForH 285, Ar
- 3A ETHICS**  
Examination of problems that arise when human beings attempt to think systematically about conduct and values (are there absolute standards?), problem of free will, and survey of historical views about the right and the good. (3 cr; III MTWThF; VH 1) Murphy
- 4A POLITICAL PHILOSOPHY**  
The nature of law and the state. The philosophical foundations of such political ideologies as democracy, communism, and fascism. (3 cr; IV MTWThF; ForH 349) Murphy

- 30A HISTORY OF WESTERN PHILOSOPHY**  
Origin of Greek thought; pre-Socratics, Socrates, Plato, Aristotle. (3 cr; II MTWThF; ForH 285) Cohen
- 32A HISTORY OF WESTERN PHILOSOPHY**  
Early modern philosophy from Descartes through Hume; impact of science; backgrounds of contemporary philosophical problems. (3 cr; III MTWThF; ForH 349) Lewis
- 106 AMERICAN PHILOSOPHY FROM WILLIAM JAMES**  
Among philosophers discussed: Peirce, James, Dewey, Lewis. (3 cr; prereq 1 or 1 qtr history of philosophy or §; III MTWThF; ForH 175) Potter
- 140 SURVEY OF CONTEMPORARY PHILOSOPHY**  
Current systematic and critical philosophies, represented by their principal exponents. (3 cr; prereq 52 or §; III MTWThF; ForH 285) Cohen

## Political Science (Pol)

- A THE STATE IN THE MODERN WORLD**  
(Part A of A-B) The development, principles, and operation of the modern nation state. (3 cr; IV MTWThF; BlegH 110) Fogelman
- 1 AMERICAN GOVERNMENT AND POLITICS**  
(Part 1 of 1-2) Fundamentals of American government, nature and growth of the Constitution, citizenship, individual rights and liberties, political parties, public opinion, nominations, and elections. (3 cr; III MTWThF; AndH 230) Staff
- 26 AMERICAN FOREIGN POLICY**  
An introduction to the institutions and processes which determine American foreign policy. Traditional and postwar foreign policies. (3 cr; II MTWThF; AndH 330) Penikis
- 40 CONTEMPORARY POLITICAL IDEOLOGIES**  
Liberalism, communism, fascism, Nazism, taking account of democratic and dictatorial regimes in theory and practice. Emphasis on ideas, role of policy, power nationally and internationally. (3 cr; III MTWThF; BlegH 235) Fogelman
- 108 LEGISLATIVE ORGANIZATION AND PROCEDURE**  
Congress and the state legislatures at work. (3 cr; prereq 2 or §; II MTWThF; BlegH 425) Backstrom
- 138 AMERICAN POLITICAL CAMPAIGNS AND ELECTIONS**  
Examination of national, state, and local campaigns and elections. (3 cr; prereq 2 or §; IV MTWThF; BlegH 205) Backstrom
- 155 LATIN-AMERICAN GOVERNMENT AND POLITICS I**  
Analysis of factors such as colonial institutions, the economy, the social structure, which condition constitutional and political organization. (3 cr; prereq 2 or §; II MTWThF; BlegH 410) Klein
- 157 GOVERNMENT AND POLITICS OF DEVELOPING AREAS**  
Analysis of political problems of new nations with particular emphasis on political consequences of breakdown of the traditional society and problems of developing new institutional forms and procedures. (3 cr; prereq B or 15 cr in any combination of economics, sociology, and/or anthropology; III MTWThF; BlegH 155) Klein
- 160 AMERICAN POLITICAL THOUGHT**  
From colonial times to present; Puritanism; Constitution; utopianism; Calhoun; history of anarchist, socialist, populist, and syndicalist thought; social Darwinism; conservatism; political thought in law and literature. (3 cr; prereq B or 9 cr in social science or §; II MTWThF; AndH 250) Shaw
- 161 PROBLEMS OF DEMOCRACY**  
Analysis of postulates and implications; moral foundations; democratic theory and the economic order; liberty and authority; equality; representation; spiritual order; democracy and practical politics; critics of democracy. (3 cr; prereq B or 9 cr in social science or §; III MTWThF; BlegH 215) Shaw

**175 DIPLOMACY**

Nature and functions, historical development of diplomacy; its relation to forms of government and power systems. Traditional diplomacy, diplomacy by conference and in international organizations, personal diplomacy, open and secret diplomacy. Essentials of diplomatic usage. Diplomatic agents. (3 cr; IV MTWThF; BlegH 155) Penikis

**Psychology****Psychology (Psy)****1-2† GENERAL PSYCHOLOGY**

General introduction to study of human behavior. Prerequisite for all advanced courses in psychology. (3 cr for each; prereq soph or 3rd qtr fr with B avg; I-II MTWThF; NH 45; CQTV)

**4-5† INTRODUCTORY LABORATORY PSYCHOLOGY**

Experiments illustrating contemporary subject matter such as: human and animal learning, motivation, verbal behavior, problem solving, visual perception, psychological measurement, personality, and social psychology. (2 cr for each; prereq soph; III-V MTWThF; WeH 101) Yonce

**100 THEORIES OF LEARNING**

Examination of major theories of learning and discussion of basic issues of learning and performance in man and animals. (3 cr; prereq 75 except for students in Sequence A and grads; II MTWThF; C 225) Winokur

**117 ANALYSIS OF BEHAVIOR**

Systematic formulation of topics of psychology based upon a Skinnerian analysis. Scientific method, learning, motivation, and emotion. (3 cr; prereq 75 except for students in Sequence A and grad students; III MTWThF; C 225) Winokur

**144-145† ABNORMAL PSYCHOLOGY**

Normal and abnormal behavior contrasted. Dynamics and determinants of personality maladjustments. (3 cr for each; prereq 9 cr or 6 cr plus Biol 2 or 12 cr in a social science; III-IV MTWThF; Ph 150) Phillips

**156 PSYCHOLOGY OF ADVERTISING**

Psychological analysis of basic principles underlying advertising and selling. Consumer research is stressed. Research techniques for investigating advertising and analysis of consumer wants are considered in detail. (3 cr; prereq 2 and Principles of Economics; II MTWThF; Ph 133) Peterman

**190 PROJECT IN PSYCHOLOGY**

Individual library study or experimental investigation. (Cr ar; prereq sr, 2) Darley

**Psy 215§§ SEMINAR: SPECIAL AREAS OF PSYCHOLOGY—PSYCHOLINGUISTICS**

A consideration of the problems involved in the development of an adequate psychology of language. Linguistic structure is viewed from the point of view of the generative grammarian. This is presumed to constitute the competence of a language user. How competence is acquired and how it is manifested in behavior are the basic questions in a psychology of language. The interplay of theory and experimentation in the search for adequate models is stressed. (3 cr; prereq 2; hrs and rm ar) Gough

**Psy 216§§ SEMINAR: SPECIAL AREAS OF PSYCHOLOGY—THE PERCEPTION OF SPEECH**

The problem of understanding the perception of speech is approached experimentally and analytically. The development of speech synthesizers is reviewed as offering powerful tools to the task. Research by both Western scientists and Rus-

§§ See Center for Research in Human Learning in the section on Schools, Colleges, and Special Programs. Also, see First Term course listing for Child Psychology (CPsy 223) on page 56.

sians is critically reviewed and discussed in the context of theories of speech perception. (3 cr; prereq #; hrs and rm ar) Liberman

**Psy 217§§ SEMINAR: SPECIAL AREAS OF PSYCHOLOGY—THE SENSES AS PERCEPTUAL SYSTEMS**

The theory is advanced that perception is not the building up of precepts from stimulus elements furnished by the senses but rather is the direct registering of information about the world. Perceptual learning is seen as the education of attention to information in the available stimulation. The theory is illustrated mainly through examples from vision but applies as well to the other senses. The evolution of perceptual systems and the development of subtle perceptual skills in man are explored in the light of the theory. (3 cr; prereq #; hrs and rm ar) Gibson

## **Personal Orientation (PO)**

### **1 HOW TO STUDY**

Practical assistance to the student in developing efficient study habits, organizing materials, preparing for examinations, and improving the speed and comprehension of reading. (2 cr, but cr does not count toward BA degree; limited to 30 students; I MTWThF; MH 214) Crewe

## **Public Administration (PA)**

### **182A ADMINISTRATIVE INTERNSHIP**

Field work in an approved administrative agency under the joint supervision of an employee of the agency and a member of the faculty. Rotation through various administrative assignments, solution of special problems, seminar discussion of experiences, and preparation of an internship report. (3 cr; prereq Δ; IX W, VIII-IX Th; SocSci 860) Likins

### **214 CURRENT ISSUES OF PUBLIC ADMINISTRATION AND POLICY DEVELOPMENT IN MINNESOTA**

Background study through lectures, panel discussions, and seminar sessions of vital issues of public policy and administration which currently confront Minnesota's governmental units. Tentative topics for 1968 include administrative reorganization, crime and law enforcement, education, urban problems, and pollution. Some 25 legislators, government officials, and university professors will serve as faculty for the course. (3 cr; prereq grad; VI-VIII W, AndH 270; VI-VII Th, BlegH 430) Warp, Hathaway, and others

### **247 URBAN DEVELOPMENT**

Role and methods of the urban administrator in effecting change and in mobilizing both public and private community resources for urban development. (3 cr; prereq 280A or #; I-V S; SocSci 860) Olsen

### **270A PUBLIC ADMINISTRATION SEMINAR: ORGANIZATION THEORY AND ADMINISTRATIVE BEHAVIOR**

Factors conditioning organization; theories of organization; models and typologies; leadership, authority, and decision making; communication; automation; operations research and management systems. (3 cr; prereq Δ; I-II TTh; SocSci 1383) Warp

### **282 ADMINISTRATIVE INTERNSHIP**

See section on 10-week courses, page 137.

### **283A-B RESEARCH SEMINAR: PUBLIC ADMINISTRATION**

See section on 10-week courses, page 137.

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§§ See Center for Research in Human Learning in the section on Schools, Colleges and Special Programs. Also, see First Term course listing for Child Psychology (CPsy 223) on page 56.



## Romance Languages

## French (Fren)

- 1 BEGINNING FRENCH**  
(5 cr; III-IV MTWThF; P 110) Rydell
- 3 BEGINNING FRENCH**  
(5 cr; prereq 2, or 2 yrs high school French; I-II MTWThF; ME 106) Highnam
- 25 INTERMEDIATE FRENCH**  
(5 cr; prereq 3, or 3 yrs high school French; III-IV MTWThF; NH 209A) Todd
- 30 INTRODUCTION TO FRENCH LITERARY TEXTS**  
A variety of literary works representing the principal genres is examined through stylistic analyses and literary explications. Students learn critical terminology and discuss literary problems and techniques. (3 cr; prereq 25 or 4 yrs high school French or ‡; I MTWThF; FolH 102) Lock
- 34 FRENCH COMPOSITION**  
(3 cr; prereq 25 or equiv; IV MTWThF; Aero 321) Mantini
- 35 FRENCH CONVERSATION AND PRONUNCIATION**  
In addition to regular conversation course, 2 hours per week (individually arranged) are devoted to practical phonetics, pronunciation, drill, and laboratory exercises. (3 cr; prereq 25 or equiv; II MTWThF; MurH 308) Rickert
- 56 FRENCH PHONETICS**  
(3 cr; prereq 25 or ‡; III MTWThF; NH 209) Sinval
- 58 ADVANCED FRENCH CONVERSATION**  
(3 cr; prereq 55; IV MTWThF; FolH 109) Rickert
- 65 SURVEY OF FRENCH LITERATURE: RABELAIS TO LA BRUYERE**  
(3 cr; prereq 30; IV MTWThF; FolH 108) Francis
- 107 STRUCTURE OF MODERN FRENCH: PHONOLOGY**  
(3 cr; prereq 57 or ‡57 or ‡; II MTWThF; Aero 321) Mantini
- 155 FLAUBERT, MAUPASSANT, AND NARRATIVE TECHNIQUES**  
(3 cr; II MTWThF; FolH 105) Lock
- 159 THE EXISTENTIAL NOVEL**  
Stress upon novelists from the thirties to the present whose work reveals concern for what Malraux calls the human condition; Malraux, Céline, Sartre, Camus, Blanchot, and Beckett. (3 cr; III MTWThF) Francis
- 170 RABELAIS**  
A study of *Gargantua and Pantagruel* in the original text. (3 cr; IV MTWThF; FolH 103) Renaud
- 189 INDEPENDENT READINGS FOR UPPER DIVISION STUDENTS**  
(1-3 cr; prereq ‡ and consent of dept chm; hrs ar) Staff
- 259 DIRECTED READINGS FOR GRADUATE STUDENTS**  
(1-3 cr; prereq ‡; hrs ar) Francis, Lock, Mantini, Renaud

**OFFERED ONLY IN LA MAISON FRANCAISE‡‡**

*All students who enroll in La Maison Française should register for Fren 100. After the ability of students enrolled in La Maison Française has been determined, students will be assigned to one of the following courses:*

- 22\*\* PRACTICAL FRENCH CONVERSATION**  
Primary purpose is to build a practical vocabulary and to give students an opportunity to use it appropriately in small drill sections under guidance of instructors. (5 cr; prereq 2 or equiv; VI-VII MTWThF) Staff

‡‡ See Modern Language Residence Houses in the section on Special Programs.

- 56A\*\* ADVANCED PRACTICAL FRENCH CONVERSATION**  
 Fluency acquired by presenting short oral reports and oral explications de texte, and participating in debates. (5 cr; prereq 25 or equiv; VI-VII MTWThF) Staff
- 106\*\* ORAL DICTION**  
 Enables advanced students to acquire a finer feeling for the language, a sense of shades of expression, and a complete mastery of certain grammatical and idiomatic difficulties. (4 cr; prereq #; VI-VII MTWThF) Robinson

*Note*—The General Extension Division will offer French for graduate students (Fren 17A). Please address all inquiries to the General Extension Division.

### *Italian (Ital)*

- 1 BEGINNING ITALIAN**  
 (5 cr; III-IV MTWThF; FolH 105) Seim
- 25 INTERMEDIATE ITALIAN**  
 (5 cr; prereq 3; I-II MTWThF; Aero 313) Pipa
- 30 INTRODUCTION TO ITALIAN LITERARY TEXTS**  
 A variety of literary works representing the principal genres is examined through stylistic analyses and literary explications. Students learn critical terminology and discuss literary problems and techniques. (3 cr; III MTWThF; FolH 104) Pipa
- 189 INDEPENDENT READINGS FOR UPPER DIVISION STUDENTS**  
 (1-3 cr; prereq # and consent of dept chm; hrs ar) Pipa
- 259 DIRECTED READINGS FOR GRADUATES**  
 (1-3 cr; prereq #; hrs ar) Pipa

### *Portuguese (Port)*

- 1-2-3 BEGINNING PORTUGUESE**  
 See section on 10-week courses, page 137.

### *Spanish (Span)*

- 1 BEGINNING SPANISH**  
 (5 cr; III-IV MTWThF; Arch 10) Collins
- 3 BEGINNING SPANISH**  
 (5 cr; prereq 2 or 2 yrs high school Spanish; I-II MTWThF; Aero 209) Franklin
- 25 INTERMEDIATE SPANISH**  
 (5 cr; prereq 3 or 3A, or 3 yrs high school Spanish; I-II MTWThF; ME 110) Cooke
- 30 INTRODUCTION TO SPANISH AND SPANISH-AMERICAN LITERARY TEXTS**  
 A variety of literary works representing the principal genres is examined through stylistic analyses and literary explications. Students learn critical terminology and discuss literary problems and techniques. (3 cr; prereq 25, or 4 yrs high school Spanish or #; III MTWThF; ME 102) Sullivan
- 54 SPANISH COMPOSITION**  
 (3 cr; prereq 25 or equiv; II MTWThF; ME 102) Sullivan
- 55 SPANISH CONVERSATION**  
 (3 cr; prereq 25 or equiv; III MTWThF; AH 350) Jones

- 57 **ADVANCED SPANISH COMPOSITION**  
(3 cr; prereq 54; II MTWThF; ME 214) Suris
- 60 **SPANISH CIVILIZATION AND CULTURE**  
(3 cr; prereq 30 or equiv; III MTWThF; Aero 319) Rundorff
- 66 **SURVEY OF SPANISH LITERATURE: THE GOLDEN AGE**  
(3 cr; prereq 30; IV MTWThF; FolH 107) Jones
- 74 **SURVEY OF THE LITERATURE OF SPANISH AMERICA**  
(3 cr; prereq 30; II MTWThF; Aero 317) Floripe
- 107 **STRUCTURE OF MODERN SPANISH: PHONOLOGY**  
(3 cr; prereq 57 or # or ¶57; III MTWThF; FolH 102) Narváez
- 109 **STRUCTURE OF MODERN SPANISH: SYNTAX**  
(3 cr; prereq 107 or # or ¶107; IV MTWThF; FolH 102) Narváez
- 131 **THE PICARESQUE NOVEL**  
(3 cr; prereq 65, 66, 67; II MTWThF; Aero 319) Rundorff
- 141 **LATIN-AMERICAN LITERATURE: ESSAY, SHORT STORY, DRAMA**  
(3 cr; prereq 65, 66, 67 or 76; III MTWThF; Arch 130) Floripe
- 189 **INDEPENDENT READINGS FOR UPPER DIVISION STUDENTS**  
(1-3 cr; prereq # and consent of dept chm; hrs ar) Staff
- 259 **DIRECTED READINGS FOR GRADUATE STUDENTS**  
(1-3 cr; prereq #; hrs ar) Floripe, Jones, Narváez, Rundorff, Serrano-Plaja

*Note*—The General Extension Division will offer Spanish for graduate students (Span 17A). Please address all inquiries to the General Extension Division.

## Scandinavian Languages

### *Finnish (Finn)*

- 1-2-3 **INTENSIVE FINNISH**  
See section on 10-week courses, page 137.

### *Swedish (Swed)*

- 1-2-3 **INTENSIVE BEGINNING SWEDISH**  
See section on 10-week courses, page 137.

### *Scandinavian (Scan)*

- 161 **THE LATE NINETEENTH-CENTURY SCANDINAVIAN NOVEL**  
Examination of "the great tradition" in the modern Scandinavian novel, together with the circumstances, intellectual and political, social and economic, out of which it grew. (3 cr; prereq 6 or 12, or 8 cr in literature...knowledge of Scandinavian languages required for majors only; II MTWThF; VH 210) Simpson
- 171 **IBSEN AND THE BEGINNINGS OF THE MODERN DRAMA**  
Intensive examination of plays of Ibsen, especially with reference to the role he has played as "founder" of modern European drama. (3 cr; prereq 6 or 12, or 8 cr in literature; knowledge of Scandinavian languages required for majors only; IV MTWThF; TSF 155) Simpson

## Slavic Languages

### Russian (Russ)

#### 1-2-3 BEGINNING INTENSIVE RUSSIAN

See section on 10-week courses, page 137.

#### 4-5-6 INTENSIVE RUSSIAN (INTERMEDIATE)

See section on 10-week courses, page 137.

#### 24 SCIENTIFIC RUSSIAN I

(See section on Special Programs) Concentration on structure of the language for the development of reading skill; basically for students of science. (5 cr; II-III MTWThF; ForH 70) Kleiner

## Social Science (SSci)

### 1 PERSONALITY

Investigation of factors that influence individual human action. Topics studied include personality in nature, culture, society; personality as shaper of culture and history; the American character; validation of theories and confirmation of findings. (3 cr; II MTWThF; AndH 230) Roshwald

### 3 COMMUNITY

Structures and patterns of human relations in traditional and modern societies. Varieties of group behavior: caste and class, kinship, urbanization, modernization, power distribution. Examination of social theories. (3 cr; III MTWThF; BlegH 115) Roshwald

## Social Work (SW)

#### Soc 90 AMERICAN SOCIAL WELFARE

(See Sociology) Milstone

#### Soc 91 INTRODUCTION TO SOCIAL WORK PROCESSES

(See Sociology) Milstone

#### 101 SPECIAL TOPIC: THE DEPRIVED CHILD

A consideration of the problems of children suffering from various forms of deprivation, review of pertinent literature, suggested societal problems. Designed for teachers and others working with children. (3 cr; I MTWThF; Arch 15) Bergherr

#### 102 SPECIAL TOPIC: GROUP INFLUENCE ON PERSONALITY

Analysis of the force of small group experiences on individual development of attitudes and ways of meeting life problems. Open to teachers, institutional personnel, and others. (3 cr; IV MTWThF; BlegH 450) Kamps

#### 103 SPECIAL TOPIC: MANAGEMENT OF CHILDREN WITH SOCIAL-EMOTIONAL PROBLEMS

Primarily for elementary and secondary school personnel interested in gaining further understanding regarding children whose problems interfere with their adjustment and educational progress. Open to teachers, social workers, counselors, and others. (3 cr; VI MTWThF; ForH 115) Merl

#### 106 SPECIAL TOPIC: TREATMENT OF THE DELINQUENT CHILD

Providing beginning knowledge of problems involved in dealing with delinquent behavior and orientation to programs and resources currently available. Open to teachers, institutional personnel, social welfare workers, and others. (3 cr; II MTWThF; ForH 120) Brusseau

#### 206 READINGS IN SOCIAL WORK

Independent study under tutorial guidance. For graduate students only. (Cr and hrs ar; SocSci 927) Merl

**287 SPECIAL STUDIES IN SOCIAL WORK**

Selected projects previously approved by instructor. Open only to social work students in their second graduate year. (Cr ar; VII MTWThF; SocSci 860) France

**Sociology (Soc)****1 INTRODUCTION TO SOCIOLOGY: MAN IN MODERN SOCIETY**

Characteristics of human group life. Analysis of factors associated with development of human group life and man's social environment; structure of social environment and its influence upon individual's behavior. (3 cr; II MTWThF; AndH 210; CCTV) McNall

**2 THE AMERICAN COMMUNITY**

Sociological analysis of modern American society. Topics include distribution of population, urban-rural differences, social factors in business systems, occupational groups, determination of social status, and minority group adjustment. Attempts to familiarize student with current research methods. (3 cr; prereq 1 or 1H or 3; IV MTWThF; BlegH 10) Kennedy

**3 SOCIAL PROBLEMS**

Survey; contemporary social problems; special emphasis on personal demoralization and social disorganization. (3 cr; III MTWThF; AndH 250) Hall

**90 AMERICAN SOCIAL WELFARE**

Analysis of American social welfare as a basic social institution. (3 cr; prereq 3; VI MTWThF; BlegH 215) Milstone

**91 INTRODUCTION TO SOCIAL WORK PROCESS**

Analysis of the nature of social work helping process through a study of development of social work theory and its implementation in field of practice. (3 cr; prereq 90 or consent of major adviser; IV MTWThF; BlegH 440) Milstone

**111 POPULATION THEORY**

Emphasizes cultural and social phases of population change, with particular reference to birth rates, death rates, and migration. Implications of population change. (3 cr; prereq 1-or §; VI MTWThF; BlegH 250) Kennedy

**130 SOCIAL PSYCHOLOGY**

Research and theory regarding relation of the individual to social groups. Emphasis on socialization processes; effects of social interaction and isolation; individual behavior under conditions of social organization and disorganization; cultural influence and its limits. (3 cr; prereq 1 or §; II MTWThF; AndH 310) C Rose

**133 MINORITY GROUP RELATIONS**

Interaction of social and cultural groups in America; particular reference to the Negro. Processes leading to group contact; characteristics and contributions of ethnic groups in the United States; mechanisms and problems of group adjustment. Democratic theory and practice; sources of prejudice; contemporary status of principal minority groups; international implications; trends and proposed solutions. (3 cr; prereq 1 or §; III MTWThF; AndH 310) C Rose

**140 SOCIAL ORGANIZATION**

Organization and structure of social groups; basic culture patterns of economic, political, and social institutions. Integration and disintegration of social groups and institutions. Essentials of social dynamics. (3 cr; prereq 1 or §; IV MTWThF; BlegH 250) Hall

**180 METHODS OF SOCIAL RESEARCH**

Survey, including advantages of major methods and limitations when applied to specific types of problems. (3 cr; prereq 45 or equiv; I MTWThF; BlegH 250) Zwerman

**Speech, Communication, and Theatre Arts**

(For special department activities see: Acting Workshop, High School Forensics Workshop, High School Theatre Workshop, Speech Science, Pathology and Audiology programs, and University Theatre)

## Speech (Spch)

- 2†† COMMUNICATION IN THE MODERN WORLD: INTERPERSONAL COMMUNICATION**  
Description of structure of acts of communication and of factors influencing occurrence, form, and effects of such acts. Analysis of relationship of communication forms in social structure. (3 cr; I MTWThF; FolH 104) Geier, Woods
- 6 FUNDAMENTALS OF SPEECH**  
Emphasis on investigation and persuasion ranging from informal committee session to formal meeting requiring parliamentary rules. (3 cr, §5; limited to 22 students; prereq 2 or ¶2; II MTWThF; A 12) Scott, Staff
- 50 PUBLIC SPEAKING**  
Principles of preparing and presenting public speeches; directed practice in public speaking. Consideration of functions of public speaking in contemporary life. (3 cr, §5; limited to 22 students; prereq Upper Division standing; I MTWThF; FolH 105) Borchers
- 52 DISCUSSION AND CONFERENCE METHODS**  
Cooperative thinking in task-oriented groups. Planning, preparing for, participating in, and leading private and public meetings. (3 cr; prereq 5 or 6, or §; II MTWThF; A 116) Jensen
- 65 INTRODUCTION TO BROADCASTING**  
Fundamentals of practice and theory in radio and television. Emphasis on projects and exercises in performance and scripting; introduction to studio equipment and procedures. Historical and sociological aspects of broadcasting. (3 cr; limited to 18 students; prereq 5 or 6 or §; II MTWThF; MurH 302 and Aero 309) Browne
- 81 INTERPRETATIVE READING**  
Aesthetic theory of literature and of oral reading. Practice in reading for interpretation and mastery of technique. (3 cr; prereq 5 or 6; limited to 24 students; III MTWThF; Aero 313) Fredricks
- 102 CONTEMPORARY POLITICAL PERSUASION**  
Study of contemporary political speaking. Analysis of ideologies in political persuasion. (3 cr; prereq 5 or 6...101 rec...or §; III MTWThF; Aero 211) Brock
- 103 ARGUMENTATION**  
The role of reasoned discourse in social and governmental affairs. Logical methods of persuasion. (3 cr; prereq 5 or 6, or §; I MTWThF; FolH 103) Howell
- 105 THEORY OF READING AND ACTING**  
Literature as an art; its various forms; psychology of creative imagination; speech elements in literature; origins in literature; origins and nature of speech symbols and techniques of their use. (3 cr; limited to 15 students; prereq 83 and Psy 2; IV MTWThF; Aero 313) Fredricks
- 109 CLASSICAL RHETORIC**  
Greek and Roman theories of speech making; historical and philosophic context and influence on education. (3 cr; prereq 5 or 6; II MTWThF; A 205) Scott
- 110 HISTORY AND CRITICISM OF BRITISH PUBLIC ADDRESS**  
British orators, their works, the historical setting. British rhetorical theory. (3 cr; prereq 5 or 6; IV MTWThF; Arch 20) Jensen
- 111 INTERCULTURAL SPEECH-COMMUNICATION**  
Survey of factors important to successful interpersonal communication across cultures. Linguistic and nonverbal variables. Emphasis is upon North Americans abroad, communication with host nationals. (3 cr; prereq 6L, Anth 2 or Anth 100, or other course in cultural anthropology, or §; III MTWThF; Arch 20) Howell
- 170 RADIO AND TELEVISION PROGRAMMING**  
Theory and practice. Principles of program effectiveness; program policies of the industry. The FCC and programming. Emphasis on talk and discussion. (3 cr; prereq 65; IV MTWThF; J 202) Browne

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†† Students in programs requiring 5 credits in speech fundamentals may fulfill the requirement by taking Spch 2 and Spch 6.

- 174 EDUCATIONAL TELEVISION PROGRAMMING AND ADMINISTRATION**  
Television applied to educational needs; current practices; significant research findings; relative effectiveness of differing types of television utilization; impact of various modes of transmission on programming and administrative concepts. (3 cr; prereq 170, 173, or #; V MTWThF; FolH 108) Goldstein
- 181, 182, 183 READINGS IN SPEECH**  
Directed reading and preparation of reports on selected subjects. (Cr ar; prereq 9 cr in Upper Division speech and #)
- 277 SEMINAR: RHETORIC**  
History and critical study of rhetorical theory. Examination of research in rhetoric. (3 cr; prereq 109 or #; VI-VII MTh; FolH 108) Scott
- 291, 292, 293 RESEARCH**  
Open to graduate students engaged in research on special problems. (Cr and hrs ar) Staff

The following course is offered by the College of Education:

- EdCI 140 THE TEACHING OF SPEECH**  
Methods and techniques of teaching speech in the high school classroom. The social framework of spoken communication and responsibilities of the individual speaker. (3 cr; prereq 5 or 6 or #; II MTWThF; FolH 103) Borchers

### *Speech Science, Pathology and Audiology (SSPA)††*

- 101, 102, 103 READINGS**  
Directed readings and preparation of reports on selected subjects. (Cr and hrs ar; prereq #) Chaiklin, Lassman, Starr
- 122 VOICE SCIENCE**  
Inspection of research data relevant to basic processes involved in speech production and perception. (3 cr; IV MTWThF; FolH 104) Speaks
- 123 LABORATORY INSTRUMENTATION**  
Basic electronics from Ohm's Law to vacuum tube and transistor amplifier design. Designed to give speech student a basic knowledge of instrumentation he will encounter in his field. (3 cr; IV MTWThF; Arch 135) Speaks
- 147 REHABILITATION OF THE LARYNGECTOMIZED**  
Historical and contemporary types of surgical intervention. Relation between types of surgery and development of speech. Methods of initiating and developing communication. Use of artificial larynx. Cooperation with other rehabilitation agencies and personnel. (2 cr; prereq 99, 120, or #; III MTWTh; Arch 135) Henrikson
- 166A CLINICAL METHODS AND PRACTICE IN SPEECH PATHOLOGY: CLEFT PALATE**  
(1-3 cr; prereq 146 or #) Starr
- 166D CLINICAL METHODS AND PRACTICE IN SPEECH PATHOLOGY: STUTTERING**  
(1-3 cr; prereq 141 or #) Martin, Haroldson
- 169 SYMPOSIUM IN SPEECH SCIENCE, PATHOLOGY, AND AUDIOLOGY**  
Problems in the rehabilitation of hearing-impaired children and adults. Recent solutions presented by specialists in auditory training, lipreading, language development, hearing aids, the measurement of young deaf children, parent counseling, etc. (3 cr; prereq grad major of professional paid experience beyond undergrad major, or #; VI-VII MTWThF; FolH 109) Lassman and visiting professors

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†† The facilities of the University Speech and Hearing Clinic are available both terms to students desiring a personal speech or hearing analysis or wanting help with their speech or hearing problems. Interested students are invited to confer with Professor Clark Starr, director of the Speech and Hearing Clinic, 110 Shevlin Hall.

**170 HEARING DISORDERS**

Basic orientation to audiology. Symptomatology and pathology of hearing disorders, their medical and surgical treatment. Clinical and educational management. Psychological effects of hearing impairment. (3 cr; prereq 99, 120, or §; III MTWThF; Arch 130) Lassman

**173 AUDIOMETRY II**

Selected advanced audiometric procedures, their theoretical bases, and their relation to assessment of auditory disorders. Loudness-matching (recruitment) procedures, bone conduction, masking, difference limen procedures. Bekey audiometry, and adaptation tests. (2-3 cr; prereq 171 or §) Chaiklin

**175 GALVANIC SKIN RESPONSE AUDIOMETRY**

Galvanic skin response audiometry in the differential diagnosis of auditory disorders; nature of the GSR mechanism; historical aspects and conditioning literature relevant to audiometry. Includes laboratory experience. (3 cr; prereq 173; III MTWThF; Aero 317) Chaiklin

**177 INDUSTRIAL AUDIOLOGY AND OCCUPATIONAL HEARING LOSS**

The temporary and permanent effects of steady, intermittent, and impulse noises on hearing. Noise measurement, reduction, and control; ear defenders and their limitations. Hearing conservation programs; pre-employment testing and monitoring audiometry. (3 cr; prereq 171 or §; IV MTWThF; Arch 140) Ward

**190, 191, 192 CLINICAL METHODS AND PRACTICE IN AUDIOLOGY**

Methods and supervised practice in analysis, diagnosis, and rehabilitation of communication disorders of persons with auditory impairments. (3 cr; prereq 173 or 174, or §) Lassman, Hoel

**204, 205, 206 RESEARCH**

Open to graduate students engaged in research. (Cr ar; prereq §; hrs ar) Chaiklin, Martin, Lassman, Ward, Starr

**248 SEMINAR: ANALYSIS OF LITERATURE IN SPEECH PATHOLOGY**

Basic problems relating to the evaluation of various types of literature in speech pathology. Individual projects designed to determine and evaluate the student's analytical procedures. (3 cr; prereq grad major in speech pathology or §; V MTWThF; FolH 103) Henrikson

**290, 291, 292 ADVANCED CLINICAL METHODS AND PRACTICE IN AUDIOLOGY**

Supervised internship experiences for advanced graduate students working with communication disorders of persons with auditory impairments. (3 cr; prereq 190, 191, 192, and §; hrs ar) Lassman, Hoel

*Note*—For clinical methods and practice in speech pathology in the College of Education, see EdCI 174-175-176.

The following courses are offered by the College of Education:

**EdCI 174, 175, 176 CLINICAL METHODS AND PRACTICES IN SPEECH PATHOLOGY**

Case history and analysis; testing and diagnosis of speech defects; techniques and work programs for treatment; practical clinical work. (3 cr each; limited to students attending full time spring qtr 1968; hrs ar) Starr, Gaines

## Theatre (Th)

**11 INTRODUCTION TO THE THEATRE**

History and theory of plays and writing as well as various arts and crafts of the theatre. (3 cr; limited to 200 students; II MTWThF; ScH 108) Ballet

**12 LABORATORY SECTION: INTRODUCTION TO THE THEATRE**

A laboratory in the practice of the arts and crafts of the theatre; scenery and particularly construction and painting, stage operation, theatre lighting, costuming, or make-up. (1 cr; prereq 11 or §11; meet first day III hr, ScH 108...hrs and rm thereafter to be ar) Scales



- 18 VOICE PRODUCTION FOR THE THEATRE**  
Physical exercises designed to free the human voice from unnecessary inhibitions and tensions. Work on prose, poetry, and drama. Vocal exercises with piano. (2 cr; limited to 20 students; prereq soph, 12 or ¶12; II MTThF, lab ar; ShH 115) Corrigan
- 21 BEGINNING ACTING: CREATIVE APPROACH**  
Creation and presentation of original scenes and skits. Ability to respond to the imaginative situation with individuality and effectiveness is stressed. (3 cr; limited to 18 students; prereq fr with Δ, or soph, 12 or ¶12; III-IV MTWThF; WeH 302) Frost
- 24 STAGE MAKE-UP**  
Theory and practice in the art of stage make-up. (1 cr; limited to 15 students; prereq 12 or ¶12; VI-VII TTh; ScH 23) Muschamp
- 34 STAGECRAFT: CONSTRUCTION AND PAINTING**  
Theory and practice in construction, painting and shifting of stage scenery. (3 cr, ¶74; limited to 20 students; prereq soph, 12; III MTWThF; WeH 306) Vogel
- 75 PLAY PRODUCTION IN THE SECONDARY SCHOOLS**  
Theory and practice of play selection, rehearsal, and presentation in the high school. (3 cr; limited to 15 students; prereq 74 or §; II MTWThF; ScH 19) Adey
- 90 COSTUMING**  
Theory, design, and construction of costumes for theatrical production. (3 cr; prereq 12, 34; V MTWThF; NH 304) Schulze

*Note*—Of the following courses, Th 101, 102, 103, 118, 119, 120, 121, 122, 123, 174, 175, and 176, the maximum number of credits for graduate degrees is: MFA, unlimited; MA Plan A, 6 credits; MA Plan B, 9 credits; and Ph.D., 18 credits.

- 101, 102, 103 THEATRE PRACTICUM**  
Individual creative projects meeting approval of a faculty committee in one or more of these areas: playwriting, directing, acting, design. Application forms in 102 Shevlin Hall. Approval of adviser and committee necessary before registration. (2-6 cr; prereq Δ and §) Ballet and staff
- 111 STAGE DIRECTION**  
Theory of direction. Exercises in blocking and production of short scenes. (3 cr; prereq sr, 21, 6 cr from 90, 91, or 92 and §; II MTWThF; NH 304) Balk
- 118 VOICE PRODUCTION FOR THE THEATRE**  
Physical exercises designed to free the human voice from unnecessary inhibitions and tensions. Work on prose, poetry, and drama. Vocal exercises with piano. Taped listening sessions required. (2 cr; limited to 18 students; prereq grad and theatre major; III MTThF; ShH 115) Corrigan
- 171 HISTORY OF THE THEATRE**  
Plays, arts, and crafts of the theatre from their beginnings to the Renaissance. Reports and projects. (3 cr; limited to 20 students; prereq 12 and 100 or §; IV MTWThF; WeH 306) Balk
- 178 THEATRE BACKGROUNDS**  
Selective examination of plays as part of the living theatre. Chronological, comparative study of development of theatrical elements in the drama. (3 cr; prereq sr, grad, 11 or equiv plus 9 Upper Division cr in one of the following: speech-theatre, English, classics, or modern languages; IV MTWThF; 115 ShH) Ballet
- 180 AMERICAN THEATRE**  
The theatre as an aspect of American culture from 1752 to the present. (3 cr; prereq 12 or grad; II MTWThF; WeH 306) Nolte
- 181, 182, 183 READINGS IN THEATRE**  
Directed reading and preparation of reports on selected subjects. (Cr ar; prereq 9 cr in theatre and §; hrs ar) Staff

- 211 SEMINAR: STAGE DIRECTION**  
Classical plays and their potential for meaningful and effective production in the modern theatre. (3 cr; limited to 12 students; prereq 111, 112, 113; I-II TTh; ShH 105) Sonkowsky
- 281, 282, 283 RESEARCH**  
Open to graduate students engaged in research on special problems. (Cr ar) Staff

## Statistics (Stat)

- 90 INTRODUCTION TO PROBABILITY AND STATISTICS**  
Elementary probability and probability distributions; sampling and elements of statistical inference. (3 cr; prereq differential and integral calculus; I MTWThF; ForH 175) Ar
- 121 THEORY OF STATISTICS**  
(For nonmajors) Probability distributions, law of large numbers, sampling, likelihood function. (3 cr; prereq Math 42 or equiv; II MTWThF; ForH 175) Ar
- 182 TUTORIAL COURSE**  
Students whose needs are not met by current offerings may obtain content of regular courses or special areas by directed study. (3 cr; prereq #) Ar

## Studio Arts (Art)

- 10 PHOTOGRAPHY**  
Introduction to the photographic medium, its background and meaning today. Lectures in contemporary and historical use of photography. Problems in the use of the camera, printing, and enlarging. (3 cr; limited to 20 students; I-II MTWThF; ArtB) Liebling
- 11 PHOTOGRAPHY**  
For students who have had previous instruction in photography or have worked in photography and know the principles of developing and printing. Develops a personal photographic perception in the student through lectures on photographic history and contemporary trends in photography. Intensive field work. (3 cr; limited to 15 students; prereq 10; III-IV MTWThF; ArtB) Liebling
- 20 BASIC DRAWING**  
An introduction to studio work; exploration of contemporary and traditional methods. Work from nature, various drawing mediums. (3 cr; limited to 25 students)  
Sec 1, I-II MTWThF, ArtB 150, Quirt  
Sec 2, III-IV MTWThF, ArtB 140, Howard
- 23 DRAWING AND PAINTING**  
Work from life and nature; introduction to color and pictorial structure. (3 cr; limited to 25 students; prereq 20)  
Sec 1, III-IV MTWThF, ArtB 160, Busa  
Sec 2, I-II MTWThF, ArtB 140, Howard
- 32-33 ELEMENTS OF PRINTMAKING**  
(Sequence limited to 20 students) Bethke
- 32** Foundation course. Familiarizes the student with the mediums of printmaking in general. Problems in engraving, etching, and other techniques employed in working on metal plate, as well as lithography, woodcuts, and combined processes. (3 cr; I-II MTWThF; ArtB 170)
- 33** A beginning course designed to introduce the various techniques of etching, engraving employed in working on metal plate. Woodcuts and lithography are included, and lectures and demonstrations are given. (3 cr; I-II MTWThF; ArtB 170)
- 40-41 SCULPTURE**  
(Sequence limited to 20 students) Daly

- 40 Beginning course. Intensive study of structure in nature with emphasis on accurate observation. Construction in metal and plaster. (3 cr; I-II MTWThF; HolB 154)
- 41 Integrates basic principles examined in Art 40. Natural form is studied for sculptural possibilities. A more imaginative approach to the study of nature is encouraged. (3 cr; prereq 40; I-II MTWThF; HolB 154)

#### 45 CERAMIC PROCESSES

Introduction to building pottery by hand and forming on the potters wheel. Experiments with decorative techniques on wet clay and on bisque-fired pottery. Primarily concerned with pottery as a creative expression but includes technical considerations of clays, glazes, and kilns. (3 cr; I-II MTWThF; HolB) Hoard

#### 53-54-55 DRAWING

From the model, still life, and nature. Principles of anatomy. (3 cr; limited to 25 students; prereq 23)

Sec 1, I-II MTWThF, ArtB 160, Busa

#### 60B-61B-62B WATER COLOR

Introduction to transparent watercolor, gouache, casein, and tempera. General course introducing student to various drawing and painting mediums. Figure, still life, landscape, and abstract design. (3 cr; limited to 25 students; prereq 20, or equiv, with #; III-IV MTWThF; ArtB 141) Myers

#### 70-71-72 OIL PAINTING

Introduction to medium of oil; individual projects and instruction. (3 cr; limited to 25 students; prereq 55 or #)

Sec 1, III-IV MTWThF, ArtB 161, Quirt

#### 80A,C-81A,C-82A,C SCULPTURE

(Sequence limited to 15 students; III-IV MTWThF; HolB 154) Daly

- 80A Work with direct metal sculpture and constructions. Attention given to 20th-century tools and equipment. (3 cr; prereq 41)
- 81A Direct metal problems of sculptural expression and organization in relation to architecture. (3 cr; prereq 80A, 80B, 80C)
- 82A Experimental work in direct metal. Class problems are assigned. (3 cr; prereq 81A)
- 80C Metal casting of sculpture. Lost-wax and sand-casting techniques are employed. (3 cr; prereq 42)
- 81C Problems concerned with cast metal sculpture for landscape architecture. (3 cr; prereq 80A, 80B, 80C)
- 82C Experimental work in cast metals. Class problems are assigned. (3 cr; prereq 81C)

#### 83-84-85 PHOTOGRAPHY II

Gives advanced students an opportunity to carry out creative problems in color development and printing. Experiments in photographic controls to illustrate limitations and capacities. Use of photography to interpret the visual environment and the photographer's responsibilities in this use. (3 cr; limited to 5 students; prereq 11 or Jour 6 or Δ; III-IV MTWThF; ArtB) Liebling

#### 90-91-92 PRINTMAKING, INTAGLIO PROCESSES

(3 cr; limited to 15 students; prereq 32 or #; III-IV MTWThF; ArtB 170) Bethke

#### 93-94-95 CERAMIC DESIGN

Continuation of Art 45. Greater emphasis on wheel throwing. Advanced design problems and introduction to glaze and clay experimentation. Emphasis on development of personal expression in ceramic medium. (3 cr; prereq 45 or #; III-IV MTWThF; HolB) Hoard

#### 150-151-152 PROBLEMS IN PAINTING

(3 cr; limited to 10 students; prereq 72 and #; III-IV MTWThF; ArtB 161) Quirt

**180A,C-181A,C-182A,C SCULPTURE IV**

(Sequence limited to 5 students; prereq 9 cr in courses numbered 81 or above;  
III-IV MTWThF; HolB 154) Daly

180A-181A-182A Advanced work in welding (3 cr)

180C-181C-182C Advanced work in foundry practices

**190-191-192 ADVANCED PRINTMAKING, INTAGLIO PROCESSES**

(3 cr; limited to 5 students; prereq 90 or §; III-IV MTWThF; ArtB 170) Bethke

**193-194-195 ADVANCED PROBLEMS IN STUDIO**

Individual projects and guidance. (3 cr; prereq §; hrs and rm ar) Quirt, Busa,  
Myers

**200-201-202 ADVANCED PROBLEMS IN PAINTING**

(3 cr; prereq §; hrs and rm ar) Quirt, Busa

# College of Medical Sciences

*For general information on the College of Medical Sciences, see section on Schools, Colleges, and Special Programs.*

## MEDICAL SCHOOL

### Anatomy (Anat)

#### ELECTIVE COURSES

- 156 **ADVANCED ANATOMY**  
Individual problems in gross anatomy, embryology, or neuroanatomy. (Cr and hrs ar; prereq §) Staff
- 204 **RESEARCH IN ANATOMY**  
Gross anatomy, cytochemistry, histology, endocrinology, embryology, hematology, or neuroanatomy. (Cr and hrs ar; prereq §) Staff

### Anesthesiology (Anes)

#### REQUIRED COURSES

- 101 **PRINCIPLES OF ANESTHESIA**  
(2 cr; prereq regis med) Van Bergen and staff

#### ELECTIVE COURSES

- 169 **RESEARCH IN ANESTHESIOLOGY**  
Anesthesia problems in experimental laboratory or in hospital. (Cr and hrs ar) Van Bergen and staff
- 181 **EXTERNSHIP IN ANESTHESIOLOGY**  
(6 cr; limited to 6 students; hrs ar) Van Bergen and staff
- 182 **EXTERNSHIP IN ANESTHESIOLOGY AND RESPIRATORY PROBLEMS**  
(6 cr; limited to 3 students; prereq 181) Van Bergen and staff

#### REQUIRED COURSES FOR GRADUATE STUDENTS

- 265 **GENERAL ANESTHESIA**  
Instruction and experience in general anesthesia. (12 cr) Van Bergen and staff
- 266 **REGIONAL ANESTHESIA**  
Observation, instruction, and administration of all types of local, regional, and spinal anesthesia. (4 cr) Van Bergen and staff
- 267 **PRE- AND POSTANESTHETIC EVALUATION**  
Selection of proper anesthetic agent and technique, premedication, and observation of recovery from anesthesia. (2 cr) Van Bergen and staff
- 268 **SEMINAR: ANESTHESIOLOGY**  
Review of literature, report of case problems, and discussion of research work in progress within the department. (2 cr) Van Bergen and staff

**269 RESEARCH IN ANESTHESIA**

Anesthesia problems in experimental laboratory or in hospital. (Cr and hrs ar)  
Van Bergen and staff

## **Biochemistry (MdBc)**

### **REQUIRED COURSES**

**100 BIOCHEMISTRY**

(7 cr; prereq organic and physical chemistry and physics; lect IV, VI MTWTh,  
II, III F, Owre 15; lab I-III MTWTh, MH 201) Carr, Koerner, Bodley

### **ELECTIVE COURSES**

**153 PROBLEMS IN BIOCHEMISTRY**

Special work arranged with qualified students. May be taken one or both terms.  
(Cr and hrs ar; prereq 100, 101) Carr, Koerner, Bodley

**205 RESEARCH IN BIOCHEMISTRY**

(Cr and hrs ar) Armstrong, Carr, Larner, Wetlaufer, Wold, Koerner, Van Pilsum,  
Bodley

## **Laboratory Medicine**

### **Laboratory Medicine (LMed)**

**181 PROBLEMS IN CLINICAL LABORATORY MEDICINE**

(Cr and hrs ar; prereq #) Benson, Quie, Strandjord, Sundberg, E Yunis, J Yunis

**235 ADVANCED CLINICAL LABORATORY MEDICINE**

(Cr and hrs ar; prereq #) Benson, Quie, Strandjord, Sundberg, E Yunis, J Yunis

**236 RESEARCH: CLINICAL LABORATORY PROBLEMS**

(Cr and hrs ar; prereq #) Benson and staff

**251 RESEARCH: HUMAN GENETICS**

(Cr and hrs ar; prereq #) J Yunis

## **Medical Technology (MedT)**

**110 ADVANCED CLINICAL LABORATORY TECHNIQUES**

Assignment on individual basis for observation, study, and practice in special problems; techniques and methodology in one or two of the units of the clinical laboratories (chemistry, hematology, histology, immunology, or microbiology). (5 cr; prereq grad; hrs ar) Hovde and staff

## **Medicine (Med)**

### **Division of Internal Medicine**

#### **REQUIRED COURSES**

**104 INTRODUCTION TO INTERNAL MEDICINE**

(2 cr per qtr for 4 qtrs; prereq 101, LMed 102; 1:00-1:50 alt W; Todd Amph)  
Ebert and staff

- 112 **CLERKSHIP: INTERNAL MEDICINE**  
(16 cr; prereq regis med; 8:00-5:00 MTWThFS) Murray and staff

### ELECTIVE COURSES††

- 180 **EXTERNSHIP IN MEDICINE**  
Care of medical patients on an inpatient service at an advanced level of responsibility. University, Murray; Veterans Administration, Hall; Hennepin County General Hospital, Schultz; St. Paul-Ramsey, Taddeini; Mount Sinai, Lewis; and Northwestern, Watson. (6 cr per period; offered 3 elective periods; hrs ar)
- 181 **RESEARCH IN MEDICINE**  
Research opportunities in the following areas are available at University and affiliated hospitals (as in Med 180): gastroenterology, hypertension and sodium metabolism, lipid metabolism as related to atherosclerosis, liver disease, adrenal disease, carbohydrate metabolism and clinical diabetes, immunology and infectious diseases, cardiovascular and pulmonary disease, experimental hemodynamics, internal medicine. A detailed listing of these opportunities is available in the departmental office. (6 cr per period; offered 3 elective periods; hrs ar) Staff
- 184 **SPECIAL CLINICAL PROBLEMS**  
Opportunities for study in the following areas of clinical interests are available at University or affiliated hospitals (as in Med 180): clinical electrocardiography and vectorcardiography, clinical and basic problems in bile pigment and porphyrin metabolism, infectious diseases, endocrinology and metabolic disease including diabetes and thyroid disturbances, immunology and allergy, cardiovascular and pulmonary disease, clinical hemodynamics. A detailed listing of these opportunities is available in the departmental office. (6 cr per period; offered 3 elective periods; hrs ar) Staff
- 201 **CLINICAL MEDICINE**  
(Cr and hrs ar) Ebert and staff
- 202 **DISEASES OF THE CARDIOVASCULAR APPARATUS**  
(Cr and hrs ar) Frantz and staff
- 203 **RESEARCH IN MEDICINE**  
(Cr and hrs ar) Ebert and staff
- 205 **DISEASES OF CHEST**  
(Cr and hrs ar) Ebert, Hall, Lillehei
- 206 **CLINICAL CONFERENCE**  
Presentation of problem cases. Discussion of diagnosis and treatment and consideration of pertinent literature. (1 cr; 11:00-11:50 S; Eustis Amph) Ebert and staff
- 207 **CLINICAL PATHOLOGICAL CONFERENCE**  
Presentation of clinical features, necropsy findings, and discussion. Medical and surgical cases. (1 cr; 9:00-9:50 Th; Todd Amph) Dawson and staff
- 208 **CLINICAL RADIOLOGICAL CONFERENCE**  
Presentation and discussion of X-ray films from the Medical Service, with clinical correlation. (1 cr; 10:00-10:50 T; Todd Amph) Peterson, Ebert, and staff
- 210 **SEMINAR: INFECTIOUS DISEASE**  
(1 cr; hrs ar) Spink
- 211 **ELECTROCARDIOGRAPHIC CONFERENCE**  
(1 cr; 3:30-4:20 T; Todd Amph) Tuna and staff
- 214 **CARDIAC CONFERENCE**  
Weekly conference on clinical cardiovascular problems, held jointly by the Departments of Medicine, Surgery, and Radiology. (1 cr; 4:00-4:50 M; Todd Amph) Wang and staff

†† Prior arrangements with departmental office.

## Division of Dermatology

### REQUIRED COURSES

- 123 **DERMATOLOGY, SYPHILOLOGY**  
(2 cr; prereq 101; 4:00-5:00 alt W; Eustis Amph) Lynch and staff
- 124 **SENIOR CLERKSHIP; DERMATOLOGY**  
(2 cr; prereq regis med; 8:00-9:00 MTThF, 1:00-5:00 MTTh, 9:00-11:00 Th, 1:00-4:00 W, 1:30-2:30 F; Eustis Amph) Lynch and staff

### ELECTIVE COURSES

- 182 **EXTERNSHIP IN DERMATOLOGY**  
(Cr and hrs ar) Lynch
- 183 **PROBLEMS IN DERMATOLOGY**  
(Cr and hrs ar) Lynch and staff
- 225 **CLINICAL DERMATOLOGY**  
(Cr and hrs ar) Lynch and staff
- 226 **SEMINAR: DERMATOLOGY**  
(Cr and hrs ar) Lynch and staff
- 227 **HISTOPATHOLOGY OF THE SKIN**  
(1 cr; hrs ar) Orkin and staff
- 228 **RESEARCH: DERMATOLOGY**  
(Cr and hrs ar) Lynch and staff
- 230 **FUNCTIONAL BIOLOGY OF THE SKIN**  
(Cr and hrs ar) Fusaro, Rukavina, and Smith

## Microbiology (MicB)

- 152 **SPECIAL PROBLEMS**  
(Cr and hrs ar; prereq §) Staff
- 201 **RESEARCH**  
(Cr and hrs ar) Staff
- 222 **PHYSIOLOGY OF BACTERIA LABORATORY**  
Techniques employed in study of bacterial physiology and metabolism. (3 cr; designed for grad students in microbiology, open to others with §; prereq 121; lab I-IV MTWThF; Mayo A-205) Rogers

## Obstetrics and Gynecology (Obst)

### REQUIRED COURSES

- 120 **OBSTETRICS AND GYNECOLOGY**  
Physiology of pregnancy; labor and the puerperium. (4 cr; prereq 124; 2:15-3:00 W) Prem and staff
- 135 **CLINICAL CLERKSHIP IN OBSTETRICS AND GYNECOLOGY**  
Includes clinics in obstetrics and gynecology. (12 cr; prereq regis med) Prem and staff

### ELECTIVE COURSES

- 184 **EXTERNSHIP IN OBSTETRICS AND GYNECOLOGY**  
Course will consist of clinical work in obstetrics and gynecology. Under exceptional circumstances investigative work can be done. Registration may be for one



or both terms. (Cr and hrs ar; for jr and sr med students and recent grads; limited to 10 students) Prem and staff

### COURSES FOR GRADUATE STUDENTS

- 201 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART I**  
(Cr ar) Prem and staff
- 202 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART II**  
(Cr ar) Prem and staff
- 203 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART III**  
(Cr ar) Prem and staff
- 204 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART IV**  
(Cr ar) Prem and staff
- 205 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART V**  
(Cr ar) Prem and staff
- 206 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART VI**  
(Cr ar) Prem and staff
- 207 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART VII**  
(Cr ar) Prem and staff
- 208 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART VIII**  
(Cr ar) Prem and staff
- 209 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART IX**  
(Cr ar) Prem and staff
- 210 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART X**  
(Cr ar) Prem and staff
- 211 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART XI**  
(Cr ar) Prem and staff
- 212 **ADVANCED OBSTETRICS AND GYNECOLOGY, PART XII**  
(Cr ar) Prem and staff
- 216 **RESEARCH**  
(Cr ar) Staff
- 301 **EXTERNSHIP**  
(6 cr) Staff

### Ophthalmology (Opth)

- 200 **CLINICAL OPHTHALMOLOGY**  
(6 cr; 10:00-5:00 MTWThF; O-P Clin) Harris and staff
- 201 **PRACTICAL OCULAR SURGERY**  
(3 cr; 7:30-10:00 TWTh; Oper Rm) Harris and staff
- 203 **BASIC AND APPLIED OPHTHALMOLOGY**  
(2 cr; 8:00-12:00 S; O-P Clin) Harris and staff

### Otolaryngology (Otol)

#### COURSES FOR GRADUATE STUDENTS

- 230 **CLINICAL OTOTOLOGY**  
(3 cr; 1:00-4:00 MTWThF; Outpatient Clinic) Paparella and staff
- 231 **CLINICAL RHINOLOGY AND LARYNGOLOGY**  
(3 cr; 1:00-4:00 MTWThF; Outpatient Clinic) Paparella and staff

- 232 SURGERY OF EAR, NOSE, AND THROAT**  
(3 cr; 9:00-12:00 MTWThF; Oper Rm) Paparella and staff
- 241 SEMINAR ON CURRENT LITERATURE**  
(1 cr; 9:00-11:00 S; Mayo A-675) Staff
- 248 RESEARCH**  
(Cr and hrs ar) Staff

## Pathology (Path)

- 104 AUTOPSIES**  
(Cr ar; prereq 102; hrs ar) Dawson, Hebbel
- 106 DISEASES OF THE HEART**  
(1 cr; prereq 102; hrs ar) Edwards
- 111 CONFERENCE ON AUTOPSIES**  
(1 cr; prereq 102; 12:30-1:30 T; JacH 178) Dawson
- 112 DIAGNOSIS OF TUMORS**  
See section on 10-week courses, page 137.
- 113 SURGICAL PATHOLOGY**  
(Cr and hrs ar; prereq 102) Hebbel
- 121 DISEASES OF THE ALIMENTARY TRACT**  
(1 cr; prereq 102; hrs ar) Hebbel
- 150 PROBLEMS IN PATHOLOGY**  
See section on 10-week courses, page 137.
- 201 RESEARCH**  
Students with the necessary preliminary training may elect research either as a major or minor in pathology. (Cr and hrs ar; prereq #) Dawson, Hebbel

## Pediatrics (Ped)

### REQUIRED COURSES

- 120 CLINICAL LECTURES IN PEDIATRICS**  
(2 cr; prereq regis med; 1:00-2:00 W; Eustis Amph) J Anderson and staff
- 135 CLINICAL CLERKSHIP**  
(12 cr; prereq regis med) J Anderson and staff

### ELECTIVE COURSES

- 181 EXTERNSHIP**  
Care of pediatric patients on an inpatient service at an advanced level of responsibility. Offered at University and affiliated hospitals. (Cr ar)
- 182 SPECIAL CLINICAL PROBLEMS**  
Opportunities for study in the following areas of clinical interest are available at University and affiliated hospitals: pediatric cardiology, pediatric neurology, pediatric endocrinology and metabolism; and renal diseases. A detailed listing of these opportunities is available in the departmental office. (Cr ar)
- 183 RESEARCH IN PEDIATRICS**  
Research opportunities in the following areas are available at University or affiliated hospitals: hematology, infectious disease, immunology and inflammatory diseases, renal diseases, metabolic and endocrinologic research. A detailed listing of these opportunities is available in the departmental office. (Cr ar)

## COURSES FOR GRADUATE STUDENTS

All pediatric medical fellows, medical fellow specialists, teaching assistants, and research assistants are required to register for one or more of the following courses. Credit obtained may be applied to the M.S. or the Ph.D. degree. The clinical experience in these courses is obtained in the outpatient and inpatient services of the University of Minnesota Hospitals. Research opportunities will be provided by arrangement in either the basic science departments of the Medical School or in the laboratories of the Department of Pediatrics.

- 200 GRADUATE SEMINAR IN PEDIATRICS**  
(1½ cr; VIII T; Mayo 1450) J Anderson and staff
- 202 PEDIATRIC CLINIC**  
(5 cr; II-IV MTWThF; O-P depts of Hennepin County General Hospital or University Hospitals) J Anderson and staff
- 204 RESIDENCY IN PEDIATRICS**  
Three-month residency in pediatrics at University Hospitals, Hennepin County General Hospital, St. Paul Children's Hospital, St. Paul-Ramsey Hospital. (7 cr; I-X MTWThF) J Anderson and staff
- 206 PEDIATRIC SPECIAL INTEREST**  
Pediatric graduate students who have completed at least 1½ years of their general graduate pediatric training may obtain advanced clinical and basic training in one or more of the following special fields: allergy, neurology, cardiology, psychiatry, pathology, endocrinology and metabolism, hematology. Clinical training in these areas is obtained in the inpatient and outpatient services of the University Hospitals and its affiliated hospitals. Training in the basic sciences related to these fields of special interest may be obtained in the preclinical divisions of the medical school. (Cr and hrs ar; prereq #) J Anderson and staff
- 208 PEDIATRIC RESEARCH**  
Special problems. Students may collaborate with members of the staff or with other students. (Cr and hrs ar; ped labs) J Anderson and staff

## Pharmacology (Phcl)

- 109 PHARMACOLOGICAL PROBLEMS**  
(Cr and hrs ar) Shideman and staff
- 203 RESEARCH IN PHARMACOLOGY**  
(Cr and hrs ar) Shideman and staff

## Physical Medicine and Rehabilitation (PMed)

- 103 PHYSICAL THERAPY CLINIC**  
(Cr and hrs ar) Gullickson
- 161 CLINICAL MEDICINE IN REHABILITATION**  
(5 cr) Staff
- 180 PROBLEMS IN PHYSICAL THERAPY**  
(Cr ar; prereq physical therapist) Staff
- 181 EXTERNSHIP IN PHYSICAL MEDICINE AND REHABILITATION**  
(Cr ar; prereq regis med) Gullickson
- 190 PROBLEMS IN PHYSICAL MEDICINE AND REHABILITATION**  
(Cr ar; prereq regis med) Staff
- 191 SEMINAR: REHABILITATION LITERATURE**  
(Cr ar; prereq regis med) Staff

- 200 **PHYSICAL MEDICINE SERVICE**  
(Cr and hrs ar) Staff
- 204 **CLINIC, PERIPHERAL VASCULAR DISEASE**  
(Cr and hrs ar) Gullickson
- 205 **READINGS**  
(1 cr; 1 M) Kottke
- 206 **CONFERENCE**  
(Cr and hrs ar) Staff
- 210 **RESEARCH IN PHYSICAL MEDICINE**  
(Cr and hrs ar) Staff
- 212 **ELECTROMYOGRAPHY**  
(Cr and hrs ar) Kottke

## *Occupational Therapy*

### **94-95-96 CLINICAL TRAINING IN OCCUPATIONAL THERAPY**

A total of 9 months of supervised training in affiliated hospitals. (18 cr per qtr for senior O T students)

## *Physical Therapy*

- 83 **THEORY AND TECHNIQUE OF MUSCLE FUNCTION**  
(5 cr; lect II MTWTh, ChRC 208; lab III-IV MTWTh, II-IV F, ChRC 220)  
Pohilla, Allison
- 88 **CLINICAL EDUCATION**  
Five weeks of supervised practice at affiliating hospitals. (3 cr; limited to physical therapy students in the professional program; hrs ar at affiliating hospitals) Clayson

## *Physiology (Phsl)*

- 51 **HUMAN PHYSIOLOGY**  
(5 cr; primarily for baccalaureate nursing students and physical therapy students; prereq zoology and 1 yr college chemistry; lect VI MWF, VII TThF, VIII TTh, Owre 111; conf IV TTh, Owre 111; lab VII-IX MW, MH 307) Lee
- 113 **PROBLEMS IN PHYSIOLOGY**  
(Cr and hrs ar) Staff
- 202 **READINGS IN PHYSIOLOGY**  
(Cr and hrs ar) Staff
- 203 **RESEARCH IN PHYSIOLOGY**  
(Cr and hrs ar) Staff

## *Psychiatry and Neurology (NPsy)*

- 101 **CLINICAL NEUROLOGY**  
(4 cr; prereq regis med or grad clin psychol; 8:00 am S) Baker
- 103 **CLINICAL CLERKSHIP**  
(12 cr) Staff
- 145 **READINGS IN PSYCHIATRY**  
(Cr ar) Staff
- 145X **READINGS IN NEUROLOGY**  
(Cr ar) Staff

- 151 SURVEY OF NEUROPATHOLOGY  
(Cr ar) Staff
- 181 EXTERNSHIP IN NEUROLOGY  
(Cr ar) Staff
- 182 PROBLEMS IN BASIC AND CLINICAL NEUROLOGY  
(Cr ar) Staff
- 191 EXTERNSHIP IN ADULT PSYCHIATRY  
(Cr ar) Staff
- 192 EXTERNSHIP IN CHILD PSYCHIATRY  
(Cr ar) Jensen
- 193 PROBLEMS IN PSYCHIATRY  
(Cr ar) Staff
- 202 SPECIAL RESEARCH TOPICS  
(Cr ar; prereq #) Staff
- 203 PSYCHOMETRIC CLERKSHIP  
(Cr ar) Staff
- 204 INTERNSHIP IN CLINICAL PSYCHOLOGY  
(2 or 4 cr; prereq PhD candidate in clinical psychology with #) Staff
- 206 MEDICAL PSYCHOLOGY I  
(3 cr; prereq grad) Briggs, Hafner
- 208 CLINICAL NEUROLOGY  
(Cr ar) Baker and staff
- 209 RESEARCH IN NEUROLOGY  
(Cr ar) Baker and staff
- 212 SURVEY OF NEUROPATHOLOGY  
(1 cr) Sung
- 226 NEUROLOGICAL-NEUROSURGICAL CONFERENCE  
(1 cr) Baker and staff
- 231 APPLIED ELECTROENCEPHALOGRAPHY, MYOGRAPHY  
(Cr ar) Torres, Kennedy
- 233 APPLIED NEUROPATHOLOGY  
(Cr ar) Sung
- 251 CLINICAL INPATIENT PSYCHIATRY  
(Cr ar) Staff
- 252 CLINICAL OUTPATIENT PSYCHIATRY  
(Cr ar) Anderson and staff
- 253 CLINICAL CHILD PSYCHOLOGY  
(Cr ar) Jensen and staff
- 254 ADVANCED CLINICAL INPATIENT PSYCHIATRY  
(Cr ar) Staff
- 255 ADVANCED CLINICAL OUTPATIENT PSYCHIATRY  
(Cr ar) Anderson and staff
- 256 ADVANCED CLINICAL CHILD PSYCHIATRY  
(Cr ar) Jensen and staff
- 257 SPECIAL ASSIGNMENTS  
(1 cr) Staff
- 258 RESEARCH IN PSYCHIATRY  
(Cr ar) Staff
- 260 ORIENTATION TO CLINICAL PSYCHIATRY  
(1 cr) Staff
- 291 SEMINAR: CURRENT LITERATURE  
(1 cr) Simon

## **Radiology (Rad)**

### **ELECTIVE COURSES FOR THIRD-AND FOURTH-YEAR STUDENTS**

- 180    **EXTERNSHIP IN RADIOLOGY**  
      (Cr and hrs ar)
- 181    **EXTERNSHIP IN DIAGNOSTIC RADIOLOGY**  
      (Cr and hrs ar)
- 182    **EXTERNSHIP IN RADIATION THERAPY**  
      (Cr and hrs ar)
- 183    **PROBLEMS IN RADIATION BIOLOGY AND RADIOACTIVE ISOTOPE METHODS**  
      (Cr and hrs ar)
- 184    **PROBLEMS IN DIAGNOSTIC RADIOLOGY**  
      (Cr and hrs ar)
- 186    **ROENTGEN TECHNIQUE**  
      (Cr and hrs ar)

### **REQUIRED COURSES FOR GRADUATE STUDENTS**

- 110    **RADIATION BIOLOGY INSTITUTE**  
      Effects of irradiation on living systems. Radioisotopic procedures. Physics and chemistry fundamental to radiation biology and effects on all types of chemical and biological systems. (Cr and hrs ar)
- 111    **MEDICAL ROENTGENOLOGIC CONFERENCE**  
      Weekly meetings with the medical staff at which all the important medical cases which have X-ray diagnostic procedures are reviewed from both the clinical and roentgenological points of view. (1 cr; III T; Todd Amph) Peterson and staff
- 124    **PEDIATRIC ROENTGENOLOGIC CONFERENCE**  
      Weekly meetings with the pediatric staff at which all the important pediatric cases which have had X-ray diagnostic procedures are reviewed from both the clinical and roentgenological points of view. (1 cr; II T; Eustis Amph) Wolfson
- 135    **SURGICAL ROENTGENOLOGIC CONFERENCE**  
      Weekly meetings with the surgical staff at which all the important surgical cases which have had X-ray diagnostic procedures are reviewed from both the clinical and roentgenological standpoints. (1 cr; II S; Todd Amph) Amplatz, Gedgudas
- 163    **NEUROSURGICAL ROENTGENOLOGIC CONFERENCE**  
      Weekly meetings with the neurosurgical staff at which all the important neurosurgical cases which have had X-ray diagnostic procedures are reviewed from both the clinical and roentgenological points of view. (1 cr; VI F; Todd Amph) Peterson
- 200    **RESEARCH IN ROENTGENOLOGY**  
      Problems in roentgen diagnosis. (Cr ar) Peterson and others
- 202    **CARDIOVASCULAR ROENTGENOLOGIC CONFERENCE**  
      (1 cr; VIII M; Todd Amph) Amplatz, Gedgudas
- 204    **TUMOR CLINIC CONFERENCE**  
      (Cr ar; IV M; Todd Amph) D'Angio
- 205    **RESEARCH: RADIATION THERAPY, NUCLEAR MEDICINE, RADIOBIOLOGY**  
      (Cr ar) D'Angio, Loken
- 206    **ROENTGENOSCOPY**  
      Theory and practical application of roentgenoscopy, particularly to diseases of the gastrointestinal tract, lungs, and heart. (3 cr) Peterson and others

- 209 ROENTGEN DIAGNOSIS**  
Theory and practical application of roentgen diagnostic methods to medical cases in general. (3 cr) Peterson and others
- 210 ROENTGEN TECHNIQUE**  
Theory and practical application of the principles of roentgen technique including the study of X-ray machines and X-ray tubes, exposure, technique, and darkroom work. (2 cr) Peterson and others
- 211 DOSIMETRY OF INTERNAL, EXTERNAL RADIATION EMITTERS**  
(1 cr; 7:00-8:00 am W; Mayo B-142) Moore
- 212 SEMINAR: RADIATION BIOPHYSICS AND NUCLEAR MEDICINE**  
Research approaches to problems in radiation biophysics; use of radioactive isotopes discussed. Recent advances reviewed. (1 cr; V M) Jacobson
- 236 RADIOISOTOPE SEMINAR**  
Recent developments in nuclear medicine. (1 cr; 12:00-1:00 W; Rigler Library) Loken
- 238 ROENTGEN-SURGICAL PATHOLOGY CONFERENCE**  
Weekly meetings with the surgical pathology staff at which surgical specimens and roentgenograms are reviewed from the pathologic and roentgenologic points of view. (1 cr; 4:00-6:00 Th; Todd Amph) Lober, Peterson, and others
- 240 RADIATION THERAPY CONFERENCE**  
Recent advances in clinical radiotherapy. (1 cr; 4:00-5:00 M; Rigler Library) D'Angio

## Surgery (Surg)

### Division of General Surgery

#### REQUIRED COURSES FOR UNDERGRADUATE STUDENTS

- 135 CLINICAL CLERKSHIP**  
(16 cr; prereq regis med) Najarian and staff

#### ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS

- 181 CARDIOVASCULAR SURGERY**  
Clinical problems and participation in surgery. (Cr and hrs ar; for srs only) Varco, Castaneda
- 182 PROBLEMS IN CLINICAL INVESTIGATIONS AND PROBLEMS IN EXPERIMENTAL SURGERY**  
(Cr and hrs ar; University and affiliated hospitals) Najarian and staff
- 183 CLINICAL TISSUE TRANSPLANTATION**  
Participation in transplantation operations, ward rounds, and seminars. Additional time may be spent in the laboratories participating in experimental organ transplantation studies. (Cr and hrs ar) Najarian
- 184 EXTERNSHIP IN AFFILIATED HOSPITALS**  
(Cr and hrs ar) Najarian and staff

#### REQUIRED COURSES FOR GRADUATE STUDENTS

- 200 OUTPATIENT CLINIC IN SURGERY**  
Student is required to assist in the outpatient surgical clinic and to participate in diagnosis and treatment. (1 cr) Najarian and staff
- 202 APPLIED SURGICAL ANATOMY ON THE CADAVER**  
Surgical fellows prepare dissections with staff supervision. (1 cr; hrs ar) Najarian and staff

- 203 PROCTOSCOPY AND SIGMOIDOSCOPY**  
Diagnosis and treatment of lesions of the lower bowel. (1 cr; hrs ar) W Bernstein and staff
- 204 TUMOR CLINIC**  
Combined clinical-pathological consideration of tumors as seen by the general surgeon. Tumor conference follows. (1 cr; hrs ar) Staff
- 205 SURGICAL DIAGNOSIS**  
Surgical fellow assists in the instruction of the clinical clerks and interns, and studies problems in diagnosis in Outpatient Department. (1 cr; hrs ar) Najarian and staff
- 208 STUDY OF SURGICAL PROBLEMS**  
Surgical fellow acts as house surgeon in University Hospitals. (1 cr; hrs ar) Najarian and staff
- 211 OPERATIVE SURGERY**  
Surgical fellow acts as the first assistant at operations in University Hospitals and later may be permitted to operate. (1 cr; hrs ar) Najarian and staff
- 214 SURGICAL WARD CONFERENCE**  
Presentation of interesting cases by the fellows. (1 cr; hrs ar) Najarian and staff
- 215 SURGICAL-ROENTGENOLOGICAL-PATHOLOGY CONFERENCE**  
Weekly reviews of selected surgical patients. (1 cr; hrs ar) Radiology, Pathology, and Surgery staffs
- 216 SURGICAL RESEARCH**  
Problems in experimental surgery. (1 cr; hrs ar) Najarian and staff
- 217 SURGICAL SEMINAR**  
Conferences for review of surgical literature, for presentation of cases, and as research. (1 cr; hrs ar) Najarian and staff
- 218 SURGICAL CLINICS—PATHOLOGIC CONFERENCE**  
Review of interesting cases by the medical, surgical, pediatrics, and pathology staffs. (1 cr; hrs ar) Najarian and staff
- 219 SURGERY-LITERATURE CONFERENCE**  
Leading surgical journals are assigned to the fellows who review and report selected articles at weekly conference (1 cr; hrs ar) Najarian and staff
- 220 PERIPHERAL VASCULAR CONFERENCE**  
Vascular clinic with conference following. (1 cr; hrs ar) Najarian and staff
- 221 SURGERY-PHYSIOLOGY CONFERENCE**  
Seminar discussing the physiological aspects of surgery. (1 cr; VIII T) Najarian and staff
- COMPLICATIONS CONFERENCE**  
Discuss complications encountered postoperatively. (Cr and hrs ar) Najarian

## *Division of Neurosurgery*

### **REQUIRED COURSES FOR UNDERGRADUATE STUDENTS**

- 127 CLINICAL LECTURES IN NEUROSURGERY**  
(1 cr per yr; prereq regis med; W) Staff

### **ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS**

- 188 NEUROSURGERY EXTERNSHIP, UNIVERSITY HOSPITALS**  
(Cr ar; prereq regis med; MTWThF) Staff
- 189 NEUROSURGERY EXTERNSHIP, VETERANS ADMINISTRATION HOSPITAL**  
(Cr ar; prereq regis med; MTWThF) Staff
- 190 NEUROSURGERY INVESTIGATION**  
(Cr ar; prereq regis med; MTWThF) Staff



## REQUIRED COURSES FOR GRADUATE STUDENTS

- 305 NEUROSURGICAL DIAGNOSIS**  
The neurosurgical fellow assists in instruction of clinical clerks and interns, and studies problems in diagnosis in the Outpatient Department and in University Hospitals. (3 cr; MTWThF) French, Chou
- 308 STUDY OF NEUROSURGICAL PROBLEMS**  
The neurosurgical fellow acts as house surgeon at University Hospitals. (4 cr; MTWThF) French, Chou
- 311 OPERATIVE NEUROSURGERY**  
The neurosurgical fellow acts as first assistant at operations in University Hospitals, and later may be permitted to operate. (4 cr; MTWThF) French, Chou
- 316 NEUROSURGICAL RESEARCH**  
Problems in experimental or clinical surgery. (3 cr; MTWThF) French, Chou
- 318 NEUROSURGICAL CONFERENCE**  
A review of X-rays and case histories on neurosurgical service. (1 cr; F) French, Chou

*Division of Orthopedic Surgery*

## ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS

- 185 EXTERNSHIP IN ORTHOPEDIC SURGERY AND FRACTURES**  
(Cr ar; prereq regis med) Staff

## REQUIRED COURSES FOR GRADUATE STUDENTS

- 401 ORTHOPEDIC CONFERENCE**  
Review of X-rays and case histories of patients on the orthopedic inpatient or outpatient service. (3 cr) Peterson, Moe, Kane, Patterson, and staff
- 403 FRACTURES**  
The orthopedic fellow acts as house surgeon on the fracture service at Hennepin County General Hospital. (5 cr) Nydahl and staff
- 405 ORTHOPEDIC DIAGNOSIS**  
The orthopedic fellow assists in instruction of clinical clerks and interns and studies problems in diagnosis in the Outpatient Department and in University Hospitals. (3 cr) Moe, Kane, Patterson, and staff
- 407 PEDIATRIC ORTHOPEDICS**  
The orthopedic fellow acts as house surgeon at Gillette State Hospital for Crippled Children. (5 cr) Moe and staff
- 408 STUDY OF ORTHOPEDIC SURGERY PROBLEMS**  
The orthopedic fellow acts as house surgeon at the University Hospitals. (5 cr) Moe, Kane, Patterson, and staff
- 410 ORTHOPEDIC PATHOLOGY**  
Seminar for systematic review of pathology of ossified tissues and soft tissues of the extremities. (2 cr) Moe, Kane, Patterson, and staff
- 411 ORTHOPEDIC OPERATIVE SURGERY**  
The orthopedic fellow acts as first assistant at operations at the University Hospitals and later may be permitted to operate. (5 cr) Moe, Kane, Patterson, and staff
- 412 ORTHOPEDIC ANATOMY**  
The orthopedic fellow dissects upper and lower extremities and aids in instruction of medical students in anatomy of the extremities. (2 cr) Moe, Kane, Patterson, and staff

- 416 **ORTHOPEDIC RESEARCH**  
Problems in experimental or clinical surgery. University Hospitals. (5 cr) Moe, Kane, and staff

## *Division of Urology*

### **ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS**

- 180 **EXTERNSHIP IN UROLOGY**  
(Cr and hrs ar) Staff

### **REQUIRED COURSES FOR GRADUATE STUDENTS**

- 250 **UROLOGICAL SURGERY**  
Urological fellow first assists at operations in the University Hospitals and later is permitted to operate under supervision of the staff. (4 cr; hrs ar) Staff
- 251 **CYSTOSCOPY AND UROLOGICAL DIAGNOSIS**  
Urological fellow performs cystoscopies and other diagnostic procedures. (4 cr; hrs ar) Staff
- 252 **UROLOGICAL CONFERENCE**  
Problems in diagnosis and treatment are discussed. (4 cr; hrs ar) Staff
- 253 **RESEARCH IN UROLOGY**  
Problems in experimental and clinical surgery. (4 cr; hrs ar) Staff

## **SCHOOL OF NURSING (Nurs)**

- 82A **NURSING TREATMENT AND DELEGATED MEDICAL ACTIVITY**  
Modification of nursing treatment and the planning and providing of delegated medical care. (4 cr; prereq 72, Psy 145, Phcl 9) Staff
- Sec 1, Lect III-IV TTh, Owre 112  
Sec 2, Lect III-IV TTh, Owre 113  
Sec 3, Lect III-IV TTh, Owre 117  
Sec 4, Lect III-IV TTh, MH 118  
Sec 5, Lect III-IV TTh, PoH 2317  
Lab III-IV, VI-VII MWF
- 92B **NURSING SYNTHESIS IN THE COMMUNITY**  
See section on 10-week courses, page 137.
- 199 **SPECIAL TOPICS IN NURSING**  
(4 cr; prereq regis in Master's programs or employed as nurse supv or inst and Δ; hrs ar) Ar

## **SCHOOL OF PUBLIC HEALTH (PubH)**

- 50 **PERSONAL AND COMMUNITY HEALTH**  
Fundamental principles of health conservation and disease prevention. (3 cr, §2, §3, §4, §5, §51, §52, or §100A; III MTWThF; Bo B6) Smith
- 65 **FIELD PRACTICE IN PUBLIC HEALTH NURSING**  
See section on 10-week courses, page 137.
- 123 **TOPICS IN PUBLIC HEALTH**  
Selected readings in public health with discussion based on these readings. (Cr ar; prereq §) Staff
- 172A° **STUDIES IN PUBLIC HEALTH NURSING**  
See section on 10-week courses, page 137.

- 179B LONG-TERM PATIENT CARE AND REHABILITATION**  
See section on 10-week courses, page 137.
- 186 PROBLEMS OF AIR POLLUTION CONTROL**  
Special supervised studies involving laboratory and field investigation procedures; pertinent literature review. (Cr ar; prereq 155, §) Paulus
- 190\*\* FIELD PRACTICE IN PUBLIC HEALTH EDUCATION**  
See section on 10-week courses, page 137.
- 200 RESEARCH**  
Opportunities will be offered by the School of Public Health and by various co-operating organizations for qualified students to pursue research work. (Cr ar) Staff
- 231\*\* GROUND WATER DEVELOPMENT**  
Development of ground water sources for public water supplies. Includes exploration through well design and construction. Special reference to public health problems involved. (Cr ar; prereq grad engineer and §) Bond, Singer, staff, visiting lecturers
- 233 WATER QUALITY INVESTIGATION AND RESEARCH TECHNIQUES**  
Field techniques and special research methods applicable to public health problems of water quality control. Procedures for establishing pollution baselines; appraisal and recognition of advancing eutrophication in surface and underground waters. (6 cr; prereq §) Olson, Odlaug, Ruschmeyer, Swain, Trihey
- 234 WATER QUALITY RESEARCH**  
Design, logistical planning, and implementation of an independent short-term research activity basic to water quality evaluation. Literature review, statistical design and data processing. Field testing of sampling and laboratory operations. (6 cr; prereq §) Olson, Odlaug, Ruschmeyer, Swain, Trihey

### *Biometry (PubH)*

- 110A BIOMETRY I**  
Basic concepts in probability; binomial, Poisson, and normal probability models; testing statistical hypotheses and estimation of parameters of probability models. (3 cr; prereq ¶111A, Math 10 or §; IV MTWThF; ForH 120) Bartsch
- 111A BIOMETRY LABORATORY I**  
Application of concepts of probability to the development of probability models for random phenomena in the biological and medical sciences. (2 cr; prereq ¶110A; III TThF and 7 hrs per wk ar during morning...afternoon hrs by special ar only; ForH 80) Jeffries
- 120D\* BIOMEDICAL COMPUTING**  
See section on 10-week courses, page 137.
- 121A QUANTITATIVE MAMMALIAN BIOLOGY**  
Diffusion, surface tension, and mechanics of respiration, circulation, digestion, and locomotion. (3 cr; prereq 1-yr sequences in mathematics, physics, chemistry, and biology or §; II MTWThF; Mayo 1205) Evans
- 211 SEMINAR: BIOMETRY**  
(Cr ar) Boen

# Mortuary Science (Mort)

*For general information about the Department of Mortuary Science, see section on Schools, Colleges, and Special Programs.*

**8 ORIENTATION**

An overview of funeral service; history, customs, development, personal qualifications, aptitudes. Field trips. (2 cr; III MTWTh; VH 113) Koschig

**56 EMBALMING**

Procedures and techniques of embalming. Embalming theory; consideration of special treatments. (5 cr; prereq Biol 2; I-II MTWThF; MH 213) Stroud

**77 CLINICAL TRAINING**

Practical experience in embalming; evaluations of theory. (2 cr; prereq 56 or 5; hrs and rm ar) Stroud

# Institute of Technology

For general information about the Institute of Technology, see section on Schools, Colleges, and Special Programs.

## COLLEGE OF ENGINEERING

### Aeronautics and Engineering Mechanics

#### Mechanics and Materials (MM)

##### 35 STATICS

Vector algebra. Application of the equations of equilibrium to the analysis of simple engineering structures and machines. Nature and influence of friction. Elementary theory of statically determinate framed structures. Deformation of structures with axially loaded elements. (4 cr; prereq Math 31 or ¶Math 31 and Phys 21; I-II MWF, II TTh; AE 21)

##### 36 DYNAMICS

Introduction to vector calculus. Kinematics. Application of principles of particle motion. Conservation principles. Dynamics of particle systems and plane rigid bodies. Technical applications. (4 cr, §Phys 100 or §Phys 100A; prereq Math 32 or ¶Math 32 and Phys 21; III-IV MWF, III TTh; AE 21)

### Civil Engineering and Hydraulics (CE)

##### 61A SURVEY ENGINEERING

The planning, design, and execution of field control survey systems to determine the horizontal and vertical position of points on the earth for mapping, engineering projects, property boundaries, and construction. Field problems in use of equipment. (3 cr; prereq Math 22A or equiv; lect I-II MW, lab VI-IX MW; Ex 265) Fant

##### 81 ELEMENTARY STRUCTURAL ANALYSIS

Algebraic and graphical analysis of structural framework. Influence lines. Effect of moving loads. Highway bridge loadings. Impact. Statically indeterminate structures. Methods of virtual work and moment area. Williot diagram. Methods of consistent deflections and least work. (4 cr; prereq MM 35, ¶MM 37; lect III-IV MWF, lab III TTh; Ex 177)

##### 264 SANITARY ENGINEERING UNIT OPERATIONS

Lectures, laboratory studies, and pilot-plant-scale studies on screening, hydraulic separation, chemical coagulation, aeration, filtration, disinfection, drying, incineration, and digestion. (3-5 cr; prereq 172; hrs ar; Ex 250) W Johnson

### Electrical Engineering (EE)

##### 30 CIRCUIT ANALYSIS

Steady-state and transient response of linear passive circuits under DC, step, and sinusoidal excitation. (3 cr; prereq Phys 23 or ¶Phys 23, Math 31 or ¶Math 31; lect I-II MWF; Arch 50) Ar

- Rec 1, I-II T, ME 208
- Rec 2, I-II Th, ME 208

**30A ELECTRICAL ENGINEERING LABORATORY**

Laboratory to accompany EE 30. (1 cr; prereq ¶30) Ar

- Lab 1, III-IV MW, EE 121
- Lab 2, V-VIII M, EE 121
- Lab 3, I-IV T, EE 121
- Lab 4, V-VIII T, EE 121
- Lab 5, V-VIII W, EE 121
- Lab 6, I-IV Th, EE 121

**65 ELECTRONICS II**

Piecewise linear and incremental models, biasing, operating characteristics of active devices in single-stage circuits; applications of diodes for rectification, clipping, and clamping. (4 cr, ¶105; prereq 64; lect I-II MWF, rec I-II TTh; ME 221) Ar

**85 JUNIOR ELECTRICAL ENGINEERING LABORATORY**

Experimental study of electronic circuits. (2 cr; prereq 84, ¶65) Ar

- Lab 1, V-VIII MW, EE 216
- Lab 2, V-VIII MW, EE 205
- Lab 3, V-VIII TTh, EE 205

**108 LINEAR SYSTEM ANALYSIS**

Introduction to feedback systems. Analog computer simulation. Spectral analysis, correlation, noise, and sampling. (3 cr; prereq 107; III-IV MWF; Arch 55) Ar

## Mechanical Engineering

### Engineering Graphics (EG)

**1 THE SLIDE RULE**

Computation practice and theory. Design of special scales. (1 cr [0 cr for IT students]; prereq higher algebra and trigonometry or ¶; VI TTh; Arch 10) Springer

**25 ENGINEERING GRAPHICS**

Engineering representation and analysis of systems of projection; the coordinate system, graphical solution of space problems, intersections, and developments. Precision in graphics and techniques of sketching; pictorial projection systems, size description, standard and simplified practices applied to graphic communication. (4 cr; prereq Math 21A or ¶; lect V MTWThF, VI W, Arch 10; rec VI MF, Arch 10; lab open hrs; ME 308) Springer

### Mechanical Engineering (ME)

**22 ANALYSIS OF MECHANISM SYSTEMS**

Kinetic analysis of mechanisms based upon constraint equations and Newtonian mechanics. Degrees of freedom of rigid body mechanisms. Geometric synthesis with three and four accuracy points. (4 cr; prereq MM 36; lect III MTWThF, 1 hr ar, ME 321; lab V-VI MF, ME 321) Frohrib

**24 OPTIMUM DESIGN OF MECHANICAL ELEMENTS**

Application of fundamental principles to the design of typical mechanical components. Engineering approach to the analysis and synthesis of machines. Optimum design criteria. (3 cr; prereq 23 or ¶23, MM 37; lect VI MWThF, ME 214; lab VII-IX MW, ME 214) Kleinhenz

**33 MEASUREMENTS LABORATORY I**

Fundamental principles of measurement. Standards, accuracy, calibration. Treatment of experimental data. (2 cr; prereq Math 32; lect II TTh, ME 321; lab VI-VII, ME 352) Tomisak

**35 MEASUREMENTS LABORATORY III**

Static and dynamic characteristics of measurement systems. Fundamental principles of measurement and calibration. Measurement of temperature, pressure, vacuum, humidity, density, viscosity, heating values, speed, power, force, stress-

- strain and radioactivity. (2 cr; prereq 34; lect III TTh, ME 214; lab VII-IX TTh, ME 370) McFarland
- 90 **INDUSTRIAL ASSIGNMENT, PART I**  
See section on 10-week courses, page 137.
- 91 **INDUSTRIAL ASSIGNMENT, PART I**  
See section on 10-week courses, page 137.
- 92 **INDUSTRIAL ASSIGNMENT, PART I**  
See section on 10-week courses, page 137.
- 93 **INDUSTRIAL ASSIGNMENT, PART I**  
See section on 10-week courses, page 137.
- 146A **AN INTRODUCTION TO COMBUSTION AND PROPULSION**  
Flame propagation, quenching, and ignition in a gaseous mixture; combustion of solid and liquid particles, and gaseous jets. Principles of propulsion, thrust, specific impulse and exhaust velocity. (4 cr; prereq 133 or ¶133; lect II MWF, IV MTWThF; ME 321) Murphy
- 192 **MECHANICAL ENGINEERING DESIGN**  
Design of mechanical engineering elements and systems. Interdivisional problems involving thermodynamics, mass and heat transfer, solid and fluid mechanics, economics and production, operations analysis, and automatic controls. (2 cr; prereq 4th yr engr or ‡; lect VI TTh, ME 325; lab VII-IX TTh, ME 325) Frohrib

## SCHOOL OF ARCHITECTURE (Arch)

- 21 **ARCHITECTURAL THEORY AND HISTORY**  
An introduction to architecture, the philosophy and principles of architecture as an art, a survey of the development of architecture from ancient periods until the present time. (3 cr; prereq for all architectural history; II MTWThF; Arch 130) Winterowd
- 55 **HISTORY OF ARCHITECTURE**  
American architecture; the history of pre-Columbian and colonial architecture through the 19th century. (3 cr; prereq 21 or 54 or ‡; IV MTWThF; Arch 130) Winterowd
- 81 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.
- 82 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.
- 83 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.
- 91 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.
- 92 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.
- 93 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.
- 111 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.
- 112 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.
- 113 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.
- 121 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.
- 122 **ARCHITECTURAL DESIGN**  
See section on 10-week courses, page 137.

# SCHOOL OF CHEMISTRY

## Analytical Chemistry (AnCh)

### 40 INTRODUCTION TO ANALYTICAL CHEMISTRY

Equilibria involved in analytical processes. Properties and formation of precipitates. Methods of separation. Introduction to electrochemical methods. (4 cr; for physics majors; prereq GeCh 14, 15; lect, rec, quiz V-VI MWF, C 325; lab I-III any 2 days of wk, C 310) Staff

### 57A QUANTITATIVE ANALYSIS

A survey of modern quantitative methods of analysis. Lecture. (3 cr [no cr until 57B completed]; for nonchemistry majors; prereq GeCh 5; V-VI MWF; C 325) Staff

### 57B QUANTITATIVE ANALYSIS

A survey of modern quantitative methods of analysis including elementary physico-chemical procedures. Laboratory. (2 cr; for nonchemistry majors; prereq 57A or ¶57A; I-III MTWThF; C 310) Staff

### 201 SPECIAL TOPICS

Analytical topics not covered in regular courses are selected after discussion with instructor. (Cr ar; prereq ¶; hrs ar) Staff

### 301 RESEARCH IN QUANTITATIVE ANALYSIS

(Cr and hrs ar) Staff

## General Chemistry (GeCh)

### 4 GENERAL PRINCIPLES OF CHEMISTRY

General laws of chemistry, principles of structure, and chemical behavior of matter. (5 cr; for premedics, predentals, etc.; prereq predicted math GPA 1.90 on ACT...Math Y or Z or college course in algebra...4 yrs high school math and high school chemistry recommended; lect I MTWThF, SciCB 325; rec V MWF and lab VI-VIII MWF, C ar) Staff

### 6 PRINCIPLES OF SOLUTION CHEMISTRY

The chemistry of the metals including the behavior of their ions in solution, equilibrium principles, oxidation and reduction, electrochemistry, nature of solutions, complex ion systems; laboratory considers the detection of metal ions, a selected few anions, and analyses of simple solids and alloys. (4 cr; prereq 5, 15 or 25; lect II MTWThF, SciCB 375; lab V-VIII MWF, C ar) Staff

### 14 GENERAL PRINCIPLES OF CHEMISTRY

Basic principles and concepts of chemistry with a similar but more rigorous treatment than that of GeCh 4. (4 cr; limited to College of Engineering students; prereq Phys 21, 22, or ¶; lect I MTWThF, SciCB 375; rec V MWF and lab VI-VIII MWF, C ar) Staff

### 24 GENERAL PRINCIPLES OF CHEMISTRY

Basic principles and concepts of chemistry with a similar but more rigorous treatment than that of GeCh 4. (5 cr; for chemistry and chemical engineering majors; lect I MTWThF, SciCB 375; rec V MWF and lab VI-VIII MWF, C ar) Staff

## Organic Chemistry (OrCh)

### 61 ELEMENTARY ORGANIC CHEMISTRY

Important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. Laboratory work includes the preparation of typical substances. (5 cr; for all colleges; prereq GeCh 5 or 25 or equiv; lect I MTWThF, C 325; rec II TTh, C 325; lab II-IV MWF, C 390; lab conf III TTh, C 325) Agre



- 65 ELEMENTARY ORGANIC CHEMISTRY LABORATORY**  
Reactions of typical functional groups and introduction to methods of organic qualitative analysis. (4 cr; prereq 63; lab VI-IX MTWTh, C 390; lab conf II MTW, C 315) Koelsch
- 96 SENIOR THESIS**  
A written final senior thesis report is required. (Cr ar; prereq #, 4th yr) Staff
- 139 ADVANCED ORGANIC CHEMISTRY LABORATORY**  
Selected laboratory synthetic problems, which may include original work. Includes considerable individual instruction. (2-5 cr; prereq 64 or 65; 12-30 hrs lab work ar) Koelsch
- 165 ORGANIC QUALITATIVE ANALYSIS**  
Reactions of typical functional groups and introduction to methods of organic qualitative analysis. (4 cr, §65; prereq 63; lab VI-IX MTWTh, C 390; lab conf II MTW, C 315) Koelsch
- 301 RESEARCH IN ORGANIC CHEMISTRY**  
(Cr ar; prereq 238 and  $\Delta$ ) Staff
- GRADUATE THESIS IN ORGANIC CHEMISTRY**  
(0 cr; prereq  $\Delta$ ) Staff

## Physical Chemistry (PCh)

- 105A, 106A-B LABORATORY**  
(1, 2, or 3 cr; prereq 101 or 102 or 101A or 108 for 105A...105A for 106A; VI-VIII MW; C 190) Schrader
- 107 ELEMENTARY PHYSICAL CHEMISTRY**  
(3 cr; prereq 1 yr college chemistry, Phys 9 or ¶Phys 9, or Phys 6 with #, Math 25A or Math 31 or Math 44; I MTWThF; C 111) Schrader

## SCHOOL OF EARTH SCIENCES

### Geology and Geophysics (Geo)

- 1 PHYSICAL GEOLOGY**  
A first course in geology for science majors and an introduction to scientific methods and the nature of the earth for others. Survey of the main features of the physical world and of the processes that have evoked them. (5 cr; limited to 72 students; prereq high school physics and chemistry recommended; lect II MTWThF; P 110) Rapp  
Lab 1, III-IV MWF, ForH 180  
Lab 2, VI-VII MWF, ForH 180
- 100 FIELD GEOLOGY**  
Measurement of stratigraphic sections; study of fossils and igneous, sedimentary, and metamorphic rocks. Geological surveying on aerial photographs and topographic maps. Preparation of geologic maps and cross sections. Study of structural and geomorphic features and geologic setting of mineral deposits. (9 cr; restricted to students majoring in geology, geophysics, and geological engineering; prereq 63, 65, or #) Bright
- 103 GEOLOGIC PROBLEMS**  
(Cr and hrs ar; prereq #)
- 109C PHYSICAL GEOLOGY FOR TEACHERS**  
An introduction to the scientific methods and the nature of the earth. Survey of the main features of the physical world and of the processes that have evoked them. (4 cr, §old Geol 1, §old Geol A, §Geo 1, §Geo 11; only for students holding degrees in education; limited to 18 students; prereq 1 term college chemistry or physics; lect II MTWThF, seminar V TTh, P 110; lab III-IV MWF, ForH 185) Rapp

# SCHOOL OF MATHEMATICS (Math)

## T (Arts) TRIGONOMETRY

Analytic trigonometry emphasizing identities, equations, and properties of the functions; right and oblique triangles without logarithmic computation. (3 cr [open for cr if taken before Math 43, even to students with high school trigonometry]; prereq plane geometry and high school algebra...[10 allowed; II MTWThF; Arch 10) Ar

## Z (Arts) PREPARATORY MATHEMATICS

Designed to supplement the background in algebra for those students whose background is insufficient. Covers most of the material of the high school elementary and higher algebra courses, with emphasis on the latter. (0 cr; III-IV MTWThF; Arch 50) Ar

## 5A (Arts) FOUNDATIONS OF ARITHMETIC

Includes a logical and axiomatic basis of the rules for arithmetical operations with integers, rational numbers, and real irrational numbers as necessary background for teaching arithmetic in elementary school, with some attention to the history of the subject and its role in our culture and civilization. (3 cr [not available for Arts College cr]; prereq 1 yr elementary algebra and 1 yr high school geometry or equiv, and enrollment as elementary education students, or  $\Delta$ ; III MTWThF; Arch 5) Ar

## 10 (Arts) COLLEGE ALGEBRA AND ANALYTIC GEOMETRY

For students requiring only some analytic geometry and college algebra without trigonometry, or for those whose background does not include logarithms. Students who plan to take several quarters of mathematics should take Math 15 if they qualify. Functions and graphs, quadratic equations, progressions, inequalities, complex numbers, theory of equations, permutations and combinations, probability, systems of equations, determinants, graphing of linear and quadratic equations, conics in standard position, logarithms. (5 cr, §15, §10A, §21A; prereq Z or high school higher algebra and satisfactory mathematics placement score; III-IV MTWThF; E 315) Ar

## 10A (Arts) ALGEBRA, ANALYTIC GEOMETRY AND ELEMENTARY FUNCTIONS

A first course of a 2-quarter sequence, specifically designed for students in the pre-business administration curriculum and for other students requiring an introduction to algebra, analytic geometry, elementary functions, and calculus of one and several variables. Students who plan to take several quarters of mathematics should register for the Math 15, 42-43-44 sequence. Inequalities and elementary set theory, functions and graphs, quadratic equations in two variables, conic sections, complex numbers, theory of equations, mathematical induction, general systems of linear equations, combinations, permutations and probability, and vectors and lines and planes in space. (5 cr, §10, §15, §21A; prereq high school higher algebra and T or high school trigonometry and satisfactory mathematics placement score; III-IV MTWThF; E 320) Ar

## 15 (Arts) COLLEGE ALGEBRA

A standard college algebra course for students planning to take the sequence in analytical geometry and calculus. Functions and graphs, quadratic equations in one and two variables, progressions, complex numbers, inequalities, theory of equations, permutations and combinations, binomial theorem, probability, mathematical induction, determinants. (5 cr, §10, §10A, §21A; prereq high school higher algebra and T or high school trigonometry and satisfactory mathematics placement score; III-IV MTWThF; E 302) Ar

## 21A (IT) ANALYSIS I: ALGEBRA, TRIGONOMETRY, AND ANALYTIC GEOMETRY

Review of algebra and elementary analytic geometry, fractions and factoring, exponents and radicals, binomial theorem, functions and graphs, linear equations and determinants, complex numbers, logarithmic and exponential functions, trigonometric functions, identities, and equations, polynomial equations, and conic sections, translation of axes, polar coordinates, introduction to differentiation. (5 cr, §10, §10A, §15; primarily for IT students; prereq 12 or 4 yrs high school mathematics including trigonometry; I-II MTWThF; E 215) Ar

## 22A (IT) ANALYSIS II: ANALYTIC GEOMETRY AND CALCULUS

Functions and derivatives, limits, continuity, slopes, tangents, differentiation of algebraic functions, applications, differentials, the indefinite integral, physical

and geometrical applications. (5 cr, §42; primarily for IT students; prereq 21A; I-II MTWThF; E 203) Ar

**23A (IT) ANALYSIS III: ANALYTIC GEOMETRY AND CALCULUS**

The definite integral, the fundamental theorem, differentiation of transcendental functions, methods of integration, parametric equations and polar coordinates, application of integration to physical and geometrical problems in two and three dimensions. (5 cr; prereq 22A; III-IV MTWThF; E 203) Ar

**31 (IT) CALCULUS IV: CALCULUS AND ANALYTIC GEOMETRY**

Study of solid analytic geometry and vectors in space involving dot and cross products, planes, quadric surfaces, derivatives of vector functions. Definition of double and triple integrals. Iterated integrals in rectangular, polar, cylindrical, and spherical coordinates. Applications to moments and centroids. Partial differentiation including the chain rule, implicit functions, directional derivative, maxima and minima. (5 cr; prereq 23A)

Sec 1, I-II MTWThF, E 229, Ar  
Sec 2, III-IV MTWThF, Arch 15, Ar

**32 (IT) CALCULUS V: CALCULUS, LINEAR ALGEBRA, DIFFERENTIAL EQUATIONS**

Standard topics of infinite series including tests for convergence and divergence. Power series, and Taylor expansions. Introduction to linear algebra. Matrices, determinants, and theorems on systems of algebraic equations. Differential equations involving the standard first order types plus higher order linear equations with constant coefficients. (5 cr; prereq 31; III-IV MTWThF; E 215) Loye

**40A (Arts) INTRODUCTION TO CALCULUS OF ONE AND SEVERAL VARIABLES**

A second course of a 2-quarter sequence, specifically designed for students in the pre-business administration curriculum and for other students requiring an introduction to algebra, analytic geometry, elementary functions, and calculus of one and several variables. Students who plan to take several quarters of mathematics should register for the Math 15, 42-43-44 sequence. Limits and derivative, differentiation of the elementary functions of one and several variables with applications to rates of change, maxima and minima, approximations by differentials, integration with standard forms and applications to area and volume, simple differential equations. (5 cr, §40, §42, §22A; prereq 10A, 10, or 15, and T or high school trigonometry; I-II MTWThF; E 226) Ar

**42 (Arts) ANALYTIC GEOMETRY AND CALCULUS I**

(Course description covers sequence 42-43-44) A full-year course in the elements of analytic geometry and calculus. Plane analytic geometry including straight line, conic sections, parametric representations, polar coordinates, translation and rotation of axes. Introduction to solid analytic geometry, functions and limits, differentiation of algebraic, trigonometric, exponential, and logarithmic functions with applications to velocity and acceleration, rates, maxima and minima, curve tracing, indeterminate forms, approximations by differentials. Introduction to partial differentiation. Integration by standard forms with applications to area, volume, work, moments. Improper integrals. Infinite series. Taylor's theorem. Multiple integrals in two and three dimensions. Math 43 and 44 are available for Upper Division credit to all except mathematics and physics majors. (5 cr, §40, §40A, §22A; prereq 10, 10A or 15 and T or high school trigonometry [may enter 43 from 40 or 40A if grade in 40 or 40A is A or B]; I-II MTWThF; E 325) Ar

**43 (Arts) ANALYTIC GEOMETRY AND CALCULUS II**

(See Math 42 for course description) (5 cr; prereq 42...or 40 or 40A with grade of B; III-IV MTWThF; E 226) Ar

**44 (Arts) ANALYTIC GEOMETRY AND CALCULUS III**

(See Math 42 for course description) (5 cr; prereq 43; III-IV MTWThF; E 325) Ar

**65 (IT) INTRODUCTION TO COMPUTER PROGRAMMING**

Basic Fortran computer language with extensions. Programming applications and techniques. The binary number system and elements of computer organization and machine language. Integral laboratory. (4 cr, §164; prereq 23A or 43; IV MTWThF; Ex 193) Ar

- 111 (Arts) DEVELOPMENT OF THE NUMBER SYSTEM**  
 Systematic construction of the real number system by extension from the natural numbers via rational numbers to irrational numbers; negative numbers; properties of the system; operation with numbers and laws governing the operations. (3 cr, §111A, §111B; prereq 31 or 44; II MTWThF; Arch 45) Ar
- 112 (Arts) ELEMENTARY SET THEORY**  
 Basic properties of operations on sets, cardinal numbers, simply ordered sets, well-ordered sets, ordinal numbers, axiom of choice, axiomatics. (3 cr; prereq 31 or 44; IV MTWThF; E 229) Ar
- 125A (Arts) CRITICAL REASONING IN MATHEMATICAL ANALYSIS**  
 Notions of limit, sequence, series, function, derivatives, and integral. Gives more mature understanding of these concepts. Techniques of developing accurate proofs; intuition and logic in connection with these techniques. (3 cr; prereq 31 or 44; II MTWThF; E 320) Ar
- 131A (Arts) LINEAR ALGEBRA AND GROUP THEORY**  
 Finite dimensional vector spaces; linear transformations and matrices over the real or complex fields; linear equations; determinants; characteristic values; canonical forms; bilinear and quadratic forms; applications. (3 cr, §142-143, §149, §180; prereq 31 or 44; V MTWThF; E 226) Harper
- 132C (IT) AN INTRODUCTION TO PROBABILITY**  
 See section on 10-week courses, page 137.
- 147 (IT) VECTOR ANALYSIS**  
 Scalar and vector products, derivatives, geometry of space curves, del operator, line and surface integrals, divergence and Stokes's theorem, transformation of coordinates, dyadics, applications. (3 cr; prereq 32 or 55; I MTWThF; Arch 45) Polansky
- 148 (IT) DIFFERENTIAL EQUATIONS**  
 Linear differential and difference equations with constant coefficients, isoclines, phase plane, reduction in order, Picard's method, uniform convergence, series solutions, Bessel functions, Legendre polynomials, introduction to boundary value problems. (3 cr, §150; prereq 32 or 106; II MTWThF; E 315) Ar
- 151 (IT) ADVANCED CALCULUS I**  
 Limits, properties of continuous functions of one and several variables, partial differentiation, implicit functions, maxima and minima, Taylor's theorem, transformations and mappings, integrals containing a parameter or variable limits, Stieltjes integral. (3 cr; prereq 32 or 55; III MTWThF; E 229) Polansky
- 167 (IT) FOURIER SERIES AND BOUNDARY VALUE PROBLEMS**  
 Partial differential equations of theoretical physics, Fourier series, proof of convergence, orthogonal systems. Sturm-Liouville systems, solutions of boundary value problems by separation of variables, applications. (3 cr, §173; prereq 32 or 106; III MTWThF; Arch 45) Ar
- 168A (IT) ELEMENTARY THEORY OF COMPLEX VARIABLES**  
 Derivative and integral of function of a complex variable. Cauchy's integral theorem and formula, residues. Application to evaluation of integrals, conformal mapping. (3 cr; prereq 151, 153, or 147, 148, 149 or 108 or #; IV MTWThF; Arch 45) Ar
- 178 (Arts) PROBABILITY**  
 Elementary principles of probability, total and compound probability, expectation, repeated trials, and as time permits topics chosen from the following: Stirling's formula, the probability integral, geometrical probability, probability of causes, Bayes's theorem, errors of observation, principle of least squares. (3 cr; prereq 31 or 44; IV MTWThF; E 225) Ar
- 179 (Arts) THE LEBESGUE INTEGRAL**  
 Definition. Basic limit theorems. Comparison with Riemann integral. Lebesgue measure. Absolute continuity. (3 cr; prereq 107, 108 or 130A, 130B or 151, 153 or #; III MTWThF; E 225) Ar
- 184 (IT) ELEMENTARY NUMERICAL ANALYSIS IN ENGINEERING**  
 Finite differences, interpolation, summation of series, numerical integration. Euler-MacLaurin formula and asymptotic expansions. Numerical solutions of systems of algebraic and transcendental equations. Newton's and Graeffe's method. (3 cr; prereq 32 or 106; III MTWThF; AE 215) Ar

# SCHOOL OF MINERAL AND METALLURGICAL ENGINEERING

## Metallurgical Engineering (MetE)

- 56 PHYSICAL METALLURGY**  
(ME, MinE) Introduction to principles. Theory of metals and alloys, constitution diagrams, heat treatment, relation of structure to properties. (3 cr; prereq 3rd yr; I MTWThF, V Th; MinMet 116) Hutchinson
- 60 PHYSICAL METALLURGY**  
(ChE) Theory of metals and alloys, constitution diagrams, heat treatment, relation of structure to properties. (3 cr; prereq 3rd yr; I MTWThF, V Th; MinMet 116) Hutchinson
- 141-142-143\*† SPECIAL PROBLEMS IN METALLURGICAL ENGINEERING**  
Laboratory investigation of problems involved in metallurgical unit processes. (Cr ar; prereq sr) Staff
- 201-202-203\*† RESEARCH IN METALLURGICAL ENGINEERING**  
(Cr ar) Staff

# SCHOOL OF PHYSICS AND ASTRONOMY

## Astronomy (Ast)

- 12 SOLAR SYSTEM**  
Survey of what is known about the properties and motions of planets and their satellites, comets, and meteors, followed by a brief description of the universe. Nonmathematical course. (3 cr, §11; II MTWThF and 1 clear evening per wk for observations with telescope; Ph 166) Kaufmanis
- 13 STARS AND GALAXIES**  
Discussion of constellations, properties, and motions of stars, and the structure of the sidereal universe. Nonmathematical course; may be taken simultaneously with Ast 12. (3 cr, §11; III MTWTh and 2 clear evenings per wk for observation; Ph 166) Kaufmanis

## Physics (Phys)

- 1 INTRODUCTORY PHYSICS**  
Demonstration lectures on the principles of physics and physical phenomena underlying these principles. (3 cr; prereq high school algebra and plane geometry; I MTWThF; Ph 133) Ar
- 1A INTRODUCTORY PHYSICS LABORATORY**  
Laboratory course given in conjunction with Phys 1. The combination of Phys 1 and 1A may be applied toward group requirements in the College of Liberal Arts. (1 cr; prereq 1 or ¶1) Ar
- 23 GENERAL PHYSICS, PART I**  
See section on 10-week courses, page 137.
- 23A PHYSICS LABORATORY, PART I**  
See section on 10-week courses, page 137.
- 50 INTERMEDIATE GENERAL PHYSICS, PART I**  
See section on 10-week courses, page 137.

- 50A PHYSICS LABORATORY, PART I**  
See section on 10-week courses, page 137.
- 123C STATISTICAL THERMODYNAMICS**  
See section on 10-week courses, page 137.
- 148C ADVANCED PHYSICS LABORATORY**  
See section on 10-week courses, page 137.

# College of Veterinary Medicine††

All classes scheduled by arrangement

## Veterinary Anatomy (VAn)

### 191° TOPICS IN ORGANOLOGY

Lecture and laboratory presentations regarding selected organ systems of domestic and laboratory animals. (1-5 cr; regis for more than 1 term permitted; prereq 151 or equiv, §) Weber, Fletcher

## Veterinary Microbiology and Public Health (VBac)

### 128° PROBLEMS IN VETERINARY BACTERIOLOGY AND PUBLIC HEALTH

(Cr ar; prereq 103 or equiv, §) Pomeroy, Anderson, Lindorfer, Loken, Diesch, Marquart, Maheswaran

### 201° ADVANCED POULTRY DISEASES

Investigations of specific infectious disease problems of poultry. (Cr ar; prereq 131, §) Pomeroy, Higbee, Nelson, Bergeland

### 205° ADVANCED VETERINARY BACTERIOLOGY

Special topics, techniques, collateral reading, and conferences. (Cr ar; prereq §) Pomeroy, Anderson, Loken, Lindorfer, Diesch

## Veterinary Medicine (VM)

### 122A-B CLINICS

Medical, obstetrical, radiological, surgical, and laboratory examination of diseases of animals. (3 cr; for 4th yr VMed; prereq 121) Low and others

### 202° ADVANCED DIAGNOSIS AND THERAPEUTICS OF ANIMAL DISEASES

Detailed examination, discussion, treatment, and prevention of animal disease problems. (Cr ar; prereq 104, 132, §) Sorensen, Low, Mather, L Johnson, Finco

## Veterinary Obstetrics (VObs)

### 204° SPECIAL PROBLEMS IN ANIMAL REPRODUCTION

(Cr ar; prereq §) Zemjanis

## Veterinary Pathology and Parasitology (VPaP)

### 157 VETERINARY NECROPSIES

Necropsy techniques, examination of tissue sections, and preparation of records. 1-5 cr; prereq 153 or equiv, Δ) Staff

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†† Tuition fees per term in College of Veterinary Medicine are \$76.50 for resident and \$190 for nonresident students; incidental fee per term is \$15.25. Students taking less than a full program will pay at the summer rate or academic year rate, whichever is higher.

- 158° **SURGICAL PATHOLOGY**  
Preparation and interpretation of surgical and necropsy specimens. (3 cr; prereq 157, #, Δ) Bergeland and staff
- 160° **DIAGNOSTIC PATHOLOGY**  
Interpretation of history, necropsy findings, laboratory findings and histopathology in the diagnosis of animal diseases. (5 cr; prereq 157, #, Δ) Bergeland and staff
- 241° **PROBLEMS IN VETERINARY PARASITOLOGY**  
(Cr ar; prereq 102 or equiv, #) Griffiths

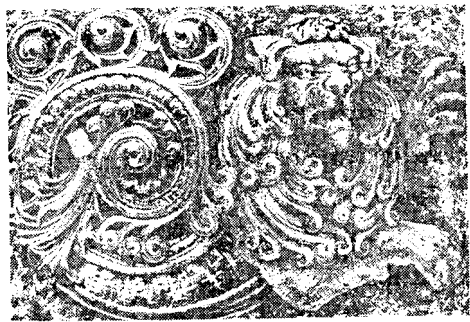
## Veterinary Physiology and Pharmacology (VPP)

- 171° **PROBLEMS IN VETERINARY PHARMACOLOGY**  
(Cr ar; prereq 152 or equiv, #) Hammond, Stowe
- 231° **RESEARCH IN ANIMAL PHYSIOLOGY**  
(Same as AnSc 231) Individual research under faculty direction. Topics, to be determined by consultation, may be a specialized aspect of a thesis problem or an independent problem of mutual interest to graduate student and adviser. (Cr ar; prereq #) Animal physiology staff

## Veterinary Surgery and Radiology (VSR)

- 210° **ADVANCED VETERINARY RADIOLOGY**  
Lecture and laboratory. Radiological diagnostic procedures and interpretation as applied to veterinary medicine. (2 cr; prereq 121 or equiv, #) Hanlon
- 220° **ANESTHESIA**  
Selection of proper anesthetic agent; administration of local, regional, and general anesthesia in large or small animals. (Cr ar; prereq 103 or equiv, #) Arnold, Usenik, Gourley
- 225° **ADVANCED SMALL ANIMAL SURGERY**  
Surgery of the various systems in small animals with preoperative and postoperative evaluation and treatment. (Cr ar; prereq 103 or equiv, #) Gourley
- 230° **ADVANCED LARGE ANIMAL SURGERY**  
Surgery of the various systems in large animals with preoperative and postoperative evaluation and treatment. (Cr ar; prereq 103 or equiv, #) Arnold, Usenik, Myers





Course Descriptions

*10 - Week Courses*

# Ten-Week Courses

*A. Students should register for both terms at the same time, and must enter in the First Term. The entire sequence must be completed before credit is granted (†), or students must satisfactorily complete the Second Term before credit is granted for First Term (††).*

## Architecture (Arch)

- 81† ARCHITECTURAL DESIGN**  
Basic exercises in composition of line, form, proportion, color, and texture. Elements of architectural design. Architectural drawing. Model making. (6 cr for both terms; prereq 2nd yr for IT students, jr for CLA and Δ; 1:00-5:00 MTWThF; Arch 210) Myers
- 82† ARCHITECTURAL DESIGN**  
(See Arch 81) (6 cr for both terms; prereq 81; 1:00-5:00 MTWThF; Arch 210) Myers
- 83† ARCHITECTURAL DESIGN**  
(See Arch 81) (6 cr for both terms; prereq 82; 1:00-5:00 MTWThF; Arch 210) Myers
- 91† ARCHITECTURAL DESIGN**  
Architectural problems with emphasis on development of structure as an integral part of design; site planning. (6 cr for both terms; prereq 83; 1:00-5:00 MTWThF; Arch 210) Myers
- 92† ARCHITECTURAL DESIGN**  
(See Arch 91) (6 cr for both terms; prereq 91; 1:00-5:00 MTWThF; Arch 210) Myers
- 93† ARCHITECTURAL DESIGN**  
(See Arch 91) (6 cr for both terms; prereq 92; 1:00-5:00 MTWThF; Arch 210) Myers
- 111† ARCHITECTURAL DESIGN**  
Advanced architectural problems of complex requirements, involving thorough study and detailed solution; electrical and mechanical equipment as well as structure as an integral part of design; research techniques. Individual effort and group collaboration. (7 cr for both terms; prereq 93; 1:00-5:00 MTWThF; Arch 210) Myers
- 112† ARCHITECTURAL DESIGN**  
(See Arch 111) (7 cr for both terms; prereq 111; 1:00-5:00 MTWThF; Arch 210) Myers
- 113† ARCHITECTURAL DESIGN**  
(See Arch 111) (7 cr for both terms; prereq 112; 1:00-5:00 MTWThF; Arch 210) Myers
- 121† ARCHITECTURAL DESIGN**  
Building design and development in the urban context. Individual and collaborative effort; survey and analysis of urban problems; reporting and preparation of large scale proposals. (9 cr for both terms; prereq 113, CE 41; 1:00-5:00 MTWThF; Arch 210) Myers

- 122† ARCHITECTURAL DESIGN**  
(See Arch 121) (9 cr for both terms; prereq 121; 1:00-5:00 MTWThF; Arch 210) Myers

## Educational Psychology (EPsy)

- 218†† STATISTICAL METHODS (Parts I and II)**  
Foundations of statistical theory; practice in applying theories to solution of educational and psychological problems. (3 cr total for combined course [Parts I-II]; limited to 40 students; prereq EPsy 217; IV MWF; WuH 130) MacEachern
- 218A†† STATISTICAL METHODS—LABORATORY (Parts I and II)**  
For students who wish more experience in solution of problems and use of machines than is obtained in EPsy 216-217-218. See EPsy 218. (2 cr total for combined course [Parts I-II]; limited to 22 students; prereq 218; II-III MF; WuH 330) Proshok

## Foreign Study (FS)

- 161, 162†† SEMINAR FOR FOREIGN STUDY I AND II**  
Directed field study (SPAN Program) in Australia, Central America, Iran, or Sweden, investigating current economic, political, educational, cultural, and religious patterns of life. Each student will study the country carefully before embarking and write a comprehensive report of his findings upon returning. (12 cr for both terms; prereq approval before December 1967 by a faculty selection committee [grad students must also have approval of adviser]) Stavrou, administrative official; Williams, Irish, Riggi, Johnson

## Mathematics (Math)

- 132C (IT)†† AN INTRODUCTION TO PROBABILITY**  
NSF Institute for High School Teachers of Physics (see also section on Special Programs). A modern introduction to the mathematical theory of probability. The course deals with set operations, finite sample topics, independence, Bayes theorem, combinatorial methods, random variables, distribution functions, moments, and binomial distributions. (5 cr for both terms; prereq admission to Summer Institute or permission of institute director; IV MTWThF plus 2 rec hrs ar; Ph 131) Ar

## Mechanical Engineering (ME)

- 90†† INDUSTRIAL ASSIGNMENT, PARTS I AND II**  
Cooperative work-study curriculum, industry laboratory quarters (work periods). Grades are based on a formal written report by the student, covering his work during the industrial assignment. (2 cr for both terms; prereq regis in engineering intern program; hrs ar) Lund
- 91†† INDUSTRIAL ASSIGNMENT, PARTS I AND II**  
(See ME 90) (2 cr for both terms; prereq regis in engineering intern program; hrs ar) Lund
- 92†† INDUSTRIAL ASSIGNMENT, PARTS I AND II**  
(See ME 90) (2 cr for both terms; prereq regis in engineering intern program; hrs ar) Lund
- 93†† INDUSTRIAL ASSIGNMENT, PARTS I AND II**  
(See ME 90) (2 cr for both terms; prereq regis in engineering intern program; hrs ar) Lund

## Nursing (Nurs)

- 92B†† **NURSING SYNTHESIS IN THE COMMUNITY**  
Study and application of principles underlying public health nursing designed to meet nursing needs of individuals and families in the community; emphasis on health and prevention of illness and disability. (6 cr for both terms; prereq 82B or 85; lect V-VI TTh, 1413 PoH; lab hrs ar) Staff

## Pathology (Path)

- 112†† **DIAGNOSIS OF TUMORS**  
(2½ cr; prereq 102; 8:00 MTThF; JacH 178) Hebbel
- 150†† **PROBLEMS IN PATHOLOGY**  
(Cr and hrs ar; prereq 102) Dawson

## Physics (Phys)

- 23†† **GENERAL PHYSICS, PARTS I AND II**  
Electricity and magnetism. (4 cr for both terms; prereq 22, ¶23A; II MTWThF; Ph 170) Ar
- 23A†† **PHYSICS LABORATORY, PARTS I AND II**  
Laboratory exercises in electricity and magnetism. (1 cr for both terms; prereq ¶23; 2 lab hrs per wk; rm ar) Ar
- 50†† **INTERMEDIATE GENERAL PHYSICS, PARTS I AND II**  
Special relativity. Atomic view of matter, electricity, and radiation. Bohr model of atom. X-rays. Introduction to wave nature of matter and radioactivity. (4 cr for both terms; prereq 6 or 9 or 23...Math 31 or ¶Math 31 or Math 44 or ¶Math 44; III MTWThF; Ph 170) Ar
- 50A†† **PHYSICS LABORATORY, PARTS I AND II**  
Laboratory course given in conjunction with Phys 50. (1 cr for both terms; prereq ¶50; 2 lab hrs per wk; rm ar) Ar
- 123C†† **STATISTICAL THERMODYNAMICS**  
NSF Institute for High School Teachers of Physics (see also section on Special Programs). A course in the principles of statistical thermodynamics, with emphasis on kinetic theory and elementary statistical mechanics; applications chosen from the physics of the gas, liquid, and solid state. (5 cr for both terms; prereq admission to Summer Institute or permission of institute director; I MTWThF; Ph 131) Ar
- 148C†† **ADVANCED PHYSICS LABORATORY**  
NSF Institute for High School Teachers of Physics (see also section on Special Programs). A.C. and D.C. measuring devices, thermionics, vacuum tube circuits, semiconductor devices, and circuits, with emphasis on applications to physics research. Experiments will also be selected from the area of atomic, nuclear, low temperature, and solid state physics. (4 cr for both terms; prereq admission to Summer Institute or permission of institute director; II MWF plus lab hrs ar; Ph 131) Ar

## Public Administration (PA)

- 282†† **ADMINISTRATIVE INTERNSHIP**  
Supervised field work in an approved local, state, or federal administrative agency; preparation of an acceptable formal report. (3 cr for both terms; prereq ¶; hrs ar)
- 283A-B†† **RESEARCH SEMINAR: PUBLIC ADMINISTRATION**  
(6 cr for both terms; prereq ¶; hrs ar)

## Public Health (PubH)

- 65†† **FIELD PRACTICE IN PUBLIC HEALTH NURSING**  
Instruction and supervised experience in public health nursing in selected public health agencies. (Cr ar; prereq nurses) E Anderson, Downey, Leonard
- 172A\*†† **STUDIES IN PUBLIC HEALTH NURSING**  
Guided study in research design and completion of project. (3 cr per qtr; prereq 171) Kroska, Sparrow
- 179B†† **LONG-TERM PATIENT CARE AND REHABILITATION**  
Independent study; exploration of a comprehensive multidiscipline approach in the continuity of care for long-term patients. (Cr ar; prereq 179A) E Anderson
- 190\*\*†† **FIELD PRACTICE IN PUBLIC HEALTH EDUCATION**  
Approximately 10 weeks of supervised field experience. (5 cr each term; prereq 181A-B-C and 227) Craig, Ellis
- 120D,\* E\*†† **BIOMEDICAL COMPUTING**  
Introduction to digital computer and FORTRAN programming with applications in biology and medicine. (2 cr per qtr, §120A; prereq Math 10) Pogue

## Quantitative Analysis (QA)

- 62†† **BASIC COMPUTER SYSTEMS**  
Concepts of computer logic and computer systems. Application of introductory software systems to the development of models for organizational decision making. The student will program decision models and basic file-oriented information systems using FORTRAN and COBOL. (3 cr, §old 61, §162; prereq 53; II TTh; BlegH 410) Ar
- Lab 1, Ar  
Lab 2, Ar

*B. To receive credit for the following courses, a student must complete both Biol 1 and 2, or NSci 1 and 2, but not necessarily in the Summer Session.*

## Biology (Biol)

- 1 and 2 **GENERAL BIOLOGY**  
Study of plants, animals, and microbes. Includes an introduction to ecology, physiology, classification, cytology, energetics, genetics, development, and evolution. (5 cr each; limited to 168 students; lect V MTWTh, V-VI F, Aero 313, 317, 319, 321; lab VI-VIII MTWTh, Z 101 ABCD) Ar

## Natural Science (NSci)

- 1 **ORIENTATION IN THE NATURAL SCIENCES**  
Integrated survey course designed primarily for students who have no significant science background and who wish to acquire some comprehension of the field for general education purposes. Student is introduced to basic principles and scope of the physical sciences as well as modes of approach or method developed in each field. Course cuts across conventional outlines of any particular science. The first quarter considers some astronomy, physics, and chemistry. (5 cr, §equi

courses in science depts; prereq 1 yr high school algebra or §; III-IV MTWThF, Ph 133; 2 hrs lab, Ph 246) Dahl

- Lab 1, I MTh
- Lab 2, I TF
- Lab 3, II MTh
- Lab 4, II TF
- Lab 5, V MTh
- Lab 6, V TF
- Lab 7, VI MTh
- Lab 8, VI TF
- Lab 9, VIII MTh
- Lab 10, VII TF
- Lab 11, VIII MTh
- Lab 12, VIII TF

## 2 ORIENTATION IN THE NATURAL SCIENCES

The second quarter continues with chemistry, introduces geology, and finishes with physics and astronomy. (5 cr; prereq 1; III-IV MTWThF, Ph 133; 2 hrs lab, Ph 246) Dahl and staff

- Lab 1, I MTh
- Lab 2, I TF
- Lab 3, II MTh
- Lab 4, II TF
- Lab 5, V MTh
- Lab 6, V TF
- Lab 7, VI MTh
- Lab 8, VI TF
- Lab 9, VII MTh
- Lab 10, VII TF
- Lab 11, VIII MTh
- Lab 12, VIII TF

*C. The following courses are concentrated programs of study extending over the entire 10 weeks of the Summer Session. They permit students to earn 15 hours of credit—the equivalent of a full year's sequence in language. Students must register in both terms of the Summer Session. Students enrolled in one of these sequences may not enroll in other courses in the Summer Session.*

## Arabic (Arab)

### A-B BEGINNING INTENSIVE ARABIC

Introduction to Arabic grammar, drill in basic vocabulary, and readings in easy texts. Equivalent to the first 1½ quarters of the regular first-year sequence, Arab 1-2-3. (15 qtr cr for both terms [10 semester cr]; I-III MTWThF; J 202) Chejne, Koury

## Finnish (Finn)

### 1-2-3 INTENSIVE BEGINNING FINNISH

(15 qtr cr for both terms [10 semester cr]; First Term, I-III MTWThF, ForH 160; Second Term, I-III MTWThF, NH 122) Lehtinen

## Hebrew (Heb)

### A-B BEGINNING INTENSIVE HEBREW

Fundamentals of grammar, written and oral exercises. Reading of selected chapters in Genesis. Equivalent to the first 1 1/4 quarters of the regular first-year sequence, Heb 1-2-3. (15 qtr cr for both terms [10 semester cr]; I-III MTWThF; TSF 155) Toledano, Paradise

## Portuguese (Port)

### 1-2-3 BEGINNING PORTUGUESE

(15 cr for both terms; I-II MTWThF; Aero 327) Lawver

## Russian (Russ)

### 1-2-3 BEGINNING INTENSIVE RUSSIAN

(See section on Special Programs) Covers the same material as the regular first-year sequence, Russ 1-2-3. (15 cr for both terms; I-III MTWThF; TSF 153) Donchenko

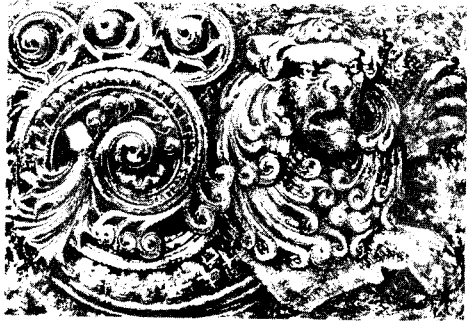
### 4-5-6 INTENSIVE RUSSIAN (INTERMEDIATE)

(See section on Special Programs) Covers the same material as the regular second-year sequence, Russ 4-5-6. (12 cr for both terms; First Term, I-II MTWThF, I F, ForH 60; Second Term, I-II MTWThF, I F, Arch 135) Prokopov

## Swedish (Swed)

### 1-2-3 INTENSIVE BEGINNING SWEDISH

(15 qtr cr for both terms [10 semester cr]; I-III MTWThF; ForH 170) Saether



**SCHOOLS,  
COLLEGES and  
SPECIAL PROGRAMS**



# COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS

There are many courses, primarily for graduate students, in the College of Agriculture, Forestry, and Home Economics. Most departments correlate thesis and problem work with work in the Agricultural Experiment Station.

High school teachers of agriculture may take advanced courses in those agricultural fields which are applicable to the requirements of the Department of Agricultural Education (see College of Education, page 55).

The summer courses of the School of Home Economics, including the Department of Home Economics Education, are planned to meet the varying needs of undergraduate and graduate students, experienced teachers, and other home economists. Transfer students and students wishing to qualify for vocational certification may meet some of their requirements through Summer Session attendance. In addition to regularly scheduled courses, a variety of offerings has been arranged to permit those who wish to attend the national meeting of the American Home Economics Association to schedule courses afterward.

Included in the summer program are readings, seminars, special problems, and concentrated courses as well as regularly scheduled classes. It is possible for students in some areas to earn advanced degrees through work completed during the Summer Session only.

Courses in a variety of subject matter areas are offered in both terms of Summer Session.

Information concerning admission to the Graduate School should be obtained from the dean of the Graduate School, 316 Johnston Hall. Students wishing information regarding courses at the graduate level should confer with the graduate staff of the department or school in which they will be working.

## Home Economics

Since the national convention of the American Home Economics Association will be held in Minneapolis, June 24-28, several concentrated courses have been arranged in home economics and home economics education (see Index). Courses planned will be useful to regularly enrolled students, graduate and undergraduate, as well as those interested in professional improvement or personal development.

Those interested in either workshops or concentrated courses should seek further information from: Associate Director, School of Home Economics, University of Minnesota, St. Paul, Minnesota 55101.

## Efficient Reading

Adult reading needs are a matter of real concern. The course Efficient Reading (Rhet 47), designed for the average and above-average adult reader, provides a unique combination of activities for improving reading speed, comprehension, and vocabulary.

## COLLEGE OF BIOLOGICAL SCIENCES

The College of Biological Sciences was officially established on September 1, 1965, for the purpose of providing a visible structure for the coordination and unification of basic biological research and training activities throughout the University.

At the present time, the college is composed of the Departments of Biochemistry, Botany, Ecology and Behavioral Biology, Genetics and Cell Biology, and Zoology. The course offerings listed are available on the Twin Cities Campus to all eligible students through the University of Minnesota college in which they are registered.

Many summer courses in the biological sciences are offered through the Biology Session held at the Lake Itasca Forestry and Biological Station. Students interested in the opportunity to study at a field station should refer to the following description of the Biology Session and to the special bulletin available upon request from: Dean of the Summer Session, 135 Johnston Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## BIOLOGY SESSION

### **Held at Lake Itasca Forestry and Biological Station**

During two 5-week terms of the Summer Session (June 12 - July 18 and July 21 - August 26) an excellent opportunity for field work in terrestrial and freshwater biology in its most fundamental aspects is presented at Itasca State Park, approximately 220 miles northwest of the Twin Cities.

These classes will be conducted cooperatively by various departments in the College of Agriculture, Forestry, and Home Economics and the College of Biological Sciences. Interested persons may find the following opportunities offered:

1. Instruction in field biology for college undergraduates, graduate students, high school and nature study teachers, and others interested.
2. Opportunities for graduate students who may wish to pursue biological investigation in the lakes, prairies, or forests of the area.
3. Facilities for guest investigators for independent research in terrestrial and freshwater biology.

For the *Lake Itasca Biology Session Bulletin*, describing in detail the opportunities and facilities at the station, write to: Dean of Summer Session, 135 Johnston Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Biological Research Stipends**

Stipends for research workers in biology will be available at the station under the terms of a grant by the National Science Foundation (see *Lake Itasca Biology Session Bulletin*).

## Admission and Registration††

The courses are open to all qualified graduate and undergraduate students who have had usual preliminary courses in biological sciences.

Graduate work taken at the Itasca Biology Session may be considered for resident requirement at the University of Wisconsin upon application to the Graduate School at Madison and upon recommendation of the department concerned.

Reservations for housing and course work should be made as early as possible. A special form for this purpose is included in the *Lake Itasca Biology Session Bulletin*. This Request for Reservation form should be mailed to: Director of Field Biology, 112 Snyder Hall, University of Minnesota, St. Paul, Minnesota 55101 as early as possible. Assignments to classes and housing will be verified by April 1. The necessary class reservation cards will be held with the reservation request for use by the student when he registers at the station on June 12 or July 24.

## Fees and Expenses

Registrations will be accepted as long as class space is available.

The following fees are payable by each registrant on or before June 12 or July 24 and must be paid before registration is completed:

Tuition fee .....	\$72.00
Incidental fee .....	15.25
Laboratory fee .....	8.50
Total fees for each term .....	\$95.75

Graduate students may register for thesis-only upon payment of \$31 tuition per term and required incidental and laboratory fees.

Individuals holding the Ph.D. degree or its equivalent, pursuing research as independent investigators, will pay a research table fee of \$5 per week.

In addition, on the basis of the experience of other groups of students, it is estimated, that board which is on a cost basis will be approximately \$80 for the 5 weeks. A charge of \$15 is made for room in the cabins of the station and is to be paid to the director during the first week of each term.

Laboratory fee includes the use of microscopes, nets, boats, various class supplies, and accessories.

The estimated cost of \$175 for each 5-week term does not include traveling expenses, clothing, laundry, and minor incidental personal expenses.

Tuition and fees are payable on or before June 12 or July 24. After June 12 or July 24 the late fee will be charged according to the following schedule:

June 13-15 or July 25-27 .....	\$ 3.00
June 17-22 or July 29-August 2 .....	5.00
Thereafter .....	10.00

†† See section on Admission and Registration, page 13.

No registration will be accepted after June 13 or July 24 without the approval of the director. Fee statements *dated* Wednesday, June 12, may be paid on Thursday, June 13, without penalty. However, fee statements *dated* Thursday, June 13 will carry the late fee described above.

## SCHOOL OF BUSINESS ADMINISTRATION

### Admission

For admission to the School of Business Administration a student must have satisfied the requirements of the 2-year prebusiness curriculum. These requirements may be completed at another institution. A student must have a minimum of approximately 90 credits, with an overall grade average of at least "C." See *School of Business Administration Bulletin*.

### Special Students

High school graduates who have reached the age of 24 and can furnish evidence that they have had business experience in an executive capacity may be admitted as special students. If later they decide to become candidates for a degree, they must complete the requirements for admission.

### Students in Other Schools or Colleges of the University

Regularly enrolled students in other schools or colleges of the University may be admitted to such courses in this school as are authorized by the faculties of the School of Business Administration and the school or college concerned. Such students are urged to select their business subjects in accordance with a definite plan and, as far as possible, to complete a systematic course of business study.

## SCHOOL OF DENTISTRY

The School of Dentistry will not offer courses regularly scheduled in the dental curriculum but will provide instruction for students who are deficient in certain clinical or laboratory requirements for promotion to the succeeding class. Instruction will also be available for students who wish to gain additional experience in certain clinical disciplines.

Dentistry fees during each summer term are: full-time tuition, resident \$84, nonresident \$190; less than a full program may be paid at the summer rate or academic year rate, whichever is higher. There will be an incidental fee of \$15.25 per term.

## COLLEGE OF EDUCATION

Under the division headings of Curriculum and Instruction (EdCI) and Educational Psychology (EPsy), courses of general interest are listed under *General Courses*, followed by offerings in *Elementary Education*, *Secondary Education*, and *Higher Education*.

Summer Session students who do not expect to become candidates for an undergraduate or graduate degree do not need to present credentials (see main section on Admission and Registration). Those wishing to enter a graduate program should apply immediately for admission to the Graduate School (see Admission under the Graduate School section). Students expecting to become candidates for a Bachelor's degree should apply for admission as regular students in the College of Education by filling out the application form in the Office of Admissions and Records and filing in that office any credentials on the basis of which they wish to request advanced standing. They should also seek as early as possible the advice of the major adviser in the department concerned in order to learn the requirements of the curriculum they will need to complete. Students who have not been admitted to a regular degree program are classified as "summer only."

For all general matters relating to admission, advanced standing, credits, grade points, curriculums, and requirements for graduation, students should consult the *College of Education Bulletin*.

Courses listed in elementary and secondary education may be used for *renewal of teaching certificates*. Former teachers reentering the profession should consult the advisers in elementary and secondary education or the Student Personnel Office, 206 Burton Hall, concerning a program for renewal of certificates. Summer programs for those planning to reenter secondary school teaching should include courses in their teaching subjects.

### **Counseling Services**

The staff of the Student Personnel Office of the College of Education will be available during both terms for consultation concerning admission, requirements of the teaching profession, and for counseling. Appointments should be made in 206 Burton Hall.

### **Committee on Student Scholastic Standing**

Undergraduate students with questions concerning program adjustments and substitutions for required work should consult their advisers or the chairman of the Committee on Student Scholastic Standing. The chairman or his representative will be available in 206 Burton Hall during both terms.

### **Graduate Credit for Workshops**

The amount of graduate credit in workshops which may be used on a Master's degree program is limited. Graduate students planning to register for

any workshop should consult their advisers concerning the possibility of using credit for the workshop in their graduate programs.

## Physical Education

**Physical Examination**—It is recommended that every man and woman student avail himself of the opportunity offered by the University Health Service for a physical examination. Health Service approval must be secured for participation in activity courses designated by ††.

**Prevention and Care of Athletic Injuries Practicum**—A special 2-week course will be offered for men and women on the prevention and care of athletic injuries in sports programs for boys and girls. The latest training and rehabilitation techniques will be demonstrated and class members will have an opportunity to practice these techniques. The practicum (PE 160) will be held from 1:30 to 5 p.m. daily, July 1 through 12.

## Student Teaching

Student teaching during the summer is open *only* to certain groups of students completing programs in the College of Education: (a) regularly approved applicants for student teaching in the nursery school-kindergarten program; (b) secondary education seniors needing 3 credits or less for completion of graduation requirements in the First Term; (c) elementary education seniors working toward junior high school endorsement; and (d) some students in special education. Application must be made by May 15 in the Student Teaching Office, 227 Burton Hall. Because of limited facilities, it is not possible to offer student teaching to students completing programs in other institutions.

## Detailed Description of Courses

For detailed description of courses and curricula in education see the *College of Education Bulletin*.

## Demonstration Facilities

Summer students are welcome to observe programs at Tuttle Demonstration Elementary School, the Institute of Child Development, the Psycho-Educational Clinic, and University High School. For information on these facilities, please see the following paragraphs.

## Summer Demonstration Elementary School

Tuttle Elementary School, kindergarten and grades 1 through 6, will be in operation during First Term. Tuttle School is used as a demonstration facility in elementary education under a cooperative agreement between the Minneapolis Board of Education and the College of Education. Classes may be ob-

served by students in elementary methods and by those registered in the laboratory course in elementary school practices. (See EdCI 186) (I, II, III, IV MTWThF; Tuttle School, Talmadge and 18th Avenues Southeast, Minneapolis, Minnesota)

## **Institute of Child Development**

The Institute of Child Development is one of the country's oldest and best known centers for research and training in child psychology. The institute offers graduate and undergraduate courses, and conducts a nursery school for demonstration and research during the Summer Session.

**Nursery School**—The Nursery School will be in session from 8:30 to 12 noon, June 18 to July 19. Applications for the enrollment of children will be received at the office of the Nursery School. Tuition is \$35 for the term. Parents are responsible for the transportation of their children to and from the school.

## **Psycho-Educational Clinic**

The Psycho-Educational Clinic will be in operation during both summer terms for training, research, and service activities. The program of the facility will include two classes for learning-disabled children. These will provide demonstration and practicum opportunity for students enrolled in training sequences of the learning disability program (EPsy 160, 160A, 161, 161A, and 165). The clinic summer program will include remedial reading classes for children diagnosed by the clinic as needing remedial help. These classes will provide remedial tutoring practice for students enrolled in EPsy 150. Clinical practice opportunity will be made available for advanced graduate students registered for practicum under EPsy 257. Information may be obtained from: Professor Evelyn Deno, Director, Psycho-Educational Clinic, 209 Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Special Education—Programs and Scholarships**

Summer offerings in Special Education include speech correction, and courses for teachers of the educable and the trainable retarded, the deaf and hard-of-hearing, the blind, the crippled, the gifted, the emotionally disturbed, the culturally disadvantaged, and children with learning disabilities. Many State Departments of Education offer summer traineeships. Students interested in traineeships should contact their State Department of Education.

## **Summer Demonstration High School**

A broadened summer program of enrichment, standard, and remedial courses will be offered at the University High School in Peik Hall during the First Term.

Course work in English, social studies, science, mathematics, art, business, and modern languages will be provided for grades 7 through 12. Interdisciplinary studies will also be available.

Students registered in student teaching will be assigned to observation and instruction in selected classes in University High School. The facilities are also available to college classes for demonstration purposes.

Admission to the Summer Session of University High School is open to any student of secondary school age. Children of teachers or other professional workers who are attending the Summer Session of the University are especially welcomed. For information regarding fees and registration procedure, write to: Principal, University High School, Peik Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Workshops in Educational Administration**

In response to the expressed needs of educational administrators, the summer offering includes a number of 3-credit workshops scheduled to meet 3 hours each day for 2½ weeks. EdAd 239, offered July 3 to 19 in the First Term and July 22 to August 7 in the Second Term, employs the technique of simulation and emphasizes the decision-making role of the administrator. The workshop in the First Term focuses on the role of the elementary school principal, and the Second Term workshop is aimed at the secondary school level.

Two workshops of special interest to elementary school principals (EdAd 128, sections 1 and 2) are scheduled for the Second Term. Students may register for one or both sections of this workshop. Section 1, July 22 to August 6, focuses on innovations in elementary education. Organizational patterns, supervisory techniques, and new instructional materials will be discussed and examined. Section 2, August 7 to 23, is designed especially for persons wishing to become familiar with the new criteria and procedures involved in elementary school evaluation.

## **Educational Administration Two-Year Programs**

Advanced graduate programs leading to the Specialist Certificate in School Administration have been developed for elementary and secondary school principals, superintendents, school business administrators, and superintendents of intermediate units. New courses, workshops, and seminars have been introduced, several of which are available this summer. An announcement describing these programs will be sent upon request to: Department of Educational Administration, 203 Burton Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Doctor of Education Programs**

The Department of Educational Administration now offers programs leading to the doctor of education (EdD) degree for administrators in elementary and secondary schools. These programs emphasize a breadth of preparation in



education and substantively related fields, and they include heavy concentration in history and philosophy of education, social psychology, and curriculum and instruction. Through independent study, internships, and clinical experiences, students are encouraged to make the application of theoretical knowledge to the practical situations of a school setting. A brochure describing these programs is available by writing to: Department of Educational Administration, 203 Burton Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Secondary Curriculum and Instruction**

Courses for secondary teachers listed under Curriculum and Instruction (EdCI) are concerned with materials and methods in English, social studies, mathematics, science, modern languages, business, and distributive education. Also included are offerings in such special areas as reading and audio-visual education.

## **Introduction to Teaching: Elementary and Secondary**

The basic professional course for persons preparing to teach in the elementary schools is Ed 75A (First Term). The basic sequence for secondary teachers is Ed 55A (First Term) and Ed 55B (Second Term).

These courses are available *only* to students who have been approved *in advance* of the Summer Session registration period for admission as regular degree students in the College of Education. Application for admission should be made to the director of admissions of the University by May 13, as each applicant must present an official record of previous college work and must complete speech, health, and psychological tests. These courses are *not* open to students planning to complete a teacher education program at another institution.

## **Teaching Emotionally Disturbed Children**

Education of Emotionally Disturbed and Socially Maladjusted Children is offered First and Second Terms (EPsy 186). An advanced course, Education of Emotionally Disturbed and Socially Maladjusted Children (EPsy 286) is offered Second Term only.

## **Teaching Culturally Disadvantaged Children**

Two courses in this area, Education of the Culturally Disadvantaged Child (EPsy 188) and Seminar on the Culturally Disadvantaged (EPsy 268) are offered First Term.

## **Teaching the Deaf and Hard-of-Hearing**

Courses for teachers of the deaf and hard-of-hearing are listed in schedules of both the Division of Speech Science, Pathology, and Audiology and the

College of Education. Pertinent course offerings in the First Term will be: Introduction to the Education of Hearing-Impaired Children (EdCI 128); Hearing Disorders (SSPA 170); and two new courses, Childhood Language Development for Teachers (EPsy 177), and Rehabilitative Audiology (SSPA 169), to be presented by five specialists in auditory training, lip reading, language development, hearing aids, and parent counseling. Second Term course offerings are Speech Retardation (SSPA 150), and Language for the Hearing Impaired (SSPA 183).

## **Teaching the Mentally Retarded**

In the First Term, several courses required for special certification to teach either educable or trainable mentally retarded children will be offered as well as related courses of value for such teachers. Questions about certification requirements and course offerings should be directed to: Special Education Department, 101 Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Survey of Theory and Research in Mental Retardation**

During the First Term an advanced seminar (EPsy 261) will be offered for experienced professionals in the field of mental retardation. Focus will be on current theories and research in the area.

## **Special Workshop—Trainable Mentally Retarded Children**

The University of Minnesota will conduct a special Second Term workshop for teachers and prospective teachers of trainable mentally retarded children which will include observation and practicum as well as lectures, discussion, and committee work (EdCI 100A). Information about application, requirements, and procedures may be obtained by writing to: Professor Dewey Force, Jr., 12 Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Special Workshop—Educable Mentally Retarded Children**

The University of Minnesota will conduct a Second Term workshop for experienced teachers of educable mentally retarded children which will center on curriculum and program planning (EdCI 100B). Information about application, requirements, and procedures may be obtained by writing to: Professor John Rynders, 13 Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Education of Blind and Partially Seeing Children**

Courses offered in the First Term will provide background information for an experienced regular class teacher to serve visually handicapped children.

This work may be taken for graduate credit by students registered in the Graduate School, or for credit as a summer student with the permission of the instructor.

Those who wish to apply for scholarships for teachers of blind children may write to: American Foundation for the Blind, 15 West 16th Street, New York, New York 10011. For more information, write to: Mrs. Glenda Martin, 101 Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Higher Education**

Regular graduate offerings in higher education will be available in both summer terms: First Term, Higher Education in the United States (EdCI 250), and Effective College Teaching (EdCI 252); Second Term, The Junior College (EdAd 274), and Junior College Administration (EdAd 275).

During the first 4 weeks of the Second Term (July 22 to August 16), the teacher education workshop (EdCI 228) planned with a committee from the North Central Association will continue the offering of previous summers.

## **Industrial Education Pre-Service Clinic for Vocational Education Teachers**

The clinic program will involve the participant in a high intensity, inter-related series of activities aimed at establishing foundation concepts and skills in course organization, lesson planning, presentation techniques, and evaluation. Twelve students will be accepted for each of two sections of Ind 106 meeting I through VII hours daily: section 1, July 22 to August 6; section 2, August 8 to 23.

The program has been designed to provide entry level instruction for vocationally certifiable persons planning to teach in post secondary vocational schools. Registration is open only to prospective vocational education teachers on recommendation of a vocational school employing agent. Participants will receive four graduate-level credits (equivalent to 48 clock hours for vocational certification purposes). For information write to: Professor Robert R. Randleman, 108 TNCD, University of Minnesota, Minneapolis, Minnesota 55455.

## **Workshop in Home Economics Education**

By special request of teachers and administrators, a workshop on foods and nutrition (HEED 196C) will be offered from June 10 to 26 for 25 teachers. Special attention will be directed to the teaching needed in preparation for entry-level foods occupations. For information and registration procedures, write to: Professor Emma B. Whiteford, 107 McNeal Hall, University of Minnesota, St. Paul, Minnesota 55101.

## GENERAL COLLEGE

The General College is open to any resident of Minnesota who is a high school graduate and for whom its courses and student personnel services are appropriate. Non-high school graduates who perform satisfactorily on scholastic aptitude tests also may apply for admission. Space limitations mean that it is not always possible to admit all applicants.

A student enrolled in the General College pursues a course of study individually planned in consultation with an adviser, selecting subjects from a free-choice curriculum. He may use this program to explore educational and personal interests, test ability to succeed in college-level academic work, or (if his grades are encouraging) as preparation for advanced study at the University or another college. He may combine general or liberal arts courses with instruction in such occupational education sequences as electronics, dental assisting, marketing, law enforcement, data processing, and ornamental horticulture. Credits earned in these sequences, and in some cases through work experience, can be applied toward the requirements for the associate in arts degree.

General or liberal studies courses in the General College resemble those offered in a traditional curriculum in that they can be classified into the social sciences, the natural sciences, and the humanities. However, the curriculum departs from tradition in some respects. Instruction focuses not only upon factual content, but also upon relations in and among fields of knowledge, practical applications, and critical and creative thinking. The courses tend to be broad in scope rather than specialized. They can be used to give an overview of a field, but students deciding upon a major should register for the basic courses offered by the department in which he hopes to do advanced study.

Students registering in the college for the first time as entering freshmen are restricted to registering for General College courses. Students with at least 1 quarter in the General College, and with satisfactory grade records, may consult an adviser about the possibility of registering for courses offered in other colleges as a means of supplementing the limited number of General College courses available in the summer.

General College students may transfer to other colleges of the University, without undue loss of time or academic credits, if they earn grades demonstrating ability to meet the level of academic competition characteristic of the college they hope to enter.

Students and prospective students are urged to bring problems and questions to the General College Student Personnel Office, 10 Nicholson Hall, or to the Office of the Dean, 106 Nicholson Hall.

## UNIVERSITY COLLEGE

This college draws upon the entire University for its courses. It has no fixed curriculum. Its purpose is to provide flexibility in the educational pro-

gram of the undergraduate who finds none of the standard curriculums of the other schools and colleges suited to his interests or particular objectives. Such a student, with the approval of the University College Committee, may arrange a study program including suitable amounts of work in two or more schools or colleges to fit his individual needs. Upon completing this approved program, he is granted either a B.A. or a B.S. degree. An applicant for admission should be at least a third-quarter sophomore who has completed at least 1 full quarter, or its equivalent, at the University of Minnesota.

Information about University College is available from: University College Office, 106 Nicholson Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## GRADUATE SCHOOL

The Graduate School presents excellent opportunities for advanced study and research in many fields. It brings together in a single organization all the programs and offerings of the University at the level of advanced instruction that may lead to the degrees of master of arts, master of science, doctor of philosophy, doctor of education, and the specialist's certificate in education and in library science teaching.

The privileges of the Graduate School are open, upon application, to those with satisfactory character and professional qualifications who have received Bachelor's degrees from recognized colleges and universities and whose records demonstrate that they are prepared for successful work in their chosen major fields of study. Applications are considered by the Graduate School and by graduate advisers in the departments in which the applicants propose to carry major work with due consideration of the available facilities for accepting additional graduate students. In many instances applicants are required to present evidence supplementary to that contained in their official transcripts. This evidence may take the form of tests such as the Graduate Record Examination or the Miller Analogies Test.

Acceptance for a summer institute offering course work at the graduate level does not, in itself, establish permission for registration in the Graduate School. The procedures that have been set up for admission to the Graduate School still must be followed.

### Admission

Students planning to use credits earned in Summer Session toward a graduate degree or who expect to receive graduate credit for such work should apply for admission directly to the Graduate School. Applications must be submitted *complete in every detail*—one official transcript from each college attended, and the credentials examination fee and test results if required—at least 4 weeks prior to the opening of the quarter or summer term in which the student expects to register (Monday, May 20, 1968, for First Term; and Tuesday, June

25, 1968, for Second Term). Applications should be sent to: Graduate School, 313 Johnston Hall, University of Minnesota, Minneapolis, Minnesota 55455.

Holders of the Bachelor's degree who are not interested in earning graduate credit do not register in the Graduate School. Instead they may apply for admission as adult special students or may register as special Summer-Session-only students. These students, if they subsequently decide to make application for admission to the Graduate School, may transfer *only their first term's work as an adult special student or Summer-Session-only student* to their graduate program. Only courses of graduate character taught by members of the graduate faculty may be transferred.

## Candidacy for a Degree

Admission to the Graduate School does not admit a student to candidacy for a degree. Admission to such candidacy is contingent upon the judgment by members of the graduate faculty that the student shows sufficient promise to be permitted to proceed toward a degree. Under no circumstances will a student be admitted to candidacy until he has been in residence for at least 1 quarter (or 1 term of the Summer Session) and until he has removed any deficiencies which may have conditioned his admission to the Graduate School.

Following completion of from 9 to 15 graduate credits, at least 3 of which must be in the major, the student who expects to obtain a Master's degree shall present his program and his thesis title (for Plan A) or his program (for Plan B) for his adviser's recommendation and transmission to the appropriate group committee for action. Approval by the Graduate School indicates the student's admission to candidacy for the degree.

## Requirements for Advanced Degrees

For information concerning requirements for graduate degrees, please refer to the *Graduate School Bulletin*, 1966-68, pages 10-26.

## Deadline Dates for Summer Session Graduation

Theses of Ph.D. candidates must be complete and registered in the Graduate School office at least 9 *weeks* before the end of the term in which they take the degree; those of Master's candidates, 8 *weeks* before the end of the term in which they take the degree.

### First Term:

PhD's—Friday, May 17, 1968

Master's—Friday, May 24, 1968

### Second Term:

Ph.D.'s—Friday, June 21, 1968

Master's—Friday, June 28, 1968

Oral examinations must be completed at least 5 *weeks* prior to the commencement date.

First Term—Friday, June 14, 1968

Second Term—Friday, July 19, 1968

## COLLEGE OF LIBERAL ARTS

Liberal arts and general education courses are offered by the College of Liberal Arts to meet the special needs of four groups of students: students, usually with a Bachelor's degree as their immediate goal, seeking preparation for professions and other careers and a foundation for a broad understanding of the world in which they are to live and work; those in other professional or specialized divisions of the University who wish to broaden the base of their educational experience; students expecting to continue in graduate work in any of the areas represented in this college; teachers wishing either to pursue graduate work or to expand their knowledge and background in their specialties and in other fields.

Courses in the College of Liberal Arts in the 1968 Summer Session are for the most part selected from the regular Arts College curriculum. The complete curriculum is described in the *College of Liberal Arts Bulletin*, which may be obtained from the Office of Admissions and Records.

Courses announced as open to "juniors and seniors" (numbered 50-99) or to "juniors, seniors, and graduates" (numbered 100-199) are called Upper Division courses. Those numbered 50-99 are usually open to sophomores who have a C average in the prerequisite courses. Those numbered 100-199 are sometimes available to advanced sophomores with strong records.

Many courses listed in this summer bulletin, under the School of Business Administration, the Medical School, the Institute of Technology, the College of Agriculture, Forestry, and Home Economics, and the College of Biological Sciences, are open to any students who have the prerequisites even though the students identify themselves basically as liberal arts students.

Admission to Summer Session is described in the section on Admission and Registration of this bulletin. Cost, housing, and other information is provided both in the summer bulletin and the *General Information Bulletin*.

Students are urged to bring questions or problems to the college offices, 214 Johnston Hall (Lower Division) and 223 Johnston Hall (Upper Division), or (on Monday, June 17) to the Arts College desk in the Coffman Union Main Ballroom.

College of Liberal Arts departments offer a wide-ranging and representative group of courses during the Summer Session at both the undergraduate and graduate levels. In addition, several special programs are available which are described in the following paragraphs.

## Intensive Scandinavian Language Offerings

The impressive success of the Intensive Swedish summer course offered by the Department of Scandinavian in 1967 has led to the expansion of the Scandinavian summer language program in 1968 to also include Finnish. As was the case in the Intensive Swedish summer course, the Intensive Finnish to be offered this summer will be the first such course in the United States. It is intended for undergraduate and graduate students without previous formal knowledge of Finnish. For detailed information on Intensive Finnish consult: Professor Meri Lehtinen and for Intensive Swedish, Professor Nils Hasselmo, Department of Scandinavian, 210 Folwell Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## Modern Language Residence Houses

During the First Term the Romance Language Department and the German Department will sponsor residence houses, located near the campus, for graduate and undergraduate students of French and German. All activities will be carried on in the language elected by the student. Each house will constitute a milieu for training in the language and culture of the country and will provide a unique opportunity for improvement in the spoken language.

The directors of the residence houses will be Professor Friedrichsmeyer for the Deutsches Haus, and Professor Peter Robinson for the Maison Française. In each house there will be native assistants. (See course listings under Department of German and Department of Romance Languages.)

**Programs**—The programs consist of practical conversation sections in the afternoon, and lectures, round-table discussions, plays, films, music, and dances in the evening conducted at the residence houses. This work carries 5 quarter-credits for the elementary group and 4 quarter-credits for the advanced and graduate students. To round out their programs it is recommended that the students select no more than 5 additional credits of work from the departmental courses of the language of their choice. It is possible, however, for students to combine work in the language houses with work in another field.

The houses have proved valuable to students and others who desire training in speaking a foreign language . . . those planning to apply for Fulbright or SPAN scholarships, or to join other foreign study groups . . . teachers or potential teachers of French or German, whether or not they are working for graduate degrees . . . men and women training for positions with the government, international organizations, or private business.

**Registration**—Students who register for the Modern Language Residence Houses should enroll for Fren 100 or Ger 100.

**Fees**—A special fee of \$40, in addition to regular Summer Session fees, is charged for the program offered in a language residence house. Room and board are additional.



## **Expanded Offerings in German**

The German Department has increased its offerings this summer in order to make it possible for in-service teachers to make more rapid progress toward the objective of earning an M.A. degree in about three summers. The policy of an expanded German program will be continued in the future.

## **Courses in Russian**

To help scientists and students of science become acquainted with the research of their Russian counterparts, the Summer Session will offer two courses in Scientific Russian in the Department of Slavic Languages. Students with no prior knowledge of the Russian language may register for Russ 24, Scientific Russian I. The major goal of this course will be the acquisition of the basic principles of grammar essential to a reading skill. Russ 25, Scientific Russian II, introduces reading and translation of scientific texts in various fields.

In addition, the department is offering two intensive courses in Russian, a beginning course in spoken and written Russian (Russ 1-2-3), and an intermediate course (Russ 4-5-6). Students completing the intensive summer courses will be prepared to continue at the next higher level in the following quarter.

## **American Studies**

During the summer of 1968, visiting professors will offer courses in various aspects of American culture, as will members of the University of Minnesota staff in anthropology, history, English, sociology, economics, education, geography, art, journalism, music, philosophy, and political science.

The American Studies summer program is designed for candidates for the B.A., the M.A., and the Ph.D. degrees. Candidates for these degrees enroll in courses conducted by the participating departments listed above, and in American Studies seminars designed to integrate these courses. Knowledge of a foreign civilization is also required of all Ph.D. candidates.

## **Journalism and Communications**

The School of Journalism and Mass Communication program contains courses for both undergraduate and graduate students interested in professional training. Several of the courses are open to students who have majors in other fields and have not had previous journalism courses. A special workshop course (Jour 182), divided into two sections, is included. Section 1 is intended for journalism teachers and publications advisers in the secondary schools or junior colleges. Section 2 is designed for college student publications editors who lack formal journalism training. Students may fit regular Summer Session courses around the 2-week workshop period.

The University of Minnesota will again cooperate with the Newspaper Fund, Inc. in its national program of 4-week seminars for high school journalism teachers and publications advisers. Enrollment is open only to those awarded fellowships by the Newspaper Fund, but high school publications advisers enrolled in regular Summer Session courses will be afforded an unusual opportunity to exchange views and experiences with Newspaper Fund fellows from many parts of the United States.

The school offers courses at the Upper Division—Graduate level in the area of mass communications. These include Communication and Public Opinion; Survey of Journalism Techniques; Communications in Authoritarian Society; Mass Communications and the News; History of Journalism; Literary Aspects of Journalism; Mass Media in a Dynamic Society; Public Relations Methods; Graphic Arts: Processes; and Seminar in the History of Communications. Several Lower Division courses are also offered.

Murphy Hall, the School of Journalism and Mass Communication building, is the headquarters of both the National Scholastic Press Association and the Associate Collegiate Press. Students are welcome to visit these organizations and to obtain counsel on publication problems from the staffs of NSPA and ACP.

## **Speech Science, Pathology, and Audiology**

The Division of Speech Science, Pathology, and Audiology will offer an expanded program for undergraduate and graduate students during the First Term.

In audiology, a symposium on Rehabilitative Audiology (SSPA 169) will be conducted by Professor Frank Lassman and four distinguished guests—Professors James Pickett, Gallaudet College, Washington, D.C.; John O'Neill, University of Illinois, Urbana, Illinois; Herbert Oyer, Michigan State University, East Lansing, Michigan; Robert Frisina, Gallaudet College. Professor W. Dixon Ward will offer a course on Industrial Audiology (SSPA 177) and Professor Joseph Chaiklin will offer a course in GSR Audiometry (SSPA 175). Additional course offerings and clinical practice will be offered.

In speech science and pathology, a distinguished guest will offer a course in Voice Science (SSPA 122) and a course in Neuromuscular Disorders (SSPA 144). Additional course offerings, clinical practica, and seminars will be offered.

Students interested in undergraduate or graduate study should contact: Professor Clark D. Starr, Speech and Hearing Clinic, 110 Shevlin Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **High School Forensics Workshop**

The Department of Speech, Communication, and Theatre Arts, in cooperation with the College of Education, will sponsor a special workshop for high school students interested in competitive speech activities. College speech students may observe the work of these high school students. Those wishing

to do so should contact Professor Bernard Brock (404 Folwell Hall). Visiting Professor Gladys Borchers will teach EdCI 140, available for students desiring instruction in teaching speech at the high school level (see the Education section and the Speech, Communication, and Theatre Arts section of First Term course descriptions in this bulletin). The workshop will be held in 406 Folwell Hall, I-V MTWThF.

## High School Theatre Workshop

The Department of Speech, Communication, and Theatre Arts, in cooperation with the College of Education, will sponsor a special enrichment program in theatre for high school students. Lectures in theatre history, classes in acting, stagecraft, and fencing, and participation in a series of plays are included in the curriculum. For further information contact: Professor Lee Adey, Scott Hall Ticket Office, University of Minnesota, Minneapolis, Minnesota 55455.

## Acting Workshop

As in the past, the Department of Speech, Communication, and Theatre Arts plans to have an outstanding artist from the professional theatre conduct a 1-week workshop open to students registered in Summer Session. Past guests have been: Lee Strasberg (1960); Peggy Wood (1961); Harold Clurman (1962); Sir Tyrone Guthrie (1963); Robert Lewis (1964); Sir Tyrone Guthrie (1965); Morris Carnovsky (1966); and Dame Sybil Thorndike and Sir Lewis Casson (1967). Our 1968 guest, professional commitments permitting, will be Alan Schneider.

## Center for Research in Human Learning

### PROGRAM IN THE PSYCHOLOGY OF HIGHER MENTAL PROCESSES

The academic departments involved in the Center for Research in Human Learning (Psychology, Child Psychology, and Educational Psychology) are offering a special program in the higher mental processes. The program is supported by the center, the Institute of Child Development, and the Summer Session. The aim of the program is to provide advanced and specialized training for graduate students and postdoctoral students in relevant fields. The program is being conducted by visiting professors selected for their research contributions and their ability to stimulate students. The offerings are concentrated in two major areas, language and perception. Consideration of these topics is important in developing an adequate understanding of psychological functioning beyond the simple associational level.

Theory and experimentation in the psychology of language will be considered in the course on psycholinguistics (offered as Psy 215) by Professor Philip Gough of the University of Texas. In a closely related course, Professor

Alvin Liberman of the University of Connecticut and Haskins Laboratories will present and critically discuss experimental findings concerning the perception of speech. He will also discuss the current state of theories of speech perception (Psy 216).

Perception will be given further emphasis in two other courses. The first, by Professor James J. Gibson of Cornell University, presents the theory that the senses are active perceptual systems rather than passive collectors of raw material from which perceptions are later developed (Psy 217). The second course, presented by Professor Eleanor J. Gibson of Cornell University, will consider theory and research on perceptual development and perceptual learning (CPsy 223).

Permission to enter the first three courses (Psy 215, 216, 217) may be secured through the Center for Research in Human Learning, 400 Ford Hall, University of Minnesota, Minneapolis, Minnesota 55455 (telephone 373-5302). Permission to enroll in the last course (CPsy 223) can be secured through the Institute of Child Development, University of Minnesota, Minneapolis, Minnesota 55455 (telephone 373-2387).

## **Geographical Field Session**

An intensive field research seminar, Geog 276 and Geog 277, will be given from August 24 to September 14 (4 days will be on reconnaissance traverses in southwestern Wisconsin; the remainder of the period will be in the environs of the field headquarters at Viroqua, Wisconsin). Research will be focused upon related problems in cultural and rural geography. Reservations must be made no later than June 6. For costs, detailed information, and reservations contact: Professor Eugene C. Mather, Department of Geography, University of Minnesota, Minneapolis, Minnesota 55455.

## **NDEA Institute in Geography for Teacher Trainers**

A 6-week institute, held under the auspices of the U.S. Office of Education, will be held in the Department of Geography from June 17 to July 26, 1968. The focus of the institute will be on the structure of college courses on the regional geography of Europe. Applications for participation will be accepted from college teachers who give or expect to give a course or courses on the geography of Europe. For further information on the nature of the institute and on stipends for participants write: John W. Webb, Chairman, Department of Geography, University of Minnesota, Minneapolis, Minnesota 55455.

## **Archaeological Field Session**

The archaeological field techniques course (Anth 140) will be offered during the First Term. The field camp will be located in Itasca State Park where students will participate in the survey and excavation of late prehistoric

wild rice harvesting sites under the direction of Professor Elden Johnson. Enrollment is limited to 15 students.

## **Travel Course in European Art**

The summer travel course in European art will be conducted by the Department of Art History under the auspices of the Summer Session. It will cover the main phases of ancient, medieval, Renaissance, and modern art in a series of guided visits and discussions held at important cultural centers, museums, and cathedrals. Among the places to be visited are Athens, the Greek Isles, Delphi, Corinth, Mycenae, Rome, Assisi, Siena, Florence, Ravenna, Venice, Salzburg, Innsbruck, Munich, Paris, Copenhagen, and London. Six credits will be given in ArtH 59 to students successfully completing the course. The total cost is approximately \$1,500 including University fees.

Members of the group will depart from New York by air about June 28, spend approximately 6 weeks in Europe, and return to New York about August 12. Return passage (Europe to U.S.A.) may be arranged for a later date than that of group return.

## **Minnesota SPAN Association**

The Student Project for Amity among Nations (SPAN) is a program for undergraduate study abroad, sponsored by the University of Minnesota and 10 other Minnesota Colleges. During the summer of 1968, SPAN will have students studying in Australia, Central America, Iran, and Sweden. The SPAN program can be divided into three distinct phases: preparation, study abroad, and the writing of a research paper.

The academic year previous to their summer abroad, the SPAN students meet with a faculty adviser for their "country groups" to study the language, history, current problems, and culture of the country to be visited. During this year the students also pursue preliminary research on their independent research projects. The second phase of the program is a minimum stay of 8 weeks in the host country where SPAN students work on their projects. This includes interviews, visits to appropriate institutions, documentary investigation, and often living with local families—all done in the SPAN spirit of encouraging international understanding and friendship. The third major phase of the program is the return to the United States and the completion of the SPAN paper, a major academic work written on the basis of material gathered during the year of preparation and the summer abroad.

The SPAN student receives 12 quarter-credits from the University of Minnesota for his preparation year work and the SPAN paper. During their summer abroad the students are registered in Foreign Studies Seminar (FS 161-162) and the faculty directors of the group are considered members of the University's Summer Session faculty. For further information, contact: Professor Theofanis Stavrou, History Department, 614 Social Sciences Building, University of Minnesota, Minneapolis, Minnesota 55455.

# COLLEGE OF MEDICAL SCIENCES

## MEDICAL SCHOOL

The Medical School offers a wide variety of courses and externships during the Summer Session. The externships for recently graduated physicians and for qualified medical students from other institutions who are recommended by their respective deans will offer an integrated program of bedside teaching and clinical responsibilities, ward rounds, conferences, and seminars on the wards of the University Hospitals, the Hennepin County General Hospital, the Veterans Administration Hospital, and St. Paul-Ramsey Hospital in St. Paul. Registration may be for one or more terms of the Summer Session. Research opportunities may be afforded registrants who remain for both terms. At the discretion of individual clinical departments, selected registrants may remain during the month of September for additional clinical training.

A student applying to register in preclinical subjects for the purpose of making up deficiencies incurred at other medical schools should present, at the time of application for such registration, a letter from the dean of his medical school approving the purpose of the registration. Medical students from other schools, whether their purpose is to make up work or to accelerate or broaden their medical education, are registered as adult special students and receive subject credit only. If such students desire legal time credit toward a medical degree, they should make arrangements with the institution from which they intend to receive the degree. No obligation to accept such students for registration in the regular medical course is attached to adult special registration. They should consult the deans or department heads in their own schools as to the equivalence of the courses in which they might be interested at the University of Minnesota. (See departmental listings)

### Opportunity for Practitioners

In addition to the externships which have been described above, attention is called to continuation courses offered from time to time throughout the year under the General Extension Division and the Department of Conferences and Institutes. These courses are primarily for practitioners and are largely practical in nature. Circulars may be obtained from the Department of Conferences and Institutes.

Clinics and conferences in the University Hospitals, the Hennepin County General Hospital, the Veterans Administration Hospital, and the St. Paul-Ramsey Hospital, St. Paul, will go on as usual during the Summer Session and will be open to visiting physicians.

### Graduate Courses

Opportunities are offered in the various departments of the Medical School for work during the Summer Session for advanced degrees, either in laboratory

or clinical branches of medicine. Such work involves admission to, and registration in, the Graduate School. For detailed information see the statement under Graduate School in this bulletin or in the special bulletin on graduate work in medicine.

## Fees

**Medical Students Desiring Time Credit**—The Medical School tuition fee for the full summer quarter is \$168 for residents of Minnesota, and \$400 for nonresidents. Less than a full program may be paid for at the summer rate or academic year rate, whichever is higher. In addition each student will pay the incidental fee of \$27. Students in certain courses are required to furnish microscopes.

**Medical Students or Physicians Registering for Externships**—A tuition fee of \$63 per term is charged for the externships listed under the various clinical departments. This is the same for residents and nonresidents of Minnesota. No additional tuition will be charged for such electives in the basic sciences or clinical work as the registrant may have time for, not to exceed one-fourth time. Each registrant for an externship will pay the incidental fee of \$15.25 per term. In elective courses where a microscope is required this may be rented from the University.

**Nonmedical Summer Session Students**—Students who do not desire to register for time credit toward a medical degree, and who are ineligible to register for an externship or for a program of clinical subjects, may pay the regular Summer Session fees per term.

## SCHOOL OF NURSING

**Courses and Fees**—Courses in the 1968 School of Nursing Summer Session are provided for those students who are currently enrolled in the school's regular programs. A limited number of qualified nurses may be admitted to the Special Topics course. Students planning to matriculate in a regular program of the School of Nursing should consult an adviser in the School of Nursing before registration for Summer Session. For further information, see the *School of Nursing Bulletin*. All students pay Summer Session fees.

**Programs Leading to a Master's Degree**—Elective courses and undergraduate courses required prior to enrollment in the program leading to the degree of master of science in psychiatric nursing or medical-surgical nursing are available during the Summer Session. Students in this program register in the Graduate School. Elective courses are available to students enrolled in the master of education in nursing education program. Students in this program register in the College of Education.

**Programs Leading to the Degree of Bachelor of Science**—Students already enrolled in the baccalaureate program in the School of Nursing may register

in the School of Nursing for either general education or nursing courses. For further information see the *School of Nursing Bulletin*.

High school graduates, graduates of associate degree or diploma programs in nursing, and transfer students from colleges or universities may register for elective courses in the College of Liberal Arts. Students planning to matriculate in a regular program of the School of Nursing should consult an adviser in the School of Nursing before registration for Summer Session. For further information see the *School of Nursing Bulletin*.

## **School of Public Health**

Summer courses at the graduate level are designed both for completion of Master's degree programs and, in the fields of environmental health, veterinary public health, and public health nutrition, for students beginning such programs. It is expected that all students in these latter three categories will begin their programs of study not later than the Second Term of Summer Session, and continue in residence in the interval between the end of Second Term and the beginning of the fall quarter.

## **Ground Water Development**

For the ninth time since 1959, the School of Public Health will offer a special intensive program on Development of Ground Water Supplies. This program, sponsored by the Agency for International Development of the Department of State, will place special emphasis on the public health aspects of such supplies. While designed primarily for engineers employed in economically underdeveloped areas of the world, the content will be applicable to those engaged in water supply programs in federal, state, and local agencies in the United States. The course will be limited in registration and will run from June 17 to August 24. For further information, write: School of Public Health, University of Minnesota, Minneapolis, Minnesota 55455.

## **Water Quality Investigations**

Two special courses in research techniques in water quality investigation will be offered First and Second Terms to specialists who have an interest in water quality control. They will be given at Duluth, Minnesota, and will be headquartered at the Limnological Research Station of the University of Minnesota, Duluth. Activities will include formal lectures, laboratory work, and extensive field operations. The latter will be centered around Knife River Harbor where two fully equipped research vessels are available for the scheduled field studies. The courses will be limited in registration, and will run from June 17 to July 20 and from July 22 to August 24. For detailed information write: School of Public Health, University of Minnesota, Minneapolis, Minnesota 55455.



## MORTUARY SCIENCE

The admission requirements for the Department of Mortuary Science are described in the departmental bulletin. The Summer Session courses offered by the department are primarily for those students who will be matriculating fall quarter 1968 for their final year in either the Plan A or Plan B program for the associate in mortuary science degree. The inclusion of these courses in the final year of either program makes an extremely heavy class schedule and it is recommended that in every possible instance they be completed prior to the last year's matriculation. The offerings are those courses not obtainable in other colleges of the University or at other institutions of higher learning.

## COLLEGE OF PHARMACY

The undergraduate courses that are offered by the divisions of the College of Pharmacy during the academic year are offered during the Summer Session only when justified by a sufficient demand.

Graduate student research work is offered during the Summer Session to students who are enrolled in the Graduate School and who are pursuing a curriculum in one of the College of Pharmacy divisions as a major or minor.

## INSTITUTE OF TECHNOLOGY

Summer courses are offered in architecture; astronomy; aeronautics and engineering mechanics; civil, electrical, mechanical, and metallurgical engineering; engineering graphics; geology; mathematics; and physics.

In the Department of Chemistry, analytical, general, organic, and physical chemistry will be given. Students are able to acquire a Master's degree in chemistry by attendance at Summer Session only.

### **Institute for Teachers of High School Physics**

An Institute for High School Teachers of Physics, supported by the National Science Foundation, will be held in Minneapolis from June 17 to August 23 (that is, both terms of the Summer Session). A limited number of stipends will be available. Teachers not receiving stipends may register by special permission of the director of the institute. Credit for the courses will be given only for the full 10-week session.

### **3M Distinguished Lectures in Chemistry**

The 3M visiting lecturer for 1968 will be Professor Thomas M. Dunn of the University of Michigan. The title for the lectures will be "A Spectro-

scopic View of the Electronic Structure of Molecules." The lectures will be presented in the period June 24 - July 26.

## Geology for High School Teachers

The Department of Geology and Geophysics offers a course in physical geology, a course in historical geology, and a course in systematic mineralogy for high school teachers who wish to obtain an introduction to earth sciences. These courses, Geo 109C, 122C, and 162, cover the description of geologic materials and processes, the history of the development of the earth, and the study of minerals and rocks composing the crust of the earth. The lectures are augmented with intensive laboratory exercises and with guided discussions on the classroom demonstrations of geological principles. These courses are introduced to help teachers in their effort to satisfy the increasing demand for earth sciences in high school curriculums.

The sequence of Geo 109C, 122C, and 162 can be accepted for the fulfillment of the minor requirements of the M.A. program of graduate students in education.

## GENERAL EXTENSION DIVISION

### Department of Conferences and Institutes Program

#### **Held in the Nolte Center for Continuing Education**

The following conferences and institutes will be offered during the Summer Session:

- June 3-7—Rock Mechanic Seminars—Basic and Advanced
- June 5-8—Minnesota-Dakotas Assembly
- June 6-7—Accounting for Nonaccountants
- June 9-14—Upholsterers Union Conference
- June 15-28—Summer Graduate Course in Epidemiology
- June 18-July 1—Family Life and Sex Education course (Hlth 120)
- June 20-28—Heat Transfer Seminar
- June 24-28—Creative Writing for Children and by Children
- July 8-12—Techniques in Infrared Spectroscopy
- July 24-28—Chemical Interpretation of Infrared Spectra
- August 5-16—Assessment and Appraisal Course for Tax Assessors, Residential I
- August 15-16—Interprofessional Seminar on Diseases Common to Animals and Man
- August 18-23—Annual Steelworkers Union Conference
- August 19-30—Assessment and Appraisal Course for Tax Assessors, Residential II

## **Summer Program in Engineering and Science**

During the summer months a number of intensive 1-day to 2-week short courses, seminars, and workshops are held at the Nolte Center for Continuing Education on the Minneapolis Campus. A large number of these relate to topics in the area of engineering and science. Some examples of subject areas covered include: engineering planning and management, utilization of modern technological instruments, computer applications in analysis and design, as well as refresher treatments in the basic disciplines.

For further information, please write to: Director, Department of Conferences and Institutes, Nolte Center for Continuing Education, University of Minnesota, Minneapolis, Minnesota 55455.

## **Continuing Education for Women**

A few special noncredit courses will be offered during the summer as part of the Continuing Education Program for Women. Plans include two courses in modern literature to be taught by Professor Sarah Youngblood, a course reviewing and updating introductory biology to be taught by Professor Elizabeth Reed, and a special course in an area in child psychology. Classes will meet once a week for 5 weeks. Each session will last from 2 to 2½ hours.

Further information may be obtained by calling 373-5166, or by writing Mrs. Louise Roff, Director, Continuing Education for Women, 310 Nolte Center for Continuing Education, University of Minnesota, Minneapolis, Minnesota 55455.

## **Northland Seminar for Writers**

The first annual University of Minnesota writers conference is scheduled for the week of August 4-10.

Workshop sessions on fiction, nonfiction, poetry, and playwriting will be held each morning, led by practicing professionals. Lectures and panel presentations by editors, teachers, and well-known writers are scheduled for the afternoons.

Special evening social events, theater parties, and writers' roundtables are also being arranged.

On-campus dormitory and dining accommodations will be available for seminar participants.

Registration may be for the full week or for selected sessions.

For information write: Harold J. Alford, Director, Department of Special Classes, 315 Nolte Center, University of Minnesota, Minneapolis, Minnesota 55455.

## UNIQUE PROGRAMS AT CIC INSTITUTIONS

The Committee on Institutional Cooperation (CIC) is an organization established in 1958 to provide for voluntary cooperative arrangements among the Big Ten universities and the University of Chicago. A primary objective of CIC is to enable the student to obtain the best education available throughout the 11-university complex.

In addition to the two rotating institutes (Far Eastern Languages at the University of Michigan, and Slavic Language and Area Studies at Indiana University) sponsored annually by CIC, the following courses were considered by the CIC Summer Session Committee to be unique offerings of the cooperating institutions. This list is only descriptive and is provided to assist students in selecting a summer program in an area which otherwise may be limited in the summer. Interested persons are advised to write the dean or director of the respective institution for complete official information.

Courses designated "graduate" are open only to graduate students. Those not so restricted are open to both undergraduates and graduate students.

### UNIVERSITY OF ILLINOIS • Urbana

**Library Science 433—Sec. H. Advanced Subject Bibliography.** Problems in acquisition, care, and library use of maps. Graduate. Prerequisite: consent of instructor, William Easton. June 17-July 12.

**Library Science 450—Sec. P. Advanced Studies in Librarianship.** Organization and care of rare book collections in large public and scholarly libraries. Graduate. Prerequisite: consent of instructor, James M. Wells. Offered at Newberry Library, 60 W. Walton St., Chicago, Illinois. June 17-July 12.

**Linguistic Institute.** Basic courses in descriptive, historical, applied, and mathematical linguistics. Advanced offerings on theory of syntactic, phonological, and semantic analysis. Seminars for advanced graduate students. June 17-August 10.

### INDIANA UNIVERSITY • Bloomington

**Folklore Institute.** Several courses dealing with a survey of literate and non-literate peoples. Emphasis in 1968 given to American and Turkish folklore. June 19-August 19.

**Intensive Program for Teachers of Latin.** Two courses requiring intensive study of materials and bibliography suitable for high school curriculum. June 19-July 17.

**Graduate Library School.** Two courses dealing with information systems and retrieval. One course pertaining to bibliography of Africa south of the Sahara. Graduate. June 19-August 9.

**Vocal Music in Latin America M629.** Music from aboriginal times to the present with emphasis on useful repertory. Graduate. June 19-August 9.

**Electronic Center for Mathematical and Automatical Music T594.** Laboratory experiments related to contemporary acoustical and musical developments

including tone production and the tonal spectrum. Graduate. June 19-August 9.

**Geometric Optics I V321.** Optics of lenses, prisms, and mirrors. Emphasis on application in visual science. Trigonometry essential. June 19-August 9.

**Police Administration.** Two courses dealing with principles underlying social organizational control devices, legal systems, and rules affecting admissibility. June 19-August 9.

**Field Geology in Rocky Mountains (Montana) G429.** June 8-July 27, and July 21-August 24.

**Polish Language Study Tour P450, and Russian Language Study Tour R450.** Five weeks of intensive study and five-week area tour. Fluency of language essential.

## UNIVERSITY OF IOWA • Iowa City

**Translation Workshop 8:488.** A course for those interested in the translation of foreign texts of high literary merit into English. Professors: Peter Clothier and Paul Engle.

**International Writers' Workshop 8:490.** A special course for the foreign writer to learn about the current literary scene throughout the world. Graduate. Professor: Paul Engle.

**Great Books of China and India 39:163.** Advanced course for serious students of religion and philosophy. Book reports and term paper. No prerequisite. Professor: Y. P. Mei.

**The Genius of American Religious Institutions 32:176.** A delineation of outstanding characteristics of the contemporary religious scene in the United States. Professor: Sidney E. Mead.

**Iowa Summer Pastoral Care Institute 32:255.** Emphasis on pastoral relationships with patients to help clergymen gain insights and skills which will make their ministry more meaningful. Graduate. Professor: David Belgum. June 3-July 12.

**Iowa Lakeside Laboratory.** Course offerings in Field Biology, Helminthology, Morphology of Algae, Aquatic Ecology, Field Entomology. Professor: Richard V. Bobbjerg. June 10-July 12; July 15-August 16.

**Tri-State Field Seminar in Geography.** (Jointly sponsored by Departments of Geography at Iowa, Minnesota, and Wisconsin). Provides guided experience in the formulation and study of individual field problems in one or two branches of geography. Graduate. August 26-September 15.

**Geology Field Techniques 12:113.** Geology field course, Park City, Utah. 6 weeks. Training in the description and mapping of rock units and geologic structures in the Wasatch and Uinta Mountains. A professional level course for advanced graduates and graduates. Professor: Richard Hoppin. June 16-July 28.

## NORTHWESTERN UNIVERSITY • Evanston

**Class Piano Conference 536-C17.** A conference designed for classroom teachers, studio teachers at all levels, and music supervisors to reveal the settings and skills appropriate for piano classes from third grade through

college level. Meets 5 hours daily. 3 quarter-hours credit. Professor Guy Duckworth. July 8-July 19.

## UNIVERSITY OF MICHIGAN • Ann Arbor

**History of Art 654. Titian and Tintoretto.** (2) TTh 3-5. 207 Tappan. Professor Harold E. Wethey.

**Spanish 809. Studies of Colonial and Nineteenth-Century Spanish-American Literature.** (2) TWThF 12. 2075 Frieze Bldg. Professor José Durand.

## OHIO STATE UNIVERSITY • Columbus

**Journalism.** A core of special courses for liberal arts graduates seeking to qualify themselves for graduate work in journalism. Director, School of Journalism.

**Languages.** Intensive programs in Greek and Latin. Full time of student required. Dean, College of Humanities.

**Summer Institute in Geology and the Nature of Science.** Program of study and teaching in Geology, which includes the broader perspective of the nature and development of science. Open for both undergraduate and graduate credit to junior and senior high school teachers and supervisors. Chairman, Department of Geology.

**Geology 581. Geology Field Program.** Essentials of field observation, mapping, and geological study; field camp located at Ephraim, Utah. Full time of student required. Chairman, Department of Geology. June 18-July 24; July 25-August 30.

**Anthropology 664. Archaeological Training Expedition.** Joint expedition of Ohio State University and Ohio Historical Society Museum to excavate prehistoric sites in Ohio. Special field work training. Requires full time of student. Chairman, Department of Anthropology. June 18-July 24; July 25-August 30.

**Study Tour to Poland.** Similar to USSR Language Study tour. Includes 5 weeks of intensive language training on campuses and 5-6 week tour of Poland during which only *Polish* may be spoken. Chairman, Department of Slavic Languages and Literature.

**Anatomy 840.** Study of all phases of medical education including observation of methods, evaluation, curriculum design, student selection, and research. Graduate credit only. Dean, College of Medicine.

**Physiology 907.09. Avian Physiology.** Study of the anatomical and functional differences between birds and mammals; mechanisms used by two classes of homeotherms in meeting physiological stresses; experience with birds as laboratory and experimental animals. Graduate credit only. Dean, College of Medicine.

**Anatomy 730. Human Anatomy.** Radiological manifestations; study of problems in the visualization of various regions of the human body. Professional credit only. June 1-30; July 1-31; August 1-30. Dean, College of Medicine.

**Lake Erie Biology.** The Franz Theodore Stone Laboratory, Put-In-Bay, Lake Erie, Ohio—Course offerings in aquatic biology dealing with the ecology of (a) physical and chemical factors, and (b) biota of fresh water Lake Erie. June 18-July 24; July 25-August 30. Dean, College of Biological Sciences.

## UNIVERSITY OF WISCONSIN • Madison

**Summer Institute in Behavioral Science and Law.** Subjects in the application of behavioral science to the study of the role of law in society. Four graduate level courses:

Sociology 641. Sociology of Law. Harry V. Ball

Law 970. Law and Social Change. Lawrence M. Friedman

Political Science 863. Law and the Political Order. Stuart A. Scheingold

Economics 961. Law and Economic Regulation. Mark S. Massel

**Noncredit seminars** in law and anthropology, law and psychiatry, the legal profession, legal dimensions of poverty. Graduate. June 24-August 16.

**Art History 180-444-2. The Craft of Old Master Drawings.** Studies in the technical resources of master draughtsmen, from the late middle ages to modern times and their art historical and aesthetic significance in master works of drawing. Prerequisite: consent of the instructor, Mr. Watrous. June 24-August 17.

**CIC Far Eastern Language Institute.** A basic program in Chinese and Japanese Languages. First- through third-year courses offered. Admission: evaluated by a CIC Committee. Credit honored by all CIC departments. Advanced courses in Chinese and Japanese will be conducted at University of Michigan Campus. Ten weeks. June 11-August 17.

## UNIVERSITY OF WISCONSIN • Milwaukee

**Music 660-215-5. Studies in Music History.** 1 credit. Graduate and undergraduate. Chamber music survey for strings and woodwinds from 18th century to 20th century.

**Music 660-316-1. Interpretation and Stylistic Problems.** 2 credits. Graduate and undergraduate. Various aspects of ensemble performance technique for strings, woodwind and keyboard students, and music educators. Instruction by the Fine Arts Quartet and New York Woodwind Quintet. June 24-August 3.

**Law Library Institute. 544-998-4. Legal Bibliography.** 2 credits. 544-998-2. Law Library Administration. 2 credits. Institute designed for practicing law librarians and other librarians intending to specialize in law librarianship. July 15-August 10.

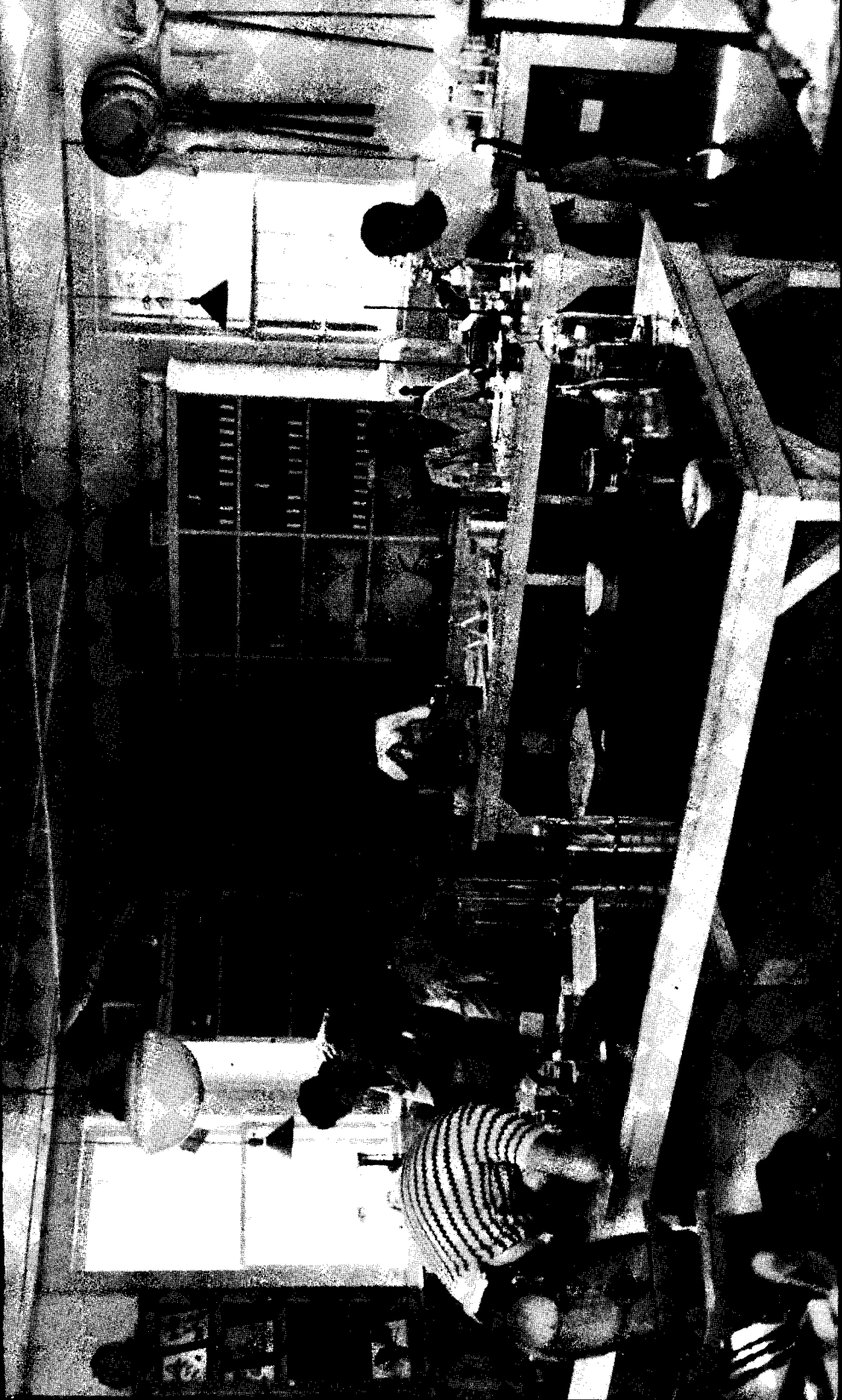
**Field Geology 420-451-7.** 4 credits. Graduate and undergraduate. Advanced Field Geology 420-453-3. 4 credits. Graduate and undergraduate. Geologic field work in Western United States, Canada, and possibly Alaska. June 20-August 15.

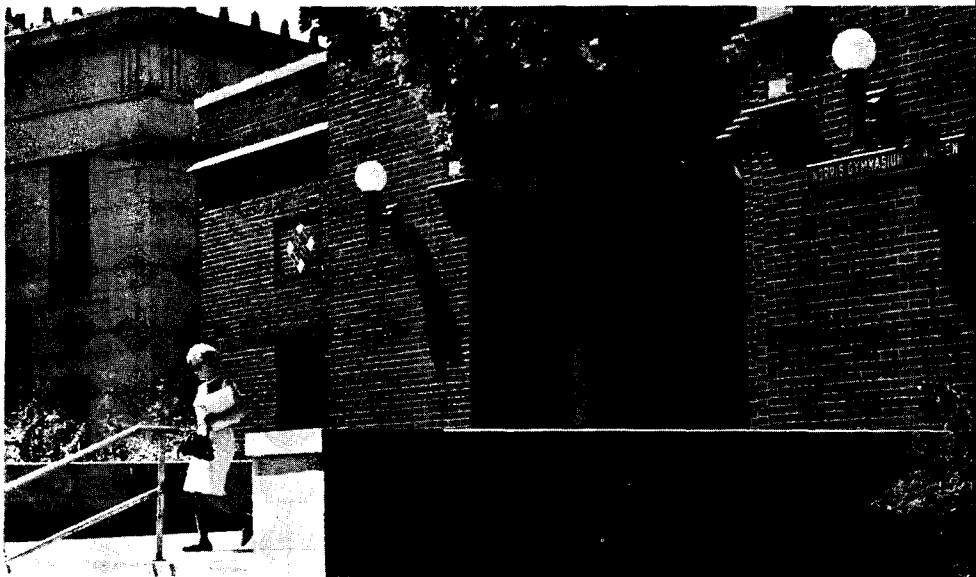
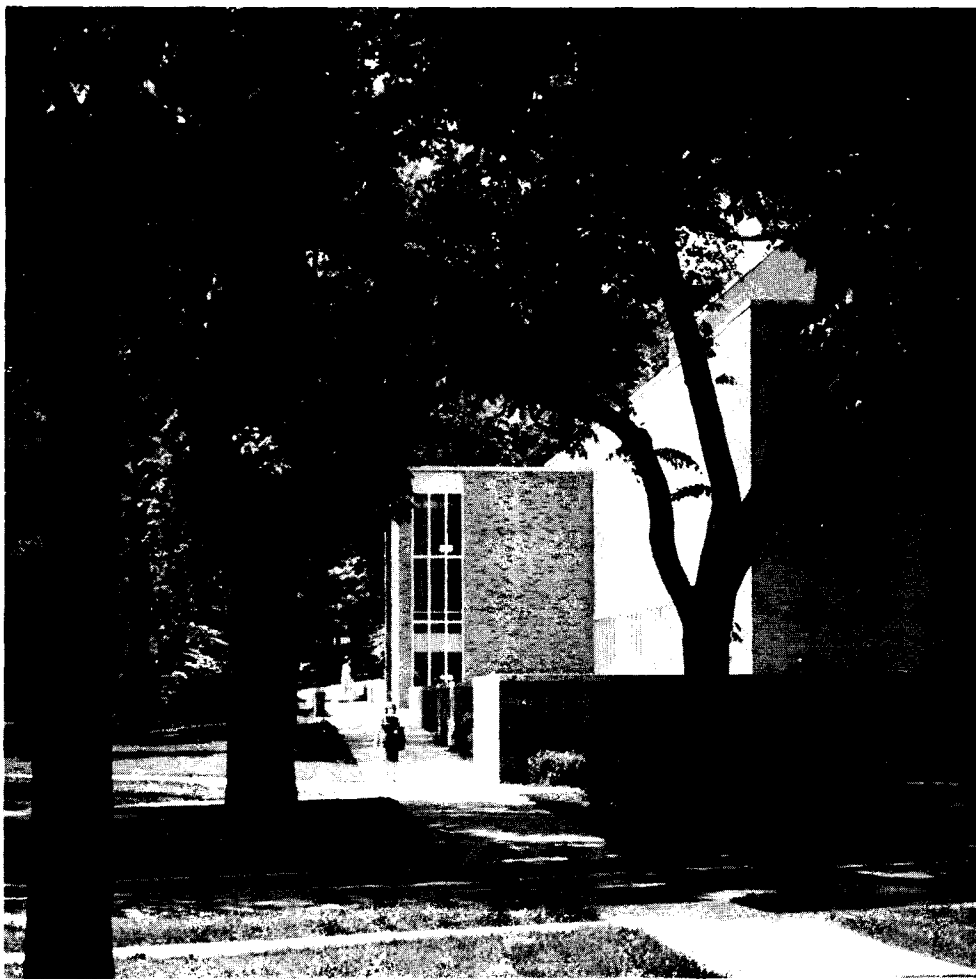
*Note*—The following courses offered by the University of Minnesota were selected by the CIC Summer Session Committee to be included in this listing of unique courses: Public Health 231-232 (Ground Water Development); Public Health 138 (Hospital Engineering Problems); Lake Itasca Biology Session; Music 60 (Introduction to Orchestral Repertoire); Library Management Workshop; Institute in Scandinavian Studies (intensive beginning Swedish). A description of these programs will appear in the summer bulletins of all CIC member institutions. The University of Minnesota programs are described in this bulletin in the appropriate college or departmental section.





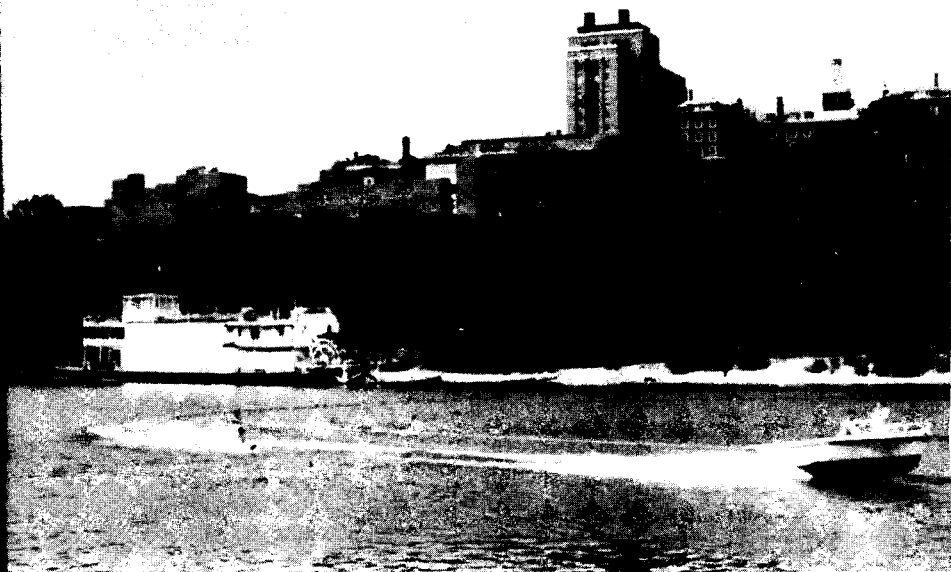
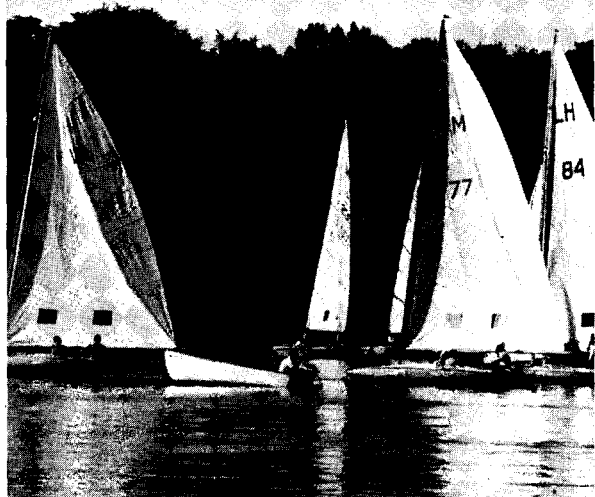








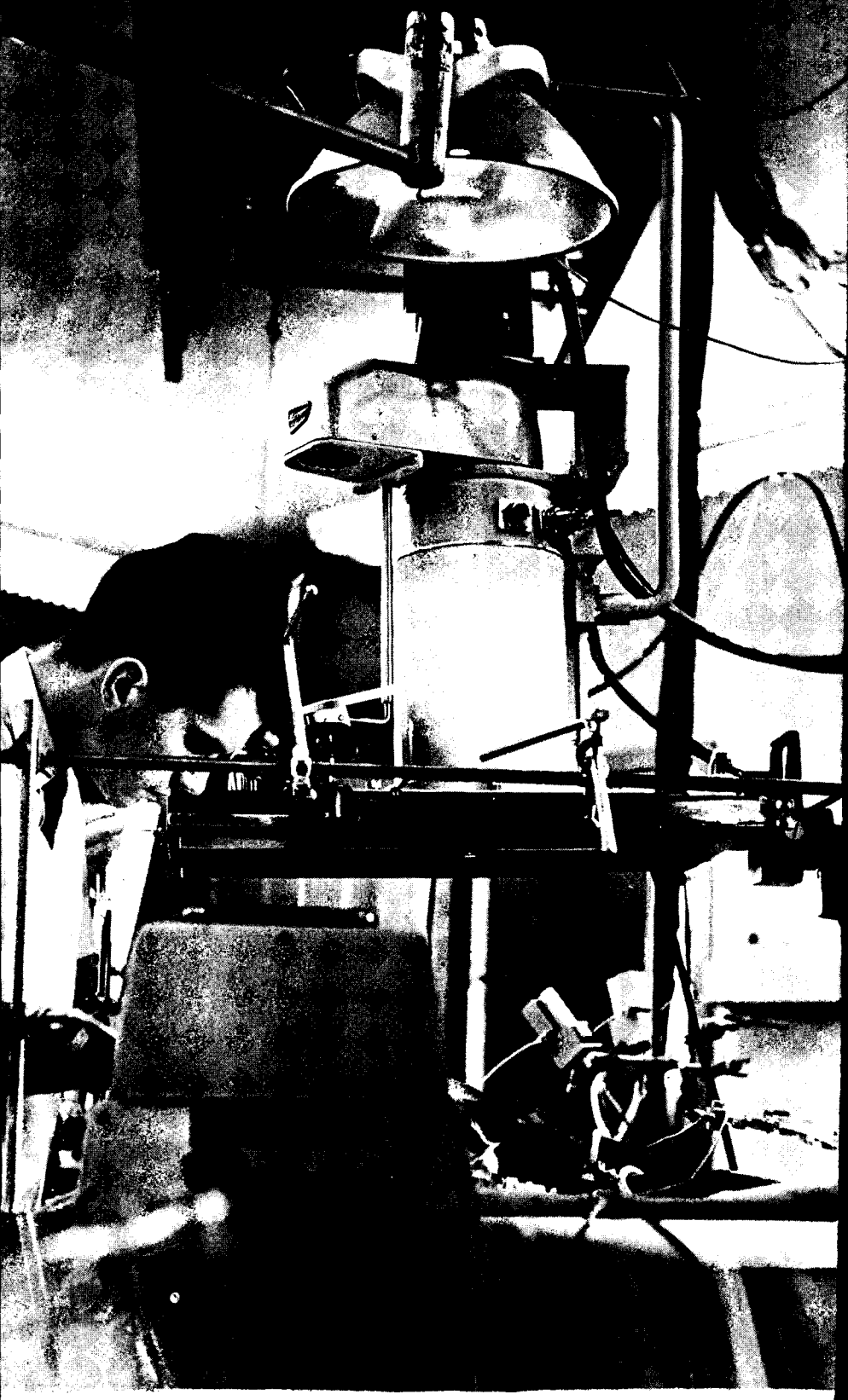








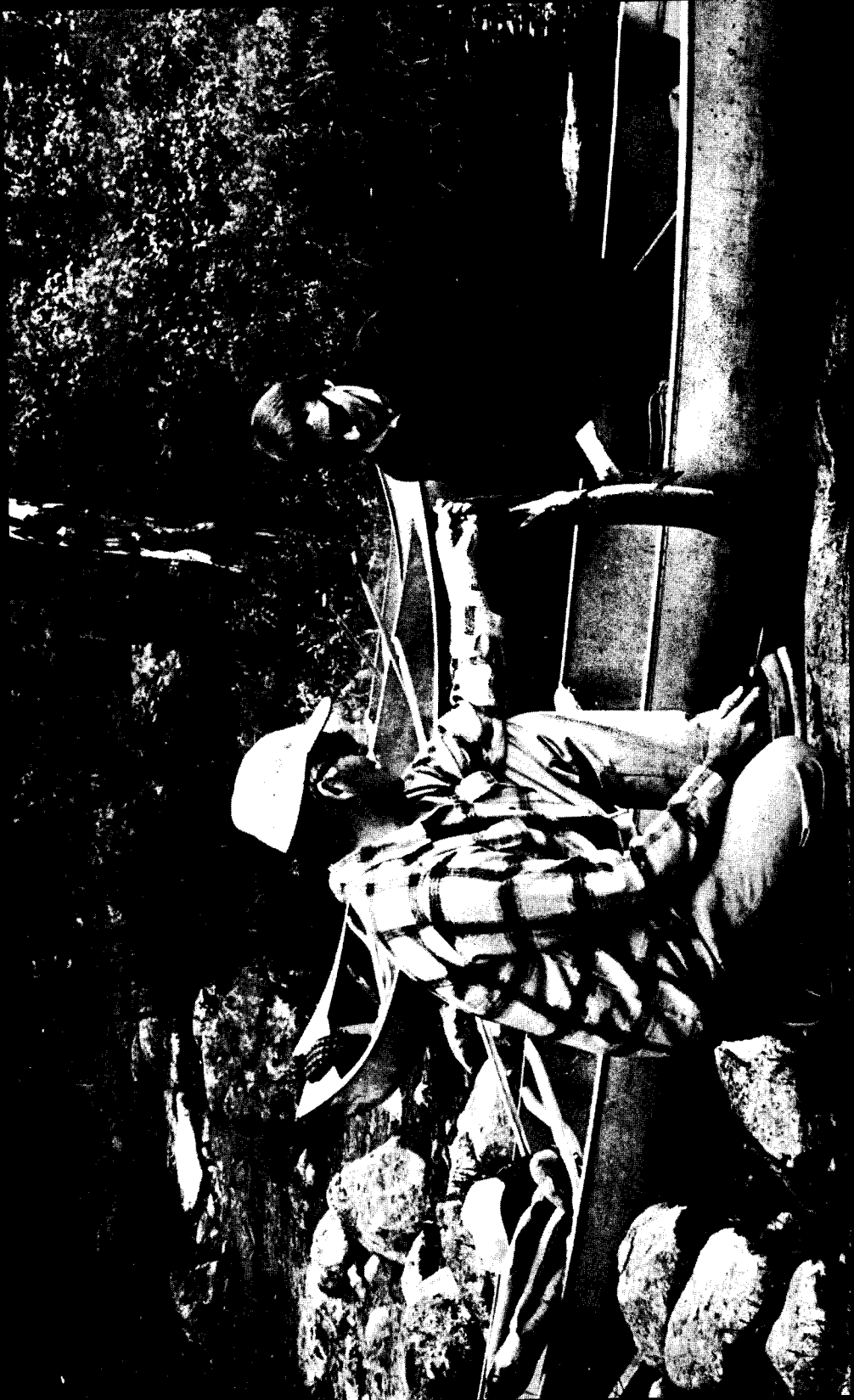


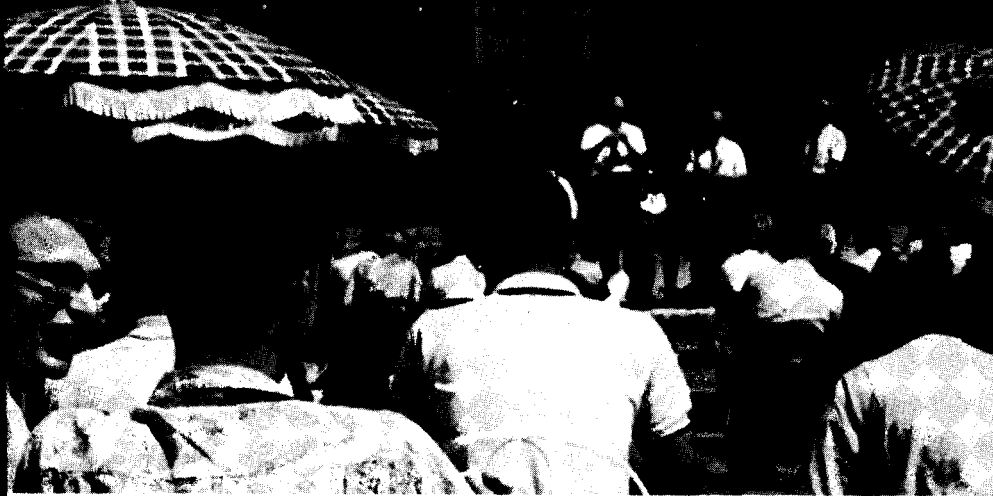


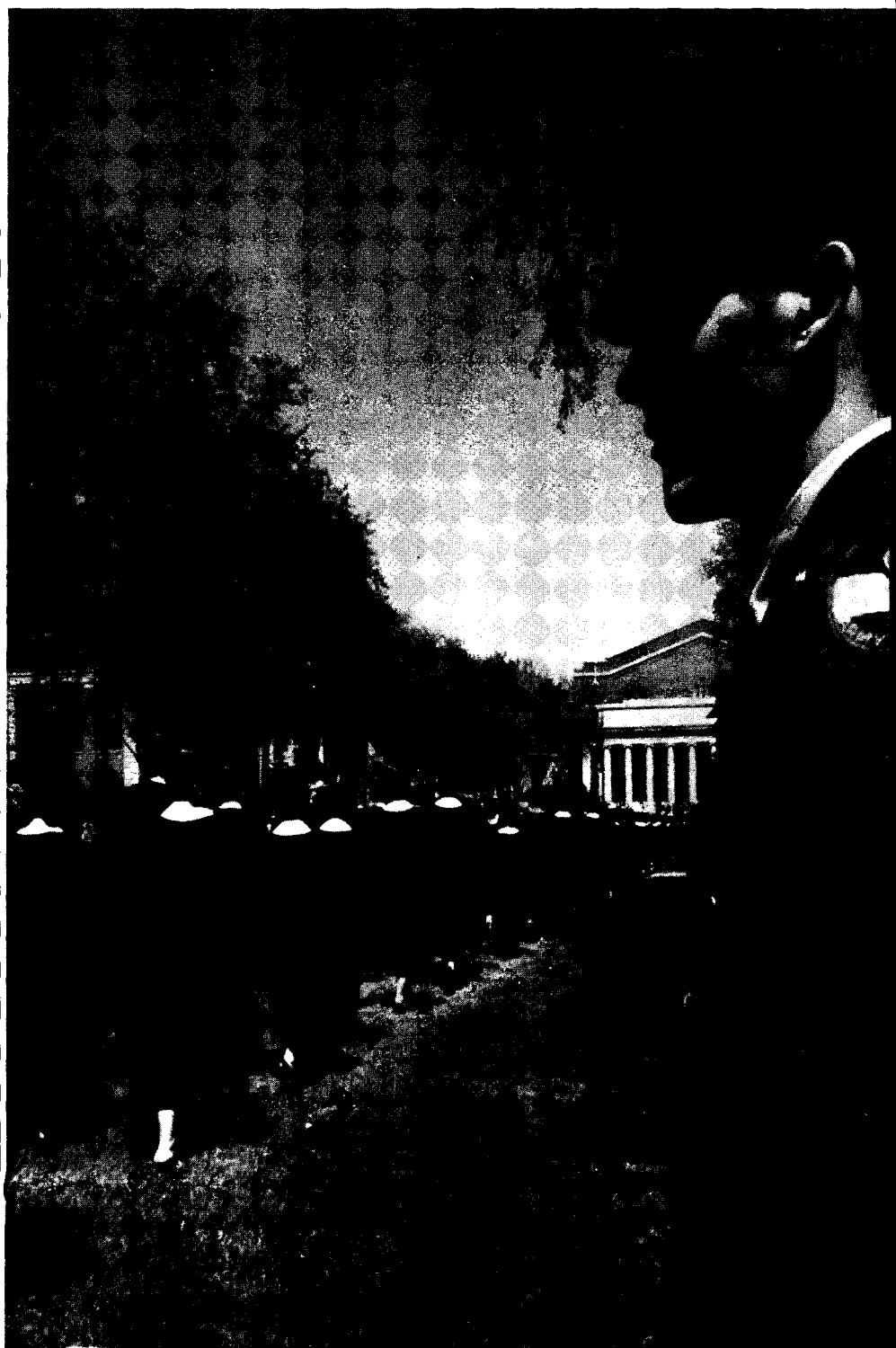


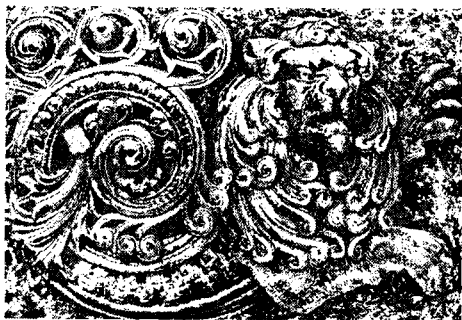












Course Descriptions

*Second Term*



# College of Agriculture, Forestry, and Home Economics

*For general information on the College of Agriculture, Forestry, and Home Economics, see section on Schools, Colleges, and Special Programs.*

## Agricultural Economics (AgEc)

### 201 GENERAL SEMINAR: AGRICULTURAL ECONOMICS

Special problems for individual work by qualified students. (3 cr; prereq # in advance of regis; hrs and rm ar) Staff

## Agricultural Engineering (AgEn)

### Mechanized Agriculture (MeAg)

### 131 PROBLEMS AND FIELD STUDIES IN ADVANCED FARM MECHANICS

Principles and practices pertaining to the implementation of an instructional program in farm mechanics. (3 cr per term [9 cr max]; prereq 130; hrs and rm ar) Bear

## Agronomy and Plant Genetics (Agro)

### Agronomy

### 201° RESEARCH IN FARM CROPS

Problems in physiology, production, and classification of crop plants. (Cr and hrs ar) Staff

### Plant Breeding

### 241° RESEARCH IN PLANT GENETICS

May be taken as major or minor work. (Cr and hrs ar) Staff

### 244 LABORATORY METHODS IN PLANT BREEDING

Field study of plant breeding programs and techniques. (1 cr total for both terms; prereq 132 or #) Lambert

## Animal Science (AnSc)

### 209° RESEARCH IN MUSCLE CHEMISTRY AND PHYSIOLOGY

Individual, original research under staff direction on selected problems involving the chemical, biochemical, and physiological aspects of muscle and meat technology. The topic may be a specialized aspect of a thesis problem or an individual problem of mutual interest to graduate student and adviser. (Cr ar; prereq #; hrs ar) Staff

- 210° RESEARCH IN ANIMAL SCIENCE**  
 Research including experimental studies in the disciplines associated with animal production and research with special emphasis on interdisciplinary studies embracing environmental and managerial considerations. (Cr ar; prereq #; hrs ar) Staff
- 211° RESEARCH IN ANIMAL GENETICS**  
 Research in quantitative genetics, cytogenetics, and other areas related to animal breeding. (Cr ar; prereq #; hrs ar) Staff
- 212° RESEARCH IN ANIMAL NUTRITION**  
 Research in selected areas of animal nutrition. Research topics and animal species determined by consultation. (Cr ar; prereq #; hrs ar) Staff
- 231° RESEARCH IN ANIMAL PHYSIOLOGY**  
 Individual research under faculty direction. Topics to be determined by consultation and may be a specialized aspect of a thesis problem or an independent problem of mutual interest to graduate student and adviser. (Cr ar; prereq #; hrs ar) Staff

## Entomology, Fisheries, and Wildlife (Ent)††

Ample opportunity for research work in various phases of entomology, fishery biology, and wildlife biology will be afforded properly qualified students. This work will be on an individual basis.

- 243° RESEARCH IN ENTOMOLOGY**  
 (Cr ar) Hodson, Chiang, Cook, Cutkomp, Harein, Peterson, Richards, Brooks, Furgala, Kulman, Price, Radcliffe
- 267° RESEARCH IN FISHERY BIOLOGY**  
 (Cr ar) Smith, Waters
- 280° RESEARCH IN WILDLIFE BIOLOGY**  
 (Cr ar) Marshall, Beer, Tester, Mackie

## Food Science and Industries (FSci)

- 170° SPECIAL PROBLEMS IN FOOD MANUFACTURING**  
 Individual laboratory or library research on chemical, physical, and engineering problems involved in processing and utilization of food products. (1-3 cr; prereq sr or #; hrs ar) Staff
- 180° SPECIAL PROBLEMS IN DAIRY AND FOOD MICROBIOLOGY**  
 Laboratory or library research on problems related to the microbiology of dairy products. (1-3 cr; prereq sr or #; hrs ar) Staff

## Forestry (For)

*Offered on the St. Paul Campus*

- 200° RESEARCH PROBLEMS IN SILVICULTURE**  
 (Cr ar) Hansen, B Brown, Bakuzis
- 203° RESEARCH PROBLEMS IN FOREST MANAGEMENT**  
 (Cr ar) Irving, B Brown, Winsness, Meyer, Hughes
- 205° RESEARCH PROBLEMS IN FOREST ECONOMICS**  
 (Cr ar) Skok, Hughes

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†† For additional courses, see index for Biology Session.

- 207° RESEARCH PROBLEMS IN FOREST PRODUCTS ENGINEERING  
(Cr ar) Hossfeld, Kaufert, Haygreen, Gertjejansen, Erickson
- 213° RESEARCH PROBLEMS IN FOREST UTILIZATION  
(Cr ar) Hossfeld, Kaufert, Haygreen, Gertjejansen, Thompson, Erickson
- 215° RESEARCH PROBLEMS IN FOREST TREE PHYSIOLOGY  
(Cr ar) Sucoff
- 218° RESEARCH PROBLEMS IN FOREST MEASUREMENTS AND PHOTOGRAMMETRY  
(Cr ar) Meyer, John
- 219° RESEARCH PROBLEMS IN FOREST RECREATION  
(Cr ar) Merriam, Hughes, Hansen, Skok
- 220° RESEARCH PROBLEMS IN FOREST TREE GENETICS  
(Cr ar) Pauley
- 221° RESEARCH PROBLEMS IN FOREST INFLUENCES  
(Cr ar) Mace
- 222° RESEARCH PROBLEMS IN FOREST POLICY  
(Cr ar) Irving, Skok, Winsness, Merriam, Hughes

**Offered at Lake Itasca Forestry and Biological Station**

Special Term for Forestry Students—August 28 to September 20

Required of all Forest Resources Development and Forest Science majors. Must be completed between sophomore and junior years. Trigonometry, a college course in botany or biology, and a college physics course are required for registration. The schedule is arranged to occupy the student's full time for 5½ days per week. Largely field or laboratory work. In addition to the regular field work in For 54 and 56, special field trips to federal, state, and private forestry operations are required of all students. All students must register for the following courses.

- 50 IMPORTANT FOREST PLANTS  
Identification of forest plants as related to forest types. (2 cr, §2) Scholten
- 54 FOREST ECOLOGY  
Ecological principles. Silvical characteristics of tree and shrub species. Forest communities and environmental factors. The ecology of recreational areas. (3 cr, §5) Sucoff
- 56 FIELD FOREST MEASUREMENTS  
Woods surveying, tree measurements, and timber estimating. (1 cr, §6) Hallgren

## Home Economics (HE)

- 24B HOME PLANNING AND FURNISHINGS EXPERIENCES I  
Problems in designing for living space needs. Experiences in evaluation of design quality of furnishing elements. Selection and coordination of fabrics, furniture, accessories in interior space laboratory. (3 cr; prereq 20, 21, 24A; III-IV MTWThF; McNH 360) Erickson
- 58B FIELD EXPERIENCES  
Supervised work-study program in display design and/or crafts. (3 cr; prereq completion of at least one half of professional sequence and §; hrs and rm ar) Esteros
- 115 SOCIOLOGICAL AND ECONOMIC ASPECTS OF CLOTHING  
Effects of clothing on the individual, society, and economy; psychological, sociological, and economic aspects of fashion. (3 cr; prereq 50, AgEc 2 or Econ 2...Soc 1 or 1A...Psy 2, or §; V MTWThF; McNH 303) Grindereing

- 126 **CRAFT PROBLEMS II**  
Advanced craft design in one selected medium. Readings. (3 cr; prereq 25 or 26 or #; III-IV MTWThF; McNH 433) Abell
- 179 **READINGS IN NUTRITION**  
Survey of literature in the field; oral and written reports. (2 cr; prereq 170; hrs and rm ar) Sirny
- 182 **PARENT IN AMERICAN SOCIETY**  
Analysis of the relationships between changes in American social structure and parental behavior. Analysis of contribution by psychological and sociological behavior theories to research and knowledge in parenthood and parental behavior. (3 cr; prereq 87 or equiv; VI MTWThF; McNH 201) Ar
- 201 **READINGS IN TEXTILES AND CLOTHING**  
Independent study—survey of literature in selected areas. Written reports. (1-3 cr; prereq 102, 115 or 116, #; III MF and ar; McNH 323) Grindereing
- 220 **READINGS IN RELATED ART**  
Independent study and review of books and periodicals in selected areas of related art. Written reports. (1-3 cr; prereq #; not open to seniors; hrs and rm ar) Esteros
- 295-296 **HOME ECONOMICS PROBLEMS**  
Food, nutrition, textiles and clothing, home management and family relationships, household equipment, related art. Independent study and written reports. (1-5 cr per qtr; prereq #; hrs and rm ar) Graduate faculty in Family Economics, Foods, Household Equipment, Nutrition, Related Art, Textiles and Clothing

## Horticultural Science (Hort)

- 190-191-192\* **SPECIAL PROBLEMS**  
Written report based on library, laboratory, or field research. (1-4 cr per qtr; prereq #) Staff
- 251\* **ADVANCED PROBLEMS IN HORTICULTURAL CROP BREEDING**  
Written report based on library, laboratory, or field research. (3-9 cr; prereq #) Staff
- 252\* **ADVANCED PROBLEMS IN PHYSIOLOGY OF HORTICULTURAL CROPS**  
Written report based on library, laboratory, or field research. (3-9 cr; prereq #) Staff

## Plant Pathology (PIPa)

- 201\* **RESEARCH IN NEMATODOLOGY**  
Taxonomy, or ecology, of plant parasitic and free-living terrestrial or aquatic nematodes. (Cr ar; prereq PIPa 101 or #) Kernkamp, MacDonald
- 203\* **RESEARCH IN PLANT PATHOLOGY**  
Special assignment of work in laboratory and field problems in pathological research. (Cr ar) Kernkamp, Christensen, Eide, French, King, Kommedahl, Wilcoxson, Anderson, Kennedy, Mirocha, Rowell, Bantari, Calpouzos, MacDonald, Moore
- 207\* **PROBLEMS IN MYCOLOGY**  
Research along lines such as taxonomy of natural groups, fungus flora of particular regions, localities, or habitats; investigation of fungi involved in industrial or natural processes; morphology or physiology of special forms. (Cr ar; prereq 105, 106, 107) Christensen, Anderson

## Rhetoric (Rhet)

- 22 **PUBLIC SPEAKING**  
A practical course in the fundamentals of speech making. Particular emphasis upon organizing the speech and projecting it to the audience. (3 cr; limited to

20 students; prereq satisfaction of freshman communication requirements; IV MTWThF; AgEng 307) Nichols

**47 EFFICIENT READING**

Designed for students, teachers, business or professional people of average reading ability wishing to improve speed, comprehension, and vocabulary. Techniques valuable in achieving or maintaining superior scholastic or professional status. Maximum use of recently developed visual aids. Of special value to teachers interested in laboratory-type experience in adult reading techniques. Not a remedial course. (3 cr [1 cr for Arts College students]; limited to 30 students) Marchand, Horberg

- Sec 1, I MTWThF, ForH 115
- Sec 2, II MTWThF, ForH 115
- Sec 3, III MTWThF, ForH 115
- Sec 4, IV MTWThF, ForH 115

**51 EXPOSITION**

Essays and articles, technical writing, application letters, review of English usage. (3 cr; limited to 25 students; prereq jr; II MTWThF; AgEng 307) Nelson

**251 SEMINAR: LISTENING COMPREHENSION**

Research problems in this field. Evaluation of published research. (2 cr, §Spch 251; III MTWThF; AgEng 221) Nichols

## Soil Science (Soil)

**130° SPECIAL PROBLEMS IN SOILS**

Research, readings, instruction. (1-5 cr per qtr [10 cr max]; prereq 18 or 19 or 119) Martin, Burson, Blake, Arneman, Rust, Farnham, Grava, Caldwell, MacGregor, Schmidt, Adams, Baker

**202° RESEARCH PROBLEMS IN SOILS**

Individual laboratory or field work on special problems in a phase of soils other than student's major thesis. Arrangements must be made in advance. (2-5 cr; hrs ar) Martin, Burson, Blake, Arneman, Rust, Farnham, Grava, Caldwell, MacGregor, Schmidt, Adams, Baker

# College of Biological Sciences

*For general information on the College of Biological Sciences, see section on Schools, Colleges, and Special Programs.*

## Biochemistry (BioC)

- 298 **GRADUATE SEMINAR**  
Reports on recent development in biochemistry and on research projects in the department. (1 cr; prereq  $\Delta$ ; hrs ar) Staff
- 299 **GRADUATE RESEARCH**  
Research problems in various fields in biochemistry represented by staff interests. (2-5 cr; prereq  $\$$ ; hrs ar) Dagley, Henderson, Jenness, Kirkwood, Liener, Schultze, Gander, Glass, Anderson, Chapman, Klein, Lovrien, Warner

## Biology (Biol)

- 2 **GENERAL BIOLOGY**  
See section on 10-week courses, page 137.
- 52 **MICROBIOLOGY**  
(Same as MicB 153) Lectures and laboratory exercises in taxonomy, anatomy, physiology, biochemistry, and ecology of microbes, with emphasis on fundamental properties of bacteria, and a study of the major groups of bacteria and other protista. (4 cr,  $\$$ MicB 153; prereq 49 or 2, OrCh 62; lect VI MTWThF, Z 313; lab VII-VIII MTWTh, Mayo 205) Klein

## Botany (Bot)††

- 299 **RESEARCH PROBLEMS**  
(Cr ar; prereq  $\$$ ) Staff

## Zoology (Zool)††

- 99 **INDIVIDUAL WORK IN SOME SPECIAL DISCIPLINE**  
(Cr ar; prereq Biol 2 or 50 and  $\$$ ) Staff
- 101 **BASIC ZOOLOGY**  
(Cr ar; prereq grad only; hrs ar) Staff
- 299 **RESEARCH**  
(Cr ar)

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†† For additional courses, see index for Biology Session.

# Biology Session

## Lake Itasca Forestry and Biological Station

*For general information on the Biology Session at Lake Itasca, see section on Schools, Colleges, and Special Programs, or write for Biology Session bulletin, Summer Session, 135 Johnston Hall, University of Minnesota, Minneapolis, Minnesota 55455.*

## Botany (Bot)

- 112 **AQUATIC FLOWERING PLANTS**  
(5 cr; limited to 20 students; prereq 52 or equiv or #; MTh) Thieret
- 116 **SUMMER FLORA OF MINNESOTA**  
(5 cr; limited to 20 students; prereq 52 or equiv or #; WS) Moir
- 155 **FRESHWATER ALGAE**  
(5 cr; limited to 20 students; prereq 10 cr in botany, biology, or zoology, or #; TF) Meyer
- 99 **RESEARCH PROBLEMS**  
(5 cr; prereq major in biological sciences, #) Staff
- 299° **RESEARCH PROBLEMS**  
(Cr ar; prereq grad) Staff

## Ecology and Behavioral Biology (Ecol)

- 119 **AQUATIC ECOLOGY**  
(5 cr; limited to 20 students; prereq 15 cr in biology or #; WS) Underhill
- 152 **ECOLOGY OF FRESHWATER ALGAE**  
(5 cr; limited to 20 students; prereq 150 or 155 or #; MTh) Brook
- 158 **THEORY AND PRACTICE IN ENVIRONMENTAL MEASUREMENT**  
(See For 158)
- 162 **VERTEBRATE ECOLOGY**  
(5 cr; limited to 20 students; prereq Biol 80, or equiv; WS) Siniff, Marshall
- 196 **PROBLEMS IN ECOLOGY AND BEHAVIORAL BIOLOGY**  
(Cr ar; prereq #) Staff

## Entomology, Fisheries, and Wildlife (Ent)

- 129 **AQUATIC ENTOMOLOGY**  
(5 cr; limited to 15 students; prereq 59, 74 or equiv or #; MTh) Cook
- 196° **SPECIAL PROBLEMS IN ENTOMOLOGY, FISHERIES, AND WILDLIFE**  
(Cr ar; prereq #) Staff

## Forestry (For)

- 158 **THEORY AND PRACTICE IN ENVIRONMENTAL MEASUREMENT**  
(Same as Ecol 158) (5 cr; limited to 20 students; prereq college physics, ecology,  
or physiology; TF) Miller
- 215° **RESEARCH PROBLEMS IN FOREST TREE PHYSIOLOGY**  
(Cr ar; prereq ♯) Miller

## Plant Pathology and Physiology (PIPa)

- 156 **STUDY OF FUNGI FOR ADVANCED STUDENTS**  
(5 cr; limited to 15 students; prereq 9 cr in botany, or ♯; WS) French
- 210° **SPECIAL PROBLEMS IN MYCOLOGY**  
(Cr ar; prereq grad; Myc 107) French

## Zoology (Zool)

- 72 **NATURAL HISTORY OF INVERTEBRATES**  
(5 cr; limited to 10 students; prereq Biol 2 or ♯; TF) Chelberg
- 115 **ADVANCED NATURAL HISTORY OF INVERTEBRATES**  
(5 cr; limited to 10 students; prereq 15 cr in zoology or ♯; TF) Chelberg
- 143 **ANIMAL PARASITES**  
(5 cr; prereq 15 cr in zoology incl Biol 2 or equiv; MTh) Larson
- 195° **PROBLEMS IN ECOLOGY AND LIMNOLOGY**  
(Cr ar; prereq Biol 2 or equiv, and ♯) Staff



# School of Business Administration

*For general information on the School of Business Administration, see section on Schools, Colleges, and Special Programs.*

## Accounting (Acct)

### 24 PRINCIPLES OF ACCOUNTING

Recording, reporting, and interpreting business events. Use of accounting as a tool of business management. (3 cr, §55A; prereq 3rd qtr fr; I MTWThF; BlegH 145) Smith

### 25 PRINCIPLES OF ACCOUNTING

Continuation of Acct 24. (3 cr, §55B; prereq 24)

Sec 1, I MTWThF, BlegH 205, Simmons  
 Sec 2, III MTWThF, BlegH 145, Simmons  
 Sec 3, IV MTWThF, BlegH 205, Ar

### 26 PRINCIPLES OF ACCOUNTING

Third quarter of Acct 24-25-26—see Acct 24. (3 cr, §55B; prereq 24)

Sec 1, II MTWThF, BlegH 145, Ar  
 Sec 2, IV MTWThF, BlegH 145, Ar

## Business Finance (BFin)

### 56 FINANCE FUNDAMENTALS

Deals with the problems of acquiring, allocating, and managing funds within the firm. The following concepts of internal financial management are considered in depth: determining financial goals of the firm; analyzing and controlling fund flows through the firm; measuring the expected return on individual investment projects; selecting optimal "portfolios" of projects; determination of capital costs, and the way these costs vary with financing mix; and evaluating the performance of the firm and its components. (3 cr, §156; prereq Acct 26; II MTWThF; BlegH 125) Whitman

### 76 CAPITAL MARKETS AND INSTITUTIONS

Study of the characteristics and institutional structure of the money and capital markets and their interrelationship through interest rates and prices. Observation of price behavior of the market as a whole and of specific types of securities. Attention to new issue markets and to secondary trading on over-the-counter and national exchanges. (3 cr; prereq 56; III MTWThF; BlegH 125) Ar

### 156 BUSINESS FINANCE FUNDAMENTALS

Study of the financial management of firms. Principles governing the planning, raising, and control of short- and long-term funds. Attention directed to capital structures, valuation situations, capital budgeting, dividend policy. Presented through text, problem, and case material. (3 cr, §56; prereq grad, Acct 26 or Acct 155B; II MTWThF; BlegH 125) Whitman

### 276 CAPITAL MARKETS AND INSTITUTIONS

Study of the characteristics and institutional structure of the money and capital markets; flow of funds analysis; markets for equity and debt securities; the role of institutional and individual investors; regulation of securities markets; price behavior of specific types of securities. (3 cr, §76, §old 72; prereq 56 or 156; III MTWThF; BlegH 125) Ar

## Insurance (Ins)

### 53 RISK MANAGEMENT AND INSURANCE

The nature and economic significance of risk. The recognition, measurement, and treatment of risk with particular emphasis upon insurable risks and insurance. Application of these concepts to the property, liability, and personnel risks faced by a business firm or by a family. The risk management function in business and its relationship to other business management functions. Public policy and risk management with special emphasis on the problem of the uncompensated automobile accident victim, social insurance, and government regulation of insurance. (3 cr, §153; prereq Econ 2 or equiv; I MTWThF; BlegH 140) Ar

### 153 RISK MANAGEMENT AND INSURANCE I

The nature and economic significance of risk. The recognition, measurement, and treatment of risk with particular emphasis upon insurable risks and insurance. Application of these concepts to the property, liability, and personnel risks faced by a business firm or by a family. The risk management function in business and its relationship to other business management functions. Public policy and risk management with special emphasis on the problem of the uncompensated automobile accident victim, social insurance, and government regulation of insurance. (3 cr, §53; prereq Econ 2 or equiv; I MTWThF; BlegH 140) Ar

## Industrial Relations (IR)

### 52 SYSTEMS OF INDUSTRIAL RELATIONS: LABOR MARKETING

Introduction to current employment relationships; and economic approach and analysis. The application and conservation of human resources in employment, related social and economic problems. Labor marketing, collective bargaining, unions and employer associations, industrial unrest and conflict, employment and unemployment, wage problems. (3 cr, §152; prereq Econ 2 or equiv)

Sec 1, II MTWThF, BlegH 230, Smythe

Sec 2, II MTWThF, BlegH 110, Schmidt

### 72 SYSTEMS OF INDUSTRIAL RELATIONS: MANPOWER MANAGEMENT

Personnel management and labor relations, the development and application of effective work teams within firms and agencies. Overview of policy and practice in major manpower management functions of staffing, training, communications, motivation, compensation, and morale maintenance. (3 cr, §172; prereq Econ 2 or §; I MTWThF; BlegH 230) Schmidt

### 152 SYSTEMS OF INDUSTRIAL RELATIONS: LABOR MARKETING

(See IR 52) (3 cr, §52; prereq Econ 2 or equiv; II MTWThF; BlegH 230) Smythe

### 172 SYSTEMS OF INDUSTRIAL RELATIONS: MANPOWER MANAGEMENT

(See IR 72) (3 cr, §72; prereq Econ 2; I MTWThF; BlegH 230) Schmidt

### 242 MANAGEMENT DEVELOPMENT

Examination of today's management development movement including management development programs within industry and in universities. Basic policy, current problems, and research findings concerning selection of management trainees, management appraisal and inventory, management motivation and compensation, and methods and techniques of development. (3 cr; prereq 72 or 172 or §; III-IV MWF; BlegH 110) Weitzel

### 282 COLLECTIVE BARGAINING: LEGAL FRAMEWORK AND PUBLIC POLICY ISSUES

Examines the legal requirements and constraints upon the collective bargaining process. Gives consideration not only to present public policy but also to its evolution and developing issues. (3 cr; prereq 152 or §; III-IV TTh; BlegH 110) Smythe

## Management (Mgmt)

- 60 BUSINESS POLICY: STRATEGY FORMULATION AND IMPLEMENTATION**  
Undergraduate level integrating course designed to develop skill in the general management function of determining corporate or divisional goals and in designing programs of action for achieving these goals. Class time is devoted almost exclusively to case analysis and discussion. Students are asked to apply data supplied in the case, as well as concepts and theories presented in this and other courses to the solution of goal selection and strategy implementation problems. The viewpoint of the general line manager (department, division, or executive level) will be taken. (3 cr; prereq sr and completion of business core or final core course)
- Sec 1, 10:10-11:10, MTWThF, BlegH 425, Mauriel  
Sec 2, 11:15-12:15, MTWThF, BlegH 425, Mauriel
- 70 FUNDAMENTALS OF MANAGEMENT**  
The principal functional areas of management: planning, organizing, staffing, directing, and controlling. Examines attributes of good organization; establishment of goals, policies, and procedures; control systems and techniques; providing necessary factors and relationships to achieve organizational objectives. (3 cr; 7:30-8:50, MTWTh; BlegH 435) Juralewicz
- 80 ADMINISTRATIVE PRACTICES**  
Develops awareness and perception of the executive's relationships with individuals and groups in the firm. Opportunity to develop administrative abilities, to think and act responsibly, to make decisions which provide opportunities for others in the organization to work effectively toward individual and organizational goals. (3 cr; II MTWThF; BlegH 435) Juralewicz

## Marketing (Mktg)

- 57 PRINCIPLES OF MARKETING**  
The social, economic, legal, and other environmental aspects of marketing. Special emphasis on the changing environment and the resulting impact on marketing strategy and marketing policies including product development, pricing, marketing channels, and promotion. (3 cr, §157; prereq Econ 2 or equiv)
- Sec 1, I MTWThF, BlegH 150, Ar  
Sec 2, III MTWThF, BlegH 115, Ar
- 77 ADVERTISING**  
A survey of economics and functions of advertising, budgets, agencies, media, copy, layout, printing processes, and research. (3 cr, §207; prereq 57...Psy 156 recommended; IV MTWThF; BlegH 255) Lewis
- 117 SALES MANAGEMENT**  
Sales policies and planning, sales organization, selection, training and compensation of salesmen, control of sales performance, sales budget, and cost control. Case materials. (3 cr [not available for grad cr], §237; prereq 57; II MTWThF; BlegH 240) Lewis
- 157 MARKETING**  
Basic concepts as reflected by the environment and market forces. Includes the behavioral, economic, legal, and ethical aspects. Cast in this framework, direction of the marketing effort and marketing activities include product, pricing, market development, and physical distribution policies. (3 cr, §57; prereq Econ 2 or equiv)
- Sec 1, I MTWThF, BlegH 150, Ar  
Sec 2, III MTWThF, BlegH 115, Ar
- 187 PRICE POLICY**  
Managerial problems concerning pricing and price policy. Methods used and factors considered in pricing goods and services in industrial and consumer markets. Topics include administered pricing, price behavior, non-price competition, government intervention, pricing objectives, organization for pricing, price leadership,

and others. (3 cr [not available for grad cr]; prereq 57; III MTWThF; BlegH 225) Harper

**207 ADVERTISING AND SALES PROMOTION**

The marketing program. Sales promotion mix components. Establishing objectives and budgets for sales promotion activities. Advertising and sales strategy. Media decisions. Advertiser-agency relationships. Measuring the effectiveness of sales promotional activities. Social and ethical implications of sales promotion. (3 cr, §77; prereq 57 or 157; IV MTWThF; BlegH 235) Lewis

**237 SALES MANAGEMENT**

Sales policies and planning; sales organization; selection, training, and compensation of salesmen; control of sales performance, sales budgets; cost control. Case materials. (3 cr, §117; prereq 57 or 157; II MTWThF; BlegH 240) Lewis

## Quantitative Analysis (QA)

**53 QUANTITATIVE METHODS FOR ADMINISTRATION II**

Introduction to decision problems; simple static models; static models dominated by constraints; dynamic models; and simulation. (3 cr; prereq 52 and Econ 2 or \*)

Sec 1, II MTWTh, BlegH 255, Willis

Lab 1, III MTWTh, BlegH 150, Ar

Lab 2, II MTWTh, BlegH 150, Ar

**62 BASIC COMPUTER SYSTEMS**

See section on 10-week courses, page 137.

**258 QUANTITATIVE APPROACHES TO ADMINISTRATION PROBLEMS I AND II**

Uses of probability, statistics, mathematics, economic analysis, and operations research in the solution of business problems at administrative levels. (3 cr, §54; prereq 150, 151, 2 qtrs economics; I MTWThF; BlegH 240) Ar

## Transportation (Tran)

**54 FUNDAMENTALS OF TRANSPORTATION**

Organization and economic aspects of the transportation system of the United States including rail, highway, air, pipeline, and water transportation. The nature of the transportation function in business. Regulatory problems associated with transportation. Current transportation developments and problems. (3 cr, §154; prereq Econ 2 or equiv; IV MTWThF; BlegH 150) Harper

# College of Education

For general information on the College of Education, see section on Schools, Colleges, and Special Programs.

## Agricultural Education (AgEd)

### 221 FIELD PROBLEMS

The development and study of special problems in the field of the individual student's choice. (3 cr; hrs ar) Marvin

### 232° RESEARCH IN AGRICULTURAL EDUCATION

Selecting research problems, preparing bibliographies, analyzing and interpreting data, and preparing manuscripts. (Cr ar; prereq 15 cr in education) Peterson, Swanson, Marvin

## Art Education (ArEd)

### 10C SURVEY OF ART ACTIVITIES

Introduction to pictorial expression, design, and the function of art in the social environment. (3 cr; each section limited to 30 students)

Sec 1, I-II MTWThF, WuH 220, Bradley

Sec 2, III-IV, MTWThF, WuH 220, Sontag

### 17C EXPERIENCES WITH PICTORIAL EXPRESSION

Materials, techniques, and ideas important in art expression; relationships between adult expression, child expression, and art history. (3 cr; limited to 35 students; I-II MTWThF; WuH 240) Sontag

### 80C CONTEMPORARY CRAFTS

Materials, equipment, design criteria, and techniques for textiles, wood, metal, and ceramics. (3 cr; limited to 28 students; III-IV MTWThF; WuH 210) Bradley

### 184 IMPROVING ART PROGRAMS IN THE ELEMENTARY SCHOOL

Evaluating research findings and introduction to new materials, developing cooperation between classroom teachers and art education specialists. (3 cr; limited to 36 students; prereq tchg exper or #; II MTWThF; WuH 110) Olson

### 295 PROBLEMS: ART EDUCATION

(Cr ar; prereq #) Olson

## Institute of Child Development

### Child Psychology (CPsy)

#### 80 CHILD PSYCHOLOGY

(3 cr; prereq Psy 2; II MTWThF; Arch 35) Daehler

#### 132 ADOLESCENT DEVELOPMENT

(3 cr, §81; prereq sr, 12 cr in psychology, child psychology, or educational psychology; II MTWThF; Arch 40) Alpern

#### 140 BEHAVIOR PROBLEMS

(3 cr; prereq 80 or equiv; IV MTWThF; CD 218) Alpern

- 142 PSYCHOLOGY OF HANDICAPPED CHILDREN**  
Research related to sensory, speech, language, physical disabilities of children. (3 cr; prereq 80 or equiv; II MTWThF; CD 218) Templin
- 143 PROBLEMS OF MENTAL DEFICIENCY**  
(3 cr; prereq 80 or equiv; III MTWThF; CD 218) Gallese
- 144 PSYCHOLOGY OF THE GIFTED CHILD**  
Psychology and development of high intellectual ability and of special talents. (3 cr; prereq 80 or equiv; I MTWThF; CD 218) Pilch
- 181 SOCIAL DEVELOPMENT**  
Family and peer influences; social interaction and social relations; developmental changes. (3 cr; prereq 80 or equiv; III MTWThF; Arch 30) Shelton
- 190 TOPICS: CHILD PSYCHOLOGY**  
(Cr and hrs ar; prereq #) Staff
- 250 PRACTICUM: CLINICAL CHILD PSYCHOLOGY**  
(3 cr; prereq #; hrs ar) Gallese

## Educational Administration (EdAd)

- 101 PUBLIC SCHOOL ADMINISTRATION**  
Organization, administration, and general support of public schools in state and local school districts. (3 cr; not open to EdAd majors; prereq sr, 9 cr in education; II MTWThF; Arch 20) Popper
- 128†† WORKSHOP: EDUCATIONAL ADMINISTRATION**  
Section 1: Innovations in elementary education such as organizational patterns, supervisory techniques, and new instructional materials. (1-6 cr; limited to 30 students; July 22-August 6; II-IV MTWThF; Arch 15) Otto  
Section 2: New criteria and procedures used in elementary school evaluation. (1-6 cr; limited to 30 students; August 7-23; II-IV MTWThF; Arch 15) Otto
- 167 JUNIOR HIGH SCHOOL**  
Sources of the movement; purposes, functions, and limitations; fundamental problems, types, and curricular implications of reorganization. (3 cr; prereq 9 cr in education; IV MTWThF; CD 105) Popper
- 201 FOUNDATIONS OF EDUCATIONAL ADMINISTRATION**  
(3 cr; I MTWThF; Bu 125) Sederberg
- 202 FOUNDATIONS OF EDUCATIONAL ADMINISTRATION**  
(3 cr; III MTWThF; Arch 145) Sederberg
- 215 THE ELEMENTARY SCHOOL PRINCIPALSHIP**  
(3 cr; prereq 201 and 202 or #; I MTWThF; WuH 130) Cross
- 216 RECENT RESEARCH: ELEMENTARY SCHOOL ADMINISTRATION**  
An examination of current and pertinent research literature appropriate for elementary school administrators. (3 cr; prereq 215; III MTWThF; CD 105) Cross
- 228° PROBLEMS: EDUCATIONAL ADMINISTRATION**  
(1-3 cr; hrs ar) Domian, Hooker, Popper, Davis, Nickerson, Cross, Sederberg
- 236 FIELD STUDY**  
(0-10 cr; prereq #; hrs ar) Curtin, Domian, Hooker, Popper, Davis, Lambert, Nickerson, Cross, Sederberg
- 239 LABORATORY IN DECISION MAKING**  
(1-4 cr; limited to 25 students; V-VII MTWThF; July 22-August 7; FraH 120) Nickerson

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†† Graduate students planning to register for any workshop should consult their advisers concerning the possibility of using credit for the workshop in their graduate program.

- 244-245-246† **SEMINAR: ADMINISTERING PUBLIC EDUCATION IN METRO-POLITAN AREAS**  
Analysis of political, social, cultural, and fiscal developments in metropolitan areas as they affect the administration of public education. (2 cr [total of 6]; prereq EdAd major; III-IV MTWThF; Arch 35) Davis
- 264 **THE SECONDARY SCHOOL PRINCIPALSHIP**  
(3 cr; II MTWThF; Arch 30) Nickerson
- 270A\* **PROBLEMS: ELEMENTARY SCHOOL ADMINISTRATION**  
(Cr and hrs ar; prereq #) Curtin, Lambert, Cross
- 270B\* **PROBLEMS: SECONDARY SCHOOL ADMINISTRATION**  
(Cr and hrs ar; prereq #) Domian, Hooker, Popper, Davis, Nickerson, Sederberg
- 274 **THE JUNIOR COLLEGE**  
Present status, development, functions, organization, curriculum, and trends. (3 cr; I MTWThF; Arch 35) White
- 275 **JUNIOR COLLEGE ADMINISTRATION**  
Selected problems and topics associated with administration and administrative positions. (3 cr; prereq 274 or #; III MTWThF; Bu 105) White

## Educational Psychology (EPsy)

### GENERAL COURSES

- 110 **EDUCATIONAL MEASUREMENT IN THE CLASSROOM**  
Principles and methods for construction, evaluation, and improvement of classroom instruction. (3 cr; each section limited to 35 students) Terwilliger  
Sec 1, III MTWThF, WuH 130  
Sec 2, IV MTWThF, Pt 111
- 116 **INTRODUCTORY STATISTICAL METHODS**  
Basic statistical techniques; comprehension of literature using elementary statistical concepts and methods. This course is not equivalent to EPsy 216, 216A. (3 cr; each section limited to 45 students)  
Sec 1, III MTWThF, Arch 50, Hoyt  
Sec 2, IV MTWThF, Bu 123, Ar
- 117 **BASIC PRINCIPLES OF MEASUREMENT**  
Principles underlying construction of achievement examinations; developments in educational and psychological measurement; theory and practice related to statistical methods; types and uses of derived scores; factors influencing reliability and validity. (3 cr; prereq 116 or 216 or Psy 70 or equiv; III MTWThF; WuH 230) D Anderson
- 148 **CLINICAL DIAGNOSIS OF READING DIFFICULTIES**  
Relationship to psychological factors and clinical remedial correction. (3 cr; limited to 35 students; prereq EdCI 145; II MTWThF; Arch 55) Balow
- 150 **CLINICAL PRACTICE IN REMEDIAL TEACHING**  
Remedial tutoring of individual children who have difficulty in school learning. (3 cr; each section limited to 10 students; prereq EdCI 145 or 151 and #) Ar  
Sec 1, II-IV MTWThF, Ar  
Sec 2, II-IV MTWThF, Pt 202  
Sec 3, II-IV MTWThF, Pt 102
- 159 **PERSONALITY DEVELOPMENT AND MENTAL HYGIENE**  
Examines theory and research in personality development and mental functioning in the light of knowledge concerning the psychology of stress and the concept of mental health as constructive behavior in response to change and stress. (3 cr; each section limited to 40 students) Kaul  
Sec 1, I MTWThF, FraH 20  
Sec 2, IV MTWThF, FraH 20

- 161 **DIAGNOSIS AND REMEDIATION OF LEARNING DISABILITY II**  
Survey, evaluation, and demonstration of special techniques for amelioration of deficits in perceptive, integrative, and expressive processes. (3 cr; limited to 30 students; prereq 160 and 160A or #; I MTWThF; Pt 102) Gallistel
- 161A **PRACTICUM IN DIAGNOSIS AND REMEDIATION OF LEARNING DISABILITY II**  
Clinical practice in prescriptive teaching using a selective range of the techniques presented in EPsy 161. (3 cr; each section limited to 10 students; prereq ¶161 or #) Deno, Gallistel  
Sec 1, III-IV MTWThF, Pt 110  
Sec 2, III-IV MTWThF, Pt 215  
Sec 3, I-IV MTWThF, St Paul Learning Center
- 165 **SEMINAR: PROBLEMS AND ISSUES IN THE EDUCATION OF LEARNING-DISABLED CHILDREN**  
Exploration of issues involved in design and conduct of services for learning-disabled children. (3 cr; limited to 30 students; prereq experience and continuing professional responsibility in the SLD field and #; VI MTWThF; Pt 102) Deno
- 182 **EDUCATION OF EXCEPTIONAL CHILDREN**  
Introduction to the field of special education for classroom teachers, and other school personnel. (3 cr; III MTWThF; FraH 20) Grismer
- 183 **EDUCATION OF GIFTED CHILDREN**  
Abilities, characteristics, and education of intellectually gifted children and adults. (3 cr; prereq Ed 55B or 75B or equiv; III MTWThF; Arch 40) Reynolds
- 184 **INTRODUCTION TO EDUCATION OF THE MENTALLY RETARDED**  
Issues which relate to educational practices; community planning; educational philosophy, administration, organization, and programming. (3 cr; prereq 182; II MTWThF; FraH 20) Grismer
- 186 **EDUCATION OF EMOTIONALLY DISTURBED AND SOCIALLY MALADJUSTED CHILDREN**  
Discussion and evaluation of curriculum, materials, and methods for instruction of disturbed and delinquent children in hospital, training school, and public school settings. (3 cr; prereq grad or #; II MTWThF; WuH 130) Wilderson
- 193 **PSYCHOLOGICAL ANALYSIS OF INSTRUCTION**  
Use of psychological concepts and principles in analysis of instructional problems and development of teaching strategies; consideration of behavior modification; behavioral objectives; task analysis. (3 cr; each section limited to 40 students)  
Sec 1, II MTWThF, WuH 230, Neale  
Sec 2, IV MTWThF, WuH 230, Ar
- 208\* **METHODS IN EDUCATIONAL RESEARCH**  
Methods and techniques employed in investigation and report of education problems. (3 cr; limited to 20 students; II MTWThF; CD 105) Hoyt
- 217 **STATISTICAL METHODS**  
Foundations of statistical theory; practice in applying theories to solution of educational and psychological problems. (3 cr; prereq 216; I MTWThF; WuH 230) MacEachern
- 217A **STATISTICAL METHODS LABORATORY**  
For students who wish more experience in solutions of problems and the use of machines than is obtained in EPsy 217. (2 cr; limited to 22 students; prereq ¶216; II-III TWTh; WuH 330) Proshok
- 218 **STATISTICAL METHODS (Part II)**  
See section on 10-week courses, page 137.
- 218A **STATISTICAL METHODS LABORATORY (Part II)**  
See section on 10-week courses, page 137.
- 226\* **COUNSELING THEORY AND PROCEDURE II**  
Dimensions of counseling relationship; dynamics of interviewing; distinction between psychotherapy and counseling; treatment of factors; counselor attitude and personality; applications in different settings. (3 cr; prereq 225, 140 or ¶140; II MTWThF; Bu 125) Blocher



- 233° PROBLEMS: GUIDANCE AND PERSONNEL WORK**  
Independent study. (1-9 cr; hrs ar) Blocher, Parker, A Anderson
- 236 GROUP COUNSELING: PRINCIPLES AND PROCEDURES**  
Introduction to basic principles of group dynamics related to the group counseling process. For counselors and student personnel workers; emphasis on developing concepts, attitudes, and skills necessary for group counseling. Including theory and laboratory experiences. (3 cr; prereq 133 or 250, and 125 or 225; III-IV MWF; Bu 125) A Anderson
- 253° RESEARCH PROBLEMS**  
(Cr and hrs ar; prereq #) Balow, Deno, Hoyt, Reynolds, Force, MacEachern, Neale, Terwilliger, Wilderson, D Anderson, Gallistel, Rynders
- 257 CLINICAL PRACTICE IN EDUCATIONAL DIAGNOSIS**  
Supervised work with children referred to the Psycho-Educational Clinic for diagnosis of learning disabilities and school-related problems. Parent and child interviewing; testing; and preparation of case reports. (3 cr, §151; limited to 4 students; prereq 210 or equiv, EdCI 145, #; hrs ar; Pt 104) Deno
- 286 ADVANCED COURSE: EDUCATION OF EMOTIONALLY DISTURBED AND SOCIALLY MALADJUSTED CHILDREN**  
Techniques of behavior modification, analysis of teacher-pupil interaction in study of classroom groups, and classroom management strategies with disturbed and delinquent children. Current literature review; individual assignments. (3 cr; prereq #; I MTWThF; Pt 104) Wilderson
- 288 PRACTICUM IN SPECIAL EDUCATION**  
Supervised experience in supervision, administration or coordination, teaching and related work in school, agencies, institutions, and other facilities for exceptional children. (3-9 cr; prereq #; hrs ar) Wilderson

## SECONDARY EDUCATION

- 283 COUNSELING PRACTICUM: INTERMEDIATE**  
Individual assignments in counseling under supervision. (1-3 cr [total 6], §282B; limited to 15 students; prereq 282 or #; VI-IX MTWThF; West High School) Parker, A Anderson

## General Education

### Curriculum and Instruction (EdCI)

#### GENERAL COURSES

- 100A WORKSHOP: EDUCATION OF TRAINABLE RETARDED CHILDREN**  
Curriculum and materials for teaching trainable mentally retarded children. (6 cr; limited to 25 students; prereq #; I-VIII MTWThF; Arch 60) Force
- 100B WORKSHOP: EDUCATION OF EDUCABLE RETARDED CHILDREN**  
Curriculum and materials for teaching educable mentally retarded children. (6 cr; limited to 25 students; prereq #; I-VIII MTWThF; Arch 140) Rynders
- 105 AUDIO-VISUAL MATERIALS IN EDUCATION**  
(3 cr; prereq sr; I MTWTh and 2 hrs lab ar; NH 211) Pearson
- 107 RADIO AND TELEVISION IN EDUCATION**  
(3 cr; limited to 30 students; prereq 9 cr in education; III MTWThF; WeH 202) Pearson
- 109 PROJECTED AUDIO-VISUAL MATERIALS AND EQUIPMENT LABORATORY**  
Planning and making projected materials for audio-visual education; use of materials and equipment. (3 cr; each section limited to 15 students; prereq 105 or ¶105; lect IV MTWThF; WeH 206) Ar  
Sec 1, VI MW, WeH 206  
Sec 2, VI TTh, WeH 206

- 145 **READING DIFFICULTIES**  
(3 cr; limited to 50 students; prereq 143A or 144 or equiv; III MTWThF; Pt 111) Manning
- 170 **PROGRAMS AND PROCEDURES OF CURRICULUM DEVELOPMENT**  
Leadership in procedures; operational processes; major considerations in planning and organizing; interpersonal relationships; and evaluation of improvement programs. (3 cr, §170A-B; prereq 113 or 119; II MTWThF; PeikH 175) Kimpston
- 201° **PROBLEMS: TEACHING SOCIAL STUDIES**  
(Cr and hrs ar; prereq 102 or 155 or 168, 204 or §) F Johnson
- 205° **PROBLEMS: AUDIO-VISUAL EDUCATION**  
(Cr and hrs ar; prereq §) Pearson
- 207° **PROBLEMS: RADIO-TELEVISION EDUCATION**  
(1-3 cr; prereq 107) Pearson
- 232° **PROBLEMS: TEACHING MATHEMATICS**  
(Cr and hrs ar; prereq 230 or 231 or 291) Donovan Johnson, Jackson
- 271° **PROBLEMS: CURRICULUM CONSTRUCTION**  
(Cr and hrs ar; prereq §) Gennaro, Hill, Kimpston
- 273° **PROBLEMS: READING**  
(Cr and hrs ar; prereq 143A or 144 or §) Balow, Kegler, Dykstra, Manning, Odland
- 296° **PROBLEMS: TEACHING ENGLISH**  
(Cr and hrs ar) Dykstra, Piche

#### ELEMENTARY EDUCATION

- 60 **TEACHING READING IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; prereq Ed 75A; III MTWThF; Bu 120) Chang
- 61 **TEACHING SOCIAL STUDIES IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; prereq Ed 75A; IV MTWThF; Pt 214) Ar
- 62 **TEACHING MATHEMATICS IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; prereq Ed 75A, Math 5A-B; I MTWThF; Pt 111) Jackson
- 63 **CHILDREN'S LITERATURE**  
(3 cr; limited to 50 students; II MTWThF; Bu 120) Ar
- 64 **TEACHING ENGLISH IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; prereq Ed 75A, Engl 60; II MTWThF; Arch 145) Dykstra
- 65 **TEACHING SCIENCE IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; prereq Ed 75A, 10 cr in natural sciences; III MTWThF; Pt 204) R Johnson
- 102 **TEACHING AND SUPERVISION OF SOCIAL STUDIES IN THE ELEMENTARY SCHOOL**  
The class is planned for graduate students and for summer students who already hold a Bachelor's degree. Undergraduate students should register for EdCI 61. (3 cr; prereq Ed 75B or equiv; II MTWThF; Pt 214) Ar
- 103 **TEACHING SCIENCE IN THE ELEMENTARY SCHOOL**  
The class is planned for graduate students and for summer students who already hold a Bachelor's degree. Undergraduate students should register for EdCI 65. (3 cr; prereq sr, Ed 75B or tchg exper; IV MTWThF; Pt 204) R Johnson
- 119 **ELEMENTARY SCHOOL CURRICULUM**  
(3 cr; prereq Ed 75B or equiv; II MTWThF; Pt 204) Goossen
- 121 **LITERATURE FOR THE ELEMENTARY SCHOOL**  
(3 cr; IV MTWThF; Bu 120) Ar
- 143A **TEACHING AND SUPERVISION OF READING IN THE ELEMENTARY SCHOOL**  
The class is planned for graduate students and for summer students who already hold a Bachelor's degree. Undergraduate students should register for EdCI 60.

- (3 cr; limited to 50 students; prereq 9 cr in education; I MTWThF; Bu 120) Manning
- 149A TEACHING AND SUPERVISION OF MATHEMATICS IN THE ELEMENTARY SCHOOL**  
Present practices and trends in methods, evaluation, and diagnosis; objectives, psychology, and philosophy related to improvement of instruction. (3 cr, §149; prereq 62 or §; II MTWThF; Pt 111) Jackson
- 150 SUPERVISION AND IMPROVEMENT OF INSTRUCTION**  
(3 cr; prereq 9 cr in education; III MTWThF; Bu 123) Curtin
- 153 TEACHING AND SUPERVISION OF ENGLISH IN THE ELEMENTARY SCHOOL**  
(3 cr; prereq 64 or elementary school tchg exper; I MTWThF; Bu 123) Dykstra
- 213 RESEARCH FOUNDATIONS OF ELEMENTARY SCHOOL SCIENCE TEACHING**  
Implications for improvement of instruction in elementary schools. (3 cr; prereq 103 or §; IV MTWThF; Arch 135) Goossen
- 261\* PROBLEMS: IMPROVEMENT OF INSTRUCTION**  
(Cr and hrs ar; prereq §) Curtin, Goossen, Dykstra, Jackson, Lambert, Manning, Odland, R Johnson

## SECONDARY EDUCATION

- 51 DISTRIBUTIVE OCCUPATIONAL EXPERIENCE**  
Observation and practice in distributive businesses combined with weekly seminars on application to the teaching and guidance of high school and post-high school students. (3-9 cr; prereq jr, sr, dist ed major only, §) Klaurens, Meyer
- 101A†† DRIVER EDUCATION I**  
Materials and methods of driver education; building a plan for driver education for a specific school; behind-the-wheel training. Valid Minnesota driver license required. (4 cr, §101; limited to 32 students; prereq Δ; 1:00-2:20 MTWThF; Arch 135) Ar
- 101B†† DRIVER EDUCATION II**  
(4 cr; limited to 32 students; prereq 101 or 101A and Δ; 2:30-3:50 MTWThF; Arch 135) Ar
- 113 PRINCIPLES OF SECONDARY SCHOOL CURRICULUM**  
Fundamental principles; curricular concepts, special services, student activity programs, instructional instruments, administrative systems and future trends. (3 cr; prereq Ed 55B or equiv; III MTWThF; PeikH 165) Kimpston, Hill
- 122A TEACHING LITERATURE IN SECONDARY SCHOOLS**  
(3 cr; prereq Ed 55B or jr-sr high school tchg exper; II MTWThF; Bu 123) Kemp
- 129 TRENDS AND ISSUES IN SECONDARY CURRICULUM**  
(3 cr; prereq 113 or equiv; IV MTWThF; PeikH 175) Hill
- 131 ADVANCED TEACHING OF TECHNICAL BUSINESS SUBJECTS**  
(3 cr; IV MTWThF; Arch 30) Driska
- 136 ORGANIZATION AND ADMINISTRATION OF DISTRIBUTIVE EDUCATION**  
(3 cr; II MTWThF; Bu 105) Meyer, Klaurens
- 137A MATERIALS AND METHODS IN COOPERATIVE PART-TIME CLASSES**  
(3 cr; IV MTWThF; Bu 105) Klaurens, Meyer
- 144 TEACHING READING IN SECONDARY SCHOOLS**  
(3 cr; limited to 45 students; prereq 9 cr in education; III MTWThF; PeikH 275) Kemp
- 156 TRENDS IN BUSINESS EDUCATION**  
(3 cr; I MTWThF; Bu 105) Price

†† Advance application required; for information write to Dean's Office, College of Education, 204 Burton Hall, University of Minnesota, Minneapolis, Minnesota 55455.

- 159 **MATERIALS LABORATORY, SECONDARY SCHOOL DISTRIBUTIVE EDUCATION**  
Development of specific related vocational materials for distributive occupations, cooperative part-time classes. (3 cr; limited to 20 students; prereq 137A or EdT 90C or #; July 29 to August 13; 12:00-4:30 MTWThF; Bu 105) Goodenough
- 168 **CURRENT DEVELOPMENTS IN THE SOCIAL STUDIES**  
Contemporary literature, curricular trends, developments in methods. (3 cr; prereq grad or #; II MTWThF; PeikH 165) F Johnson
- 190 **CURRENT DEVELOPMENTS IN SECONDARY SCHOOL SCIENCE TEACHING**  
(3 cr; prereq EdT 68B-C or 68M, equiv undergrad courses or science tchg exper; III MTWThF; PeikH 385) Gennaro
- 193B **METHODS AND MATERIALS FOR TEACHING BIOLOGICAL SCIENCES**  
Individualized instruction in laboratory techniques and equipment with application to classroom use. (3 cr; limited to 20 students; prereq EdT 68C or 68M or equiv; II TTh and lab ar MWF; PeikH 375) Gennaro
- 195B **SOURCES FOR CURRICULUM DEVELOPMENT IN ENGLISH AND SPEECH**  
Implications from anthropology, sociology, psychology, rhetoric, dialectology and dialect geography, mathematical linguistics, logic, and semantics. (3 cr; prereq 195A or #; I MTWThF; PeikH 245) Kegler, Piche
- 237 **SEMINAR: RESEARCH IN BUSINESS, DISTRIBUTIVE, AND ECONOMIC EDUCATION**  
(No cr; prereq #; hrs ar) Price, Meyer
- 238° **PROBLEMS: DISTRIBUTIVE EDUCATION**  
(Cr and hrs ar; prereq #) Meyer, Klaurens
- 239° **PROBLEMS: BUSINESS EDUCATION**  
(Cr and hrs ar; prereq #) Price, Driska
- 295 **READINGS IN ENGLISH AND MODERN LANGUAGE EDUCATION**  
(1-3 cr; VI MTWThF; Bu 129) Piche

## HIGHER EDUCATION

- 228°11 **WORKSHOP: PROBLEMS OF TEACHER EDUCATION**  
(6 cr; hrs and rm ar MTWThF, July 22 to August 16) Mork, McCune, Woestehoff, and consultants

## Education (Ed)

- 55B **INTRODUCTION TO SECONDARY SCHOOL TEACHING**  
Open only to students accepted for a regular degree program in the College of Education who have completed Ed 55A. (5 cr; each section limited to 30 students; prereq 55A, #; lect I MTWThF; SciCB 125) Neale
- Sec 1, II MTWThF, Aero 309, Ar  
Sec 2, II MTWThF, Arch 45, Ar  
Sec 3, III MTWThF, Aero 215, Ar  
Sec 4, III MTWThF, Aero 309, Ar  
Sec 5, IV MTWThF, Aero 215, Ar

## History and Philosophy of Education (HEd)

- 90 **THE SCHOOL AND SOCIETY**  
(3 cr; each section limited to 75 students; prereq sr) Harkins
- Sec 1, I MTWThF, Arch 10  
Sec 2, II MTWThF, Arch 10

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†† Graduate students planning to register for any workshop should consult their advisers concerning the possibility of using credit for the workshop in their graduate program.

- 141 **CRITICAL ISSUES IN CONTEMPORARY EDUCATION**  
Introduces graduate students to ideas involved in current theory and practice. (3 cr; III MTWThF; Arch 135) Dupuis
- 151 **SOCIAL HISTORY OF AMERICAN EDUCATION**  
Impact of education on social and institutional development in America from the colonial period to the present. Although schools, both private and public, will receive continuous attention, education will be defined broadly to include the work of the family, the religious congregation, the popular press, clubs, and other private associations. (3 cr, §Hist 141E; II MTWThF; BlegH 205) Smith
- 182 **COMPARATIVE PHILOSOPHIES OF EDUCATION**  
Examination of competing philosophies of education. (3 cr; IV MTWThF; Arch 145) Dupuis
- 190 **SOCIOLOGY OF EDUCATION**  
Advanced studies in the social aspects of education including the school as a socialization process, the social structure of education, the role of the school in social change. (3 cr, §Soc 195; I MTWThF; CD 105) Bennett
- 241° **PROBLEMS; HISTORY AND PHILOSOPHY OF EDUCATION**  
For graduate students interested in research and work in these areas. (Cr and hrs ar; prereq #) Dupuis

## Home Economics Education (HEEd)

- 60 **CURRICULUM IN HOME ECONOMICS EDUCATION**  
Selection and organization of content of curriculum at secondary level. (3 cr; prereq 49, Soc I or Soc 1A, Ed 55B or ¶Ed 55B; VI MTWThF; McNH 144) Wantoch
- 190 **READINGS IN HOME ECONOMICS EDUCATION**  
Independent study under tutorial guidance. (1-3 cr; prereq #; hrs ar) Ford, Whiteford
- 201° **PROBLEMS; HOME ECONOMICS EDUCATION**  
Independent study of current educational problems. (1-9 cr, §293; prereq 200A and #; hrs ar) Ford, Whiteford

## Industrial Education (Ind)

- 106 **INDUSTRIAL EDUCATION WORKSHOP: PRE-SERVICE CLINIC FOR VOCATIONAL EDUCATION TEACHERS**  
The clinic program will involve the participant in a high intensity, interrelated series of activities aimed at establishing foundation concepts and skills in course organization, lesson planning, presentation techniques, and evaluation. (3, 6, or 9 cr; each section limited to 12 students) Randleman  
Sec 1, I-VII MTWThF, July 22-August 6, TNCD 116  
Sec 2, I-VII MTWThF, August 8-August 23, TNCD 116
- 110 **VOCATIONAL GUIDANCE**  
History of educational and vocational guidance movement; typical public school means and methods; types and uses of occupational information; duties of the counselor; organization and relationships. (3 cr; prereq Ed 55B; II MTWThF; TNCD 113) Nelson
- 200° **RESEARCH PROBLEMS**  
Independent work for the degrees, master of arts, Plan B, and master of education, Plan Y. Individual conferences. (3, 6, or 9 cr; prereq approval of candidacy for Master's degree; hrs ar MTWThF; TNCD 103) Nelson

## Music Education (MuEd)

### 56 TEACHING MUSIC IN THE ELEMENTARY SCHOOL

Methods and materials in teaching singing, rhythm, music reading, creativity, classroom instruments, fundamentals, appreciation in K-6. (3 cr; for nonmusic majors; each section limited to 20 students; prereq Mus 4 or exemp)

Sec 1, II MTWThF, ScH 103, Turrentine

Sec 2, III MTWThF, ScH 103, Nyberg

Sec 3, IV MTWThF, ScH 103, Nyberg

### 105 ADVANCED TOPICS: INSTRUMENTAL MUSIC

Application of formal and stylistic characteristics represented in selected wind chamber music to the teaching of instrumental music on the precollegiate level. (3 cr; prereq ♯; I MTWThF; ScH 103) Turrentine

### 121 MUSIC FOR EXCEPTIONAL CHILDREN

Trends; methods and materials for a functional program of singing, playing, rhythm, listening, and creative activities for mentally and physically handicapped and gifted children. (3 cr; prereq 56 or ♯; IV MTWThF; ScH 104) Borg

### 224° RESEARCH PROBLEMS

(3-9 cr; prereq knowledge of elementary statistics; hrs ar; ScH 214) Borg, Turrentine

## Physical Education

*For Special Fees, see page 23.*

## Physical Education for Men (PEM, PEMP, PE)

### ACTIVITY COURSES (PEM)

#### 5B†† SWIMMING

(1 cr; limited to 24 students; prereq ability to swim 100 yds; IV MTWTh; CH Pool; co-ed, see PEW 5B) Ostrander

#### 19A†† APPARATUS

(1 cr; limited to 24 students; II MTWTh; CH App Gym; co-ed, see PEW 19A) Bird

#### 29B†† GOLF

(1 cr; each section limited to 24 students)

Sec 1, 12:30-1:45 MW, Golf Course, Bolstad

Sec 2, 12:30-1:45 TTh, Golf Course, Bolstad

#### 36A†† TENNIS

(1 cr; limited to 24 students; 1:25-2:40 TTh; CH 214) Ostrander

### PROFESSIONAL COURSES OPEN TO MEN ONLY (PEMP)

#### 67 FOOTBALL COACHING

Theory, strategy, generalship, styles of offense and defense, methods of organizing practices and handling of players. (2 cr; prereq 4A or 1 yr experience on squad; V MTWThF; CH 215) Crawford

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†† Health Service approval must be secured for participation in this course.

## PROFESSIONAL COURSES OPEN TO MEN AND WOMEN (PE)

- 102 CURRICULUM**  
(See 102 under PEW)
- 118E PROBLEMS**  
Focus on teaching of physical education. (Cr and hrs ar; prereq MEd candidate, #) Alexander
- 135 TESTS AND MEASUREMENTS IN PHYSICAL EDUCATION**  
Study of construction and interpretation of evaluative procedures; place and limitation of measurement. (3 cr; prereq grad, MEd, #; IV MTWThF; CH 420) Alexander
- 137 READINGS: PHYSICAL EDUCATION**  
Independent study under tutorial guidance. (1-3 cr; prereq grad, #; hrs ar) Alexander
- 171 APPLIED PHYSIOLOGY**  
Lectures and laboratory problems demonstrating the physiological bases for objectives and content. (3 cr; prereq PubH 92 or Phys 51 or equiv; V MTWThF; CH 420) Alexander
- 224B\* RESEARCH PROBLEMS**  
Individual problems. (Cr and hrs ar; prereq 224A or #) Alexander

*Physical Education for Women (PEW, PE)*

## ACTIVITY COURSES (PE)

- 5B†† SWIMMING**  
(1 cr; limited to 24 students; prereq 5A or equiv; IV MTWTh; CH Pool; co-ed, see PEM 5B) Ostrander
- 13A†† POSTURE AND INDIVIDUAL EXERCISE**  
(1 cr; limited to 24 students; III MTWTh; NGW 153-153A) Lampe
- 19A†† APPARATUS**  
(1 cr, §PEWP 40D; limited to 24 students; II MTWTh; CH App Gym; co-ed, see PEM 19A) Bird
- 29A†† GOLF FOR BEGINNERS**  
(1 cr, §PEWP 22B; limited to 24 students; I MTWTh; NGW 60) Lampe
- 36A†† TENNIS FOR BEGINNERS**  
(1 cr, §PEWP 22C; limited to 24 students; IV MTWTh; NGW 151) Lampe

## PROFESSIONAL COURSES OPEN TO MEN AND WOMEN (PE)

- 102 CURRICULUM**  
For students without previous experience in curriculum; objectives, content, organization, evaluation, and trends. (3 cr; II MTWThF; NGW 3) Young
- 135 TESTS AND MEASUREMENTS IN PHYSICAL EDUCATION**  
(See 135 under PEM)
- 171 APPLIED PHYSIOLOGY**  
(See 171 under PEM)

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†† Health Service approval must be secured for participation in this course.

## Recreation and Park Administration (Rec)

In the Second Term, offerings include courses in supervised field work and a new course in school recreation.

- 90 **FIELD EXPERIENCE**  
(3-9 cr [9 cr req for majors, 3 cr for minors], §84-85; prereq sr, recreation major or minor; hrs ar) Chapman
- 118E **PROBLEMS**  
Focus on conduct of recreation program. (Cr and hrs ar; prereq MEd candidate, §) Anderson
- 137 **READINGS: RECREATION**  
Independent study under tutorial guidance. (1-3 cr; prereq §; hrs ar) Anderson, Scott
- 151 **SCHOOL RECREATION**  
Principles of organizing and conducting school-sponsored recreation programs. (3 cr; II MTWThF; CH 215) Anderson
- 224B° **RESEARCH PROBLEMS**  
Individual problems. (Cr and hrs ar; prereq 224A or §) Anderson
- 251 **PRACTICUM: THERAPEUTIC RECREATION**  
Supervised experiences in program operation; administrative and supervisory duties. (3-9 cr; prereq 12 grad cr in recreation; hrs ar) Chapman



# General College (GC)

*For general information on the General College, see section on Schools, Colleges, and Special Programs.*

## 2C PSYCHOLOGY OF HUMAN DEVELOPMENT

Provides an objective view of the complex individual as he functions in and interacts with a complex environment at various stages during the process of physical and psychological development from conception through maturity. (3 cr; I MTWThF; NH 216) Latts

## 5C PROBLEMS OF ETHICS

The student is given an opportunity to discover and analyze the presuppositions, principles, and standards which he employs in his attempts to do what is right and avoid doing what is wrong. He is asked to consider the nature and justification of moral judgments, extent of individual moral responsibility, and ethical foundations of democratic society. (3 cr; II MTWThF; NH 207) Zanoni

## 8A APPLIED MATHEMATICS

Measurement, calculations with measured data, use of the slide rule, formulas, and equations. The most commonly useful mathematical skills are built up in a steady progression against a background of practical applications. Problems provide a broad acquaintance with the language and nature of many fields. (3 cr; III MTWThF; NH 207) McCutcheon

## 10B THE HUMAN BODY: STRUCTURE, FUNCTION, HEALTH

Problems of physical, mental, and social health are related to the structure, function, and needs of the human body. The anatomy and physiology of the systems which constitute the human organism are studied, e.g., the heart—what it is, how it works, importance to body function, what can go wrong with it, what is known about keeping it on the job. (5 cr; III-IV MTWThF; SciCB 125) Jefferson

## 16 ACCOUNTING FUNDAMENTALS

Basic concepts in accounting are presented, with preliminary emphasis upon the theory of the accounting cycle, and the more routine record-keeping processes. Attention is given to using and interpreting accounting information in the decision-making functions of business. (3 cr; IV MTWThF; FolH 110) Ruth Larson

## 20A PRACTICAL LAW

Covers a study of courts and court procedure; contracts; law of sales of goods under the Uniform Sales Act; nature and classification of real estate; deeds and conveyances; Torrens titles; tenancy; wills; insurance. (3 cr; III MTWThF; NH 216) Donnelly

## 29E READING SHORT STORIES

To enhance his appreciation of a popular form of leisure reading, the short story, the student reads representative stories by outstanding American, British, and Continental writers. He sees how individual writers have used the short story to express in a concise artistic form their ideas about human experience. (3 cr; II MTWThF; NH 216) Sheldon

## 30B FUNDAMENTALS OF USAGE AND STYLE

Intensive drill in usage and punctuation; emphasis on such matters of style as subordination, parallel construction, tense consistency, and placement of modifiers. (3 cr; I MTWThF; NH 207) Kivits

## 31B WRITING LABORATORY: ORGANIZING IDEAS

The student learns how to organize ideas in expository writing and how to read at the level of comprehension required in university courses. From textbook material the student learns to detect central ideas and supporting details and to utilize such patterns of organization in his own factual writing. He writes summaries, outlines, and various pieces of explanatory writing. (3 cr; prereq 31A; I-II MTWTh; NH 201) Draxten

**32A ORAL COMMUNICATION: BASIC PRINCIPLES**

An introduction to the basic principles of speech. By means of such assignments as an introduction, a demonstration, an argument, and a group discussion, the student is given an opportunity to apply these principles. He is helped to develop confidence in himself, to express his ideas clearly and effectively, and to listen critically. (3 cr; II MTWThF; NH 107) Amram

**38A GENERAL GEOGRAPHY**

Topics covered are selected from the following units: the philosophy and tools of the geographer, the Twin Cities, Minnesota, a comparison of the U.S.S.R. with the U.S., Japan, and a summary of world geography. Each is approached in terms of man's culture, the physical environment, and problems man faces in making a living. (5 cr; I-II MTWThF; NH 213) Steinhauser

**43C THE FAR EAST**

This is essentially a study of China in revolution following the Western impact. It will focus upon the disintegration of traditional China and the initial reform efforts, the transitional period of the Republic and the Kuomintang, and the present communist regime. (3 cr; IV MTWThF; NH 216) Matsumoto

**44B CURRENT HISTORY**

Analysis of current problem areas of the world (such as Latin America, Southeast Asia, Africa, the Soviet Union) or of domestic topics (such as national and state elections, labor-management disputes) forms the material for this course. The sharpening of the student's alertness to news media and of his ability to make critical judgments of current events is another purpose. (3 cr; IV MTWThF; NH 213) F Johnson

# College of Liberal Arts

*For general information on the College of Liberal Arts, see section on Schools, Colleges, and Special Programs.*

## American Studies (AmSt)

### Hum 22 AMERICAN LIFE II

Religious and philosophic attitudes in relation to American life and thought. (3 cr; I MTWThF; VH 6) Smith

### 252 INDEPENDENT READINGS IN AMERICAN CIVILIZATION

(Cr ar; prereq consent of program chm) Staff

## Anthropology (Anth)

### 1A INTRODUCTION TO ANTHROPOLOGY: PREHISTORIC MAN AND CULTURE

The origins of man and the development of modern races. The growth and differentiation of the cultures of man from the Dawn Stone Age to early glacial times through the Old and New Stone Ages to the dawn of civilization in the Bronze and Iron Ages. (3 cr; I MTWThF; ForH 155) Krantz

### 100 PRINCIPLES OF CULTURAL ANTHROPOLOGY

Intensive introduction to the elements of cultural anthropology. Analysis of primitive societies with respect to range and variability of human behavior. Principles of culture dynamics. (3 cr, §2A; may be taken in lieu of 2A; III MTWThF; ForH 155) Hermitte

### 119 PEOPLES AND CULTURES OF MIDDLE AMERICA

A survey of both Indian and Spanish speaking people of Middle America. Analysis of the processes of acculturation which have produced the contemporary cultures of Mexico and Central America. (3 cr; prereq 2A or 100 [waived for major in Latin-American Area Studies]; V MTWThF; ForH 285) Hermitte

### 121 ETHNOLOGY OF POLYNESIA

Survey of South Pacific race, language, prehistory, and culture. Emphasis on comparative ethnology of Polynesia. Impact of Western culture on island societies; significance of Oceanic ethnology to anthropological theory. (3 cr; prereq 2A or 100; II MTWThF; ForH 185) Ogan

### 161 ANTHROPOLOGY OF RELIGION

Varieties and range of religious beliefs and practices. Relation of religion to other aspects of culture. (3 cr; prereq 2A or 100; IV MTWThF; ForH 155) Ogan

### 170 PRIMATE AND HUMAN EVOLUTION

Origins and relationships of extinct forms of nonhuman primates and man. (3 cr; prereq 1A, 101, or Δ; III MTWThF; ForH 185) Krantz

### 190, 191, 192 DIRECTED RESEARCH

(Cr and hrs ar; prereq sr, Δ) Staff

### 237 ADVANCED FIELD TECHNIQUES IN ARCHAEOLOGY

(6 cr; prereq 140) Johnson

## Art History (ArtH)

### 1 PRINCIPLES OF ART

Lecture course on basic problems of art. Examples from the painting, sculpture, and architecture of various periods will be used to illustrate general cultural factors that influence the production of art as well as basic problems of design and of technique. (3 cr, §50; II MTWThF; Arch 25) Simon

### 47 INTRODUCTION TO FAR EASTERN ART

Selected major themes within broad context of Indian and Far Eastern art. Introduction to arts of Eastern world but not an inclusive historical survey. (3 cr; III MTWThF; J 207B) Poor

### 50 INTRODUCTION TO THE VISUAL ARTS

Similar to ArtH 1 in organization and basic content. Expanded program of reading and more extensive contact with works of art. (3 cr, §1; II MTWThF; Arch 25) Simon

### 110 ART OF INDIA

Development of architecture, painting, sculpture, and minor arts. (3 cr; V MTWThF; J 207B) Poor

### 176 TWENTIETH-CENTURY PAINTING

Art nouveau, fauvism, cubism, futurism, orphism. Matisse, Picasso, Braque, Gris, Léger, Boccioni, Rousseau, de Chirico, Duchamp. (3 cr; prereq sr, grad, or #; IV MTWThF; J 207B) Simon

## Classics

### Classics (Clas)††

#### 2 THE AGE OF PERICLES: CITY-STATE AND INTELLECTUAL MATURITY

"Golden Age" and classical ideal of self-realization in service to the polis. Exploration of creativity in literature, philosophy, art. Ideological struggle between democracy and authoritarianism. Failure of the city-state. (3 cr; III MTWThF; FolH 105) Swanson

#### 81 GREEK TRAGEDY IN TRANSLATION (AESCHYLUS, SOPHOCLES, EURIPIDES)

Introductory lectures on the origin of European drama as a distinct literary form, the characteristics of Greek tragedy, and the ancient theaters and theatrical conventions. Careful discussion of selected tragedies. Emphasis on understanding the problems posed in relation to cultural patterns of the time. (3 cr, §181; prereq 9 cr in English literature, English beyond C, or foreign literature; or Δ; open to qualified Lower Division students; IV MTWThF; FolH 105) MacCary

#### 181 GREEK TRAGEDY IN TRANSLATION

Meets with Clas 81 but students will do additional work for advanced credit. (3 cr, §81; prereq grad; IV MTWThF; FolH 105) MacCary

## Greek (Grk)

#### 83 HERODOTUS

(3 cr; prereq 1 yr Greek; II MTWThF; FolH 103) Swanson

#### 122 GREEK TEXT COURSE

Meets with Grk 83 but students will do supplementary work at discretion of instructor. (3 cr; prereq grad in field other than classics; II MTWThF; FolH 103) Swanson

†† No knowledge of Latin or Greek is required.

- 176D DIRECTED READING**  
Meets with Grk 83 but students will do extra work for graduate credit. (3 cr; prereq grad in classics; II MTWThF; FolH 103) Swanson

## Latin (Lat)

- 83 VIRGIL'S BUCOLICS AND GEORGICS**  
(3 cr; prereq 1 yr college Latin or 3 yrs high school Latin; I MTWThF; FolH 102) MacCary
- 122 LATIN TEXT COURSE**  
Meets with Lat 83 but students will do supplementary work at discretion of instructor. (3 cr; prereq grad in field other than classics; I MTWThF; FolH 102) MacCary
- 176D DIRECTED READING**  
Meets with Lat 83 but students will do extra work for graduate credit. (3 cr; prereq grad in classics; I MTWThF; FolH 102) MacCary

## Economics (Econ)

- 1 PRINCIPLES OF ECONOMICS**  
Principles underlying economic activity and the economic institutions within which economic units function. National income, money and banking, business cycles, and international trade. Econ 1-2 or equivalent are prerequisite for most advanced courses in business administration and economics. (3 cr, †1-2, §1T, §C, §50A; prereq 3rd qtr fr)  
Sec 1, II MTWThF, CB 120, Staff  
Sec 2, III MTWThF, CB 120, Staff
- 2 PRINCIPLES OF ECONOMICS**  
(Continuation of Econ 1) Demand and supply, competition and monopoly, and the distribution of income. (3 cr, †1-2, §2T, §C, §50B; prereq 1 or equiv)  
Sec 1, I MTWThF, CB 415, Staff  
Sec 2, II MTWThF, CB 415, Staff  
Sec 3, III MTWThF, CB 415, Gregory  
Sec 4, IV MTWThF, CB 415, Staff
- 65 INTERMEDIATE ECONOMIC ANALYSIS I**  
Behavior of firms and industries under competitive and monopolistic conditions; factors influencing production, price, and advertising decisions. (3 cr, §65T, §165; prereq 1-2 or ‡; II MTWThF; CB 130) Coen
- 66 INTERMEDIATE ECONOMIC ANALYSIS II**  
Determinants of national income, employment, and price level; attention given to aggregate consumption and investment. (3 cr, §66T, §166; prereq 1-2 or ‡)  
Sec 1, II MTWThF, CB 220, Foster  
Sec 2, III MTWThF, CB 130, Simler
- 67 MONEY AND BANKING**  
Historical development, present pattern, and economic role of financial institutions, with special emphasis on commercial banks, the money supply, and the Federal Reserve System. (3 cr; prereq 66 or equiv; IV MTWThF; CB 435) Smith
- 68 ELEMENTS OF PUBLIC FINANCE**  
Survey of government expenditures, budgeting, fiscal policy, debts, and taxes in terms of fiscal institutions, impact on business and the economy, and policy issues. (3 cr; prereq 65, 66 or equiv; III MTWThF; CB 220) Foster
- 69 GOVERNMENT REGULATION OF BUSINESS**  
Economic aspects of public policy affecting the market process. Relations between market structure and economic efficiency and welfare; economic origins of monopoly and other business limitations on free competition; purposes and effect of antitrust laws and laws relating to "unfair business practices." (3 cr; prereq 65 or

equiv for business or economics majors, suitable background in law or political science for others, or §; II MTWThF; CB 140) Staff

- 75 INTERMEDIATE ECONOMIC ANALYSIS III**  
Introduction to household and welfare theory. Applications of evaluative techniques to various market phenomena and government policies. (3 cr; prereq 65 or equiv; III MTWThF; CB 240) Coen
- 102 CONTEMPORARY LABOR ISSUES**  
Analysis of important labor problem areas. Current issues will be examined in light of their broader economic, legal, political, and social implications. (3 cr; prereq 62 or equiv or §; IV MTWThF; CB 220) Gregory
- 104 INTERNATIONAL ECONOMICS**  
Significance of foreign trade and investment. International payments and foreign exchange. Gold standard. International Monetary Fund and Bank. Arguments over tariffs and foreign aid policies. (3 cr, §104A; not open to economics majors; prereq 2 or equiv; III MTWThF; CB 155) Smith
- 104A INTERNATIONAL ECONOMICS**  
Significance of foreign trade and investment. International payments and foreign exchange. Gold standard. International Monetary Fund and Bank. Arguments over tariffs and foreign aid policies. (3 cr, §104 and §114A; prereq 65, 66, or equiv or §; III MTWThF; CB 155) Smith
- 165 ELEMENTS OF ECONOMIC ANALYSIS: FIRM AND HOUSEHOLD**  
Individual decision making by households and by firms under conditions of monopoly, competition; some welfare economics. (3 cr, §65; prereq grad or §; II MTWThF; CB 130) Coen
- 166 ELEMENTS OF ECONOMIC ANALYSIS: INCOME AND EMPLOYMENT**  
Determinants of national income, employment, and price level; aggregate consumption, investment, and asset holding. (3 cr, §66; prereq grad or §; III MTWThF; CB 130) Simler
- 176B DYNAMIC MACROECONOMICS**  
Theories of the pattern of movements over time of employment, incomes, and prices. Effects of various economic policies upon the magnitude of fluctuations; stability of the economy. (3 cr; prereq 176A or equiv or §; IV MTWThF; CB 155) Negishi
- 185B ADVANCED MICROECONOMICS**  
Price and output policies under conditions of imperfect competition. Problems of choice under conditions of uncertainty. (3 cr; prereq 185A or §; II MTWThF; CB 115) Negishi
- 190 READINGS IN ECONOMICS**  
Areas useful to individual programs and objectives not available in regular course offerings. (Cr ar; prereq consent of adviser and §) Staff

## English (Engl) §§

### 1 FRESHMAN ENGLISH

(3 cr, §A or §1A or §1B or §10H or §Comm 1; each section limited to 28 students; prereq assignment to Category 1 or 1A or 2)

Sec 1, I MTWThF, VH 205

Sec 2, II MTWThF, VH 205, Zorn

### 2 FRESHMAN ENGLISH

(3 cr, §B or §2A or §2B or §11H or §Comm 2; each section limited to 28 students; prereq 1)

Sec 1, I MTWThF, VH 207

Sec 2, I MTWThF, VH 2

Sec 3, II MTWThF, VH 302, Bales

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§§ Credit in English will be allowed for certain classics courses numbered between 40 and 82. Consult English Department for approval.

- 21 **INTRODUCTION TO LITERATURE**  
Medieval and Renaissance literature. (6 cr; prereq ††; III-IV MTWThF; VH 1) Stricker
- 37 **MODERN LITERATURE**  
Readings in modern poetry, mainly British and American, and mainly 20th century. (3 cr; prereq ††; III MTWThF; VH 2) R Foster
- 55 **SHAKESPEARE**  
The reading of plays from Shakespeare's early and middle periods: *Richard II*, *A Midsummer Night's Dream*, *The Merchant of Venice*, *Hamlet*, and two or three other plays from the early and middle periods. (3 cr; limited to 35 students; prereq ††, may not be taken concurrently with 56; III MTWThF; VH 301) Roth
- 56 **SHAKESPEARE**  
The reading of plays from middle and late periods: *Twelfth Night*, *King Lear*, *Macbeth*, *The Tempest*, and two other plays from the middle and late periods. (3 cr; limited to 35 students; prereq 55, may not be taken concurrently with 55)  
Sec 1, III MTWThF, VH 205, Unger  
Sec 2, IV MTWThF, VH 205, Unger
- 60 **INTRODUCTION TO THE ENGLISH LANGUAGE**  
How English exemplifies basic concepts of language with respect to inner structure, outer form, time, situation, and user. (3 cr; prereq ††; may not be counted toward a major in English in Arts College except by students taking 34 or more Upper Division cr in English; II MTWThF; VH 1) McNally
- 73 **AMERICAN LITERATURE**  
Notable authors from Whitman through James. (3 cr; prereq ††; III MTWThF; VH 6) Alsen
- 90H **MAGNA HONORS THESIS**  
(3 cr; prereq candidate for *magna cum laude* and Δ)
- 91H **SUMMA HONORS THESIS**  
(3 cr; prereq candidate for *summa cum laude* and Δ)
- 92H **SUMMA HONORS THESIS**  
(3 cr; prereq 91H)
- 93H **HONORS THESIS**  
(3 cr; prereq honors candidacy in English and consent of English honors adviser)
- 106 **WHITMAN AND MARK TWAIN**  
(3 cr; prereq ††; II MTWThF; VH 301) Roth
- 108 **ROMANTIC POETRY AND PROSE**  
Blake, Wordsworth, Coleridge, and others. (3 cr; prereq ††; I MTWThF; VH 301) Zorn
- 133 **AMERICAN SOCIAL DIALECTS**  
Social and class variation in American English, with emphasis upon the dialects of the culturally disadvantaged, and their relation to standard English as a second dialect. (3 cr; II MTWThF; VH 6) Allen
- 158 **AMERICAN POETRY**  
Major poets of the late 19th and early 20th centuries. (3 cr; prereq ††; IV MTWThF; VH 301) Bales
- 165 **THE STRUCTURE OF MODERN ENGLISH**  
An introductory study of English phonemics, morphemics, and syntax. (3 cr; prereq ††; I MTWThF; VH 1) Allen
- 166 **HISTORY OF ENGLISH LANGUAGE**  
Historical influences upon, and changes within, the language as both a popular and a literary medium of communication. (3 cr; prereq ††; IV MTWThF; VH 6) McNally

†† Five credits in literature, English or American, exclusive of Freshman English.

†† Completion of or exemption from Freshman English requirement.

**181 MODERN LITERARY CRITICISM**

Major texts and movements in modern literary criticism; examination of a few of the more important historical documents from earlier centuries. (3 cr; prereq ††; IV MTWThF; VH 2) R Foster

**297 INDEPENDENT READING**

(3 cr; prereq MA degree or equiv)

## Family Studies (FamS)

**1 DYNAMICS OF DATING, COURTSHIP, AND MARRIAGE**

Application of principles from the behavioral sciences to dating, courtship, mate selection, engagement, mixed marriages, roles of men and women, interaction of marital spouses, and marital stability. (3 cr; limited to 40 students; I MTWThF; FolH 110) Kokosh

## Foreign Study (FS)

**162 SEMINAR FOR FOREIGN STUDY II**

See section on 10-week courses, page 137.

## Geography (Geog)

**41 ECONOMIC GEOGRAPHY**

Introductory survey and analysis of world patterns of economic activity. Emphasis on raw material occurrence and resource potential, centers of industrial fabrication, and circulation of trade and services. (5 cr; II-III MTWThF; BlegH 10) Thomas

**63 SOVIET UNION**

Character of and bases for regional diversity of physical resources, population, agriculture, manufacturing, and transportation in the U.S.S.R. (3 cr, §107; III MTWThF; BlegH 235) Adams

**151 CLIMATOLOGY**

World distribution of climatic elements; methods of arranging climatic data; climatic classifications, and world distributions of climatic types; general circulation; climatic change and climatic fluctuations. (3 cr, §133; prereq I or ‡; V MTWThF; BlegH 435)

**165A FIELD COURSE**

Concepts and techniques of field work. Devoted to field study in eastern Minnesota and neighboring areas. (3 cr, §170; prereq sr, 15 cr in geography; 1:30-4:00 TTh or ar; BlegH 445) Adams

**190 DIRECTED READINGS**

(1-3 cr; prereq sr) Thomas

**276, 277 SEMINAR: AGRICULTURAL GEOGRAPHY**

An intensive field research seminar will be given from August 24 to September 14. Four days will be on reconnaissance traverses in southwestern Wisconsin; the remainder of the period will be in the environs of the field headquarters at Viroqua, Wisconsin. Research will be focused upon related problems in cultural and rural geography. (Reservations must be made no later than June 6. For costs, detailed information, and reservations contact Cotton Mather, Department of Geography, University of Minnesota, Minneapolis, Minnesota 55455). (6 cr; prereq ‡) Mather

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†† Five credits in literature, English or American, exclusive of Freshman English.



## German (Ger)

- 2A BEGINNING GERMAN**  
(5 cr; prereq IA or 1 yr high school German; I-II MTWThF; Aero 211) Staff
- 4 INTERMEDIATE GERMAN**  
Selected readings from literature. (3 cr; prereq 3A or 3B or 3 yrs high school German...¶5 recommended; I-II MWF; Aero 215) Staff
- 5 INTERMEDIATE GERMAN**  
Elementary composition and conversation. (2 cr; prereq 3A or 3B or 3 yrs high school German...¶4 recommended; I-II TTh; Aero 215) Staff
- 56A READING AND ANALYSIS OF LITERARY TEXTS**  
(3 cr; not open to students who have had course 70 or above; prereq 4 or 4 yrs high school German; III MTWThF; Aero 211) Staff
- 70 LYRIC POETRY: GOETHE**  
(3 cr; prereq 56A or ¶; II MTWThF; FolH 109) F Wood
- 75 MODERN DRAMA**  
(3 cr; prereq 56 or 4 and ¶; I MTWThF; FolH 109) Mcnez
- 78 GERMAN PROSE OF NINETEENTH AND TWENTIETH CENTURIES: MODERN WRITERS**  
(3 cr; prereq 56A or ¶; III MTWThF; FolH 109)
- 80 HISTORY OF THE GERMAN LANGUAGE**  
Required of all German majors in the College of Education. (3 cr; prereq 6 cr in courses 70 or above; IV MTWThF; FolH 109) C Wood
- 103-104-105 GERMAN STYLE AND COMPOSITION**  
(3 cr; required of all grad majors; prereq 66 or equiv; II-III MW; FolH 108; Friedrichsmeyer)
- 111†† MIDDLE HIGH GERMAN LANGUAGE**  
(See 110, First Term) (Prereq 110; VI-VII MW; Arch 20) C Wood
- 189 EXPRESSIONISM IN GERMAN LITERATURE**  
(3 cr; IV-V TTh; FolH 108) F Wood

## History (Hist)

- 2 CIVILIZATION OF THE MODERN WORLD, PART II**  
Struggle for control over the Western states system, and emergence of liberal democracy in the modern world. (3 cr; II MTWThF; BlegH 5) Staff
- 19 HISTORY OF ASIA, PART III**  
Modern Asia: Impact of Europe, nationalism. (3 cr; III MTWThF; AndH 230) Marshall
- 23 AMERICAN HISTORY, PART I**  
Colonial, early national period through the sectional crisis. (4 cr; IV MTWThF; SciCB 375) Staff
- 61 HISTORY OF ASIA, PART III**  
Modern Asia: Impact of Europe, nationalism. (3 cr; III MTWThF; AndH 230) Farmer
- 101B DIRECTED STUDY, PART II**  
Qualified senior and graduate students may register for 1 or more quarters with *consent of instructor* for work and training on a tutorial basis. (3 cr; prereq ¶) Staff
- 133E AMERICAN HISTORY, 1850-1900, PART I**  
Compromise of 1850 to Appomattox. (3 cr; II MTWThF; AndH 230) Loehr

†† To receive credit toward the philological requirement for an advanced degree the student must complete the whole sequence 110-111-112.

- 139A CURRENT INTERPRETATION AND THE PROBLEM OF SYNTHESIS IN AMERICAN HISTORY**  
The course is designed to acquaint students with current scholarship in the field and its implications for the general interpretation of American History. (3 cr; 1:00-3:30 MTh; BlegH 140) Berkhofer
- 148E CHINESE HISTORY, 1279 TO 1949, PART I**  
To 1800. (3 cr; II MTWThF; BlegH 215) Farmer
- 149F HISTORY OF JAPAN, PART II**  
Since 1700. (3 cr; IV MTWThF; BlegH 215) Marshall
- 164A PROSEMINAR: MEDIEVAL HISTORY, PART II**  
(3 cr; VI MTWThF; SocSci 628) Hoyt
- 182F PROSEMINAR: AMERICAN HISTORY, 1850-1900, PART II**  
(3 cr; III MTWThF; SocSci 628) Loehr

## Humanities (Hum)

- 1 HUMANITIES IN THE MODERN WORLD I**  
The Old Regime, the Revolution, neoclassicism, and romanticism. Period from about 1740 to about 1820. Authors: Pope, Voltaire, Goethe. One historical novel, Tolstoy's *War and Peace*. (3 cr, §1A or §51; I MTWThF; ForH 120) White
- 2 HUMANITIES IN THE MODERN WORLD II**  
The Industrial Revolution, liberalism, and socialism. Period from about 1776 to 1890. Authors: the classical economists, Marx, Mill, Ibsen, Dostoevski. (3 cr, §2A or §52; I MTWThF; ForH 130) Hult
- 3 HUMANITIES IN THE MODERN WORLD III**  
From about 1840 to about 1914. Authors: Darwin, Nietzsche, Kierkegaard, and Mann. (3 cr, §3A or §53; II MTWThF; ForH 130) Milgrom
- 4 HUMANITIES IN THE MODERN WORLD IV**  
The humanities since World War I. Authors: Freud, Lenin, Koestler, T. S. Eliot, Kafka, and others. Background topics include civilization between two wars, impact of psychoanalysis, communism, and fascism. (3 cr, §54; IV MTWThF; ForH 130) Milgrom
- 9 THE SCIENCES AND THE HUMANITIES**  
Examines "war" between scientific and humanistic cultures; similarities and differences among methods, purposes, and values of scientific disciplines, humanistic studies, and the arts. Readings include Snow, Leavis, Bronowski, Barzun, selected scientific and other writings. Topics include creativity in the arts and sciences; citizens' options in the age of the expert; the interrelations of knowledge, truth, and power. (3 cr; II MTWThF; ForH 120) Giese
- 22 AMERICAN LIFE II**  
Religious and philosophic attitudes in relation to American life and thought. (3 cr; I MTWThF; VH 6) Smith
- 54 HUMANITIES IN THE MODERN WORLD**  
(See Hum 4) (3 cr, §4)  
Sec 1, II MTWThF, VH 207, Atkin  
Sec 2, IV MTWThF, VH 207, Atkin
- 55 HUMANITIES IN THE MODERN WORLD V**  
The intellectual climate of the western world since World War II. The worlds of existentialism and "the absurd"; alienation, irrationalism; the anti-hero in literature; the new theology; the influence of Zen. Readings in Buber, Camus, Ionesco, Tillich, Hesse, etc. (3 cr; IV MTWThF; ForH 285) Chute
- 62 ROMAN AND MEDIEVAL HERITAGE**  
Late Hellenistic philosophy; stoicism, epicureanism, neoplatonism, Jesus and the world of Christendom; paleo-Christian anarchy, Augustinian synthesis, Gothic art, scholasticism, the world of Dante. Readings in Lucretius, Marcus Aurelius, the New Testament, St. Augustine, Dante. (3 cr, §12; III MTWThF; ForH 120) Hult

## Journalism and Mass Communication (Jour)

- 90 MASS COMMUNICATIONS AND THE NEWS**  
How the news gets to and affects the public, in print, on the air, by film. Evaluation of news gathering and presentation methods. Contemporary influences on communications media. Individual news media and news commentators. (3 cr; not open to jour majors; III MTWThF; MurH 311) Sim
- 103 LITERARY ASPECTS OF JOURNALISM**  
Survey as exemplified in, and influenced by, works of English and American writers, past and present. Lectures, discussion, and papers. (3 cr; I MTWThF; MurH 302) Hage
- 109 HISTORY OF JOURNALISM**  
Development of American newspapers and periodicals, from early beginnings in Europe to the present day; the rise of radio and television; the relation of communication developments to political, economic, and social trends in America. (3 cr; IV MTWThF; MurH 308) Emery
- 112 COMMUNICATION AND PUBLIC OPINION**  
Theories of communication process and of persuasion and attitude change. Functions of interpersonal and mediated communication in diffusion of information and in opinion formation. (3 cr; prereq 15 cr in social sciences; II MTWThF; MurH 308) Nixon
- 126 COMMUNICATIONS IN AUTHORITARIAN SOCIETIES**  
Operational relationships between government and communication media in authoritarian nations. Rise of totalitarian regimes; impact upon structure and operations of mass communication media. Case studies of communications in selected communist states and other dictatorships. (3 cr; prereq 15 cr in social sciences with an Upper Division course in international relations or comparative government recommended; III MTWThF; MurH 308) Nixon
- 210 SEMINAR: HISTORY OF COMMUNICATION**  
Research in history and development of mass media. Historical bibliography and criticism in the field of journalism. (3 cr; prereq 110 or #) Emery

## Library School (Lib)††

- 74 LIBRARY MATERIALS IN THE CLASSROOM**  
Correlating the library, as a materials center, with the school program. Sources of information and evaluation of materials for teaching and resource units. (3 cr; limited to 50 students; IV MTWThF; Ph 145) Ar
- 102 REFERENCE I**  
Intensive study of some 150 outstanding and useful reference books and tools most frequently used by students and librarians. Landmark reference books, indexes, and periodical guides. Theory and practice of reference work. (3 cr; limited to 50 students; II MTWThF; Ph 210)

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†† The graduate Library School is a professional school. Courses numbered above 200 are open only to graduate students and to librarians who hold a fifth-year degree from an A.L.A.-accredited library school. Courses numbered below 200 are open to anyone who has been admitted to the Graduate School, to anyone who has been admitted to a Minimum Certification Program, and to any undergraduate in the College of Liberal Arts or the College of Education. Students who do not fall in one of the above categories may register for library courses numbered below 200, but in order to avoid loss of credits, a letter requesting permission to register for library courses should be sent to the Library School before May 1 for the First Term and before June 1 for the Second Term. The Library School discourages registration of unadmitted students who have not sent transcripts before these dates, because it is not possible for us to give appropriate advice to students who appear on the last registration day.

- 103 CATALOGING AND CLASSIFICATION**  
Basic principles of descriptive cataloging, rules of entry, subject headings and classification in libraries, for all types of libraries. (3 cr; limited to 35 students; I MTWThF; Lib 4B) Kittilson
- 104 SELECTION OF LIBRARY MATERIALS**  
Theory, principles, and techniques of selection; an introduction to the basic tools for selection of books, magazines, pamphlets, phonograph records, films, etc., for all types of libraries. (3 cr; limited to 60 students; III MTWThF; Ph 210) Murphy
- 172 READING GUIDANCE FOR ADOLESCENTS**  
The library's relationship to the teen-ager in terms of his interests and needs. Method of introducing books and developing and guiding reading. Required for minimum certification. (3 cr; prereq 104; limited to 35 students; VI MTWThF; Lib 4B) Ar
- 194 NONPRINT MATERIALS IN LIBRARIES**  
Selection, organization, and administration of nonprint materials in library programs; emphasis upon the instructional and recreational use of nonprint materials. (3 cr; limited to 35 students; prereq 104; III MTWThF; VH 113) Kittilson
- 254 THE PUBLIC LIBRARY**  
History and development. Service standards. Modern trends and problems. Overview of the literature of the field. Development of the materials collection. (3 cr; limited to 20 students; prereq 101; II MTWThF; MurH 311) Penland
- 257 SCHOOL LIBRARY PROBLEMS**  
Library objectives in relation to educational objectives, larger units of school service, value and effect of standards. (3 cr; limited to 30 students; prereq 101; II MTWThF; Lib 4B) Olson
- 260 LITERATURE OF THE SOCIAL SCIENCES**  
Bibliographical and other reference sources. Development of knowledge, landmark books, and current trends in the subjects covered. (3 cr; limited to 20 students; prereq 102; V MTWThF; Ph 236A) Murphy
- 262 LITERATURE OF THE NATURAL SCIENCES**  
Bibliographical and other reference sources, with emphasis on indexing, abstracting, and reviewing media. Growth and development of scientific literature and its control and dissemination. Science background is not required for this course. (3 cr; limited to 20 students; prereq 102; III MTWThF; MurH 302) McGrath
- 265 ADVANCED BIBLIOGRAPHY**  
National and trade bibliographies of the world, with emphasis on those of the United States, Great Britain, France, Germany, and Russia. Their use in selection and acquisition of books and in preparation of subject bibliographies. (3 cr; limited to 30 students; prereq 102; I MTWThF; Ph 236A) McGrath
- 266 ADVANCED REFERENCE**  
(3 cr; limited to 25 students; prereq 102; V MTWThF; Ph 145) Penland
- 268 RESEARCH METHODS IN LIBRARIANSHIP**  
Purposes and principles of research with emphasis upon the distinctive characteristics of library science problems; critical examination of research studies; preparation of tentative research proposals. (3 cr; limited to 30 students; IV MTWThF; Lib 4B) Olson
- 283 ADVANCED CATALOGING AND CLASSIFICATION**  
Rules of entry, descriptive cataloging and subject analysis of library materials; administrative problems in cataloging. (3 cr; limited to 30 students; prereq 103; III MTWThF; Lib 4B) Simonton
- 295,\* 296,\* 297\* LIBRARY RESEARCH**  
Graduate students may register for one or more of these courses, with the approval of the professor who will guide the research paper. (3 cr; prereq #) Staff

## Linguistics (Ling)

- 171 INTRODUCTION TO GENERAL LINGUISTICS**  
Synchronic, diachronic, and contrastive study of language; applications of linguistics. (3 cr [no cr for linguistics majors]; prereq 170; II MTWThF; FolH 110) Lehn

## Middle Eastern Languages

### Arabic (Arab)

- B BEGINNING INTENSIVE ARABIC**  
See section on 10-week courses, page 137.

### Hebrew (Heb)

- B BEGINNING INTENSIVE HEBREW**  
See section on 10-week courses, page 137.

## Music (Mus)

- 4 FUNDAMENTALS OF MUSIC**  
(2 cr; for nonmusic majors—primarily child development students and elem tchrs)  
Sec 1, I MTWThF, ScH 3, Lauritzen  
Sec 2, III MTWThF, WuH 320, Lauritzen  
Sec 3, IV MTWThF, NMA 4, Byrne
- 7B EAR TRAINING**  
Résumé of aural work included in Mus 4T-6T, with concentration on their application. (3 cr; prereq #: III MTWThF, ScH 3; IV MWF, ScH 3) Argento
- 8A HARMONY**  
Résumé of part writing and harmonization of chorales which are included in Mus 1T-3T, with concentration on their application. (3 cr; prereq #: II MTWThF, ScH 3; IV TTh, ScH 3) Argento

*Note*—Applied music courses 11 through 30 are offered as electives for nonmusic majors and as part of degree programs for Lower Division and Upper Division music majors. When taken for no credit, place the letter V after the appropriate number.

- 11°° PIANO**  
(2 cr; prereq entr exam; hrs ar; ScH 107) McNab
- 12°° VOICE**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Knowles
- 13°° VIOLIN**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Saslav
- 14°° VIOLA**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Fischer
- 15°° CELLO**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Ar
- 16°° BASS**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Ar
- 17°° FLUTE**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Niosi
- 18°° OBOE**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Angelucci
- 19°° CLARINET, SAXOPHONE**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Ar
- 20°° BASSOON**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Ar

- 21°° **TRUMPET**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Tetzlaff
- 22°° **FRENCH HORN**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Binstock
- 23°° **TROMBONE**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Ar
- 24°° **TUBA**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Walton
- 25°° **PERCUSSION**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Fine
- 26°° **HARP**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Miller
- 27°° **ORGAN**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Fleischer
- 28°° **HARPSICHORD**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Ar
- 29°° **CLASSICAL GUITAR**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Ar
- 30°° **CLASSICAL ACCORDION**  
(2 cr; prereq entr exam; hrs ar; ScH 107) Malmberg, Hane
- 57 **CHAMBER SINGERS**  
A small mixed vocal ensemble of select voices. Sacred and secular music from 16th century to contemporary composers prepared for concert presentation. (2 cr; prereq #: V MTWTh; NMA 4) Schwartz

*Note*—Applied music courses 61 through 80 are offered as electives for nonmusic majors and as part of degree programs for Lower Division and Upper Division music majors. When taken for no credit, place the letter V after the appropriate number.

- 61°° **PIANO**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) McNab
- 62°° **VOICE**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Knowles
- 63°° **VIOLIN**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Saslav
- 64°° **VIOLA**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Fischer
- 65°° **CELLO**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Ar
- 66°° **BASS**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Ar
- 67°° **FLUTE**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Niosi
- 68°° **OBOE**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Angelucci
- 69°° **CLARINET, SAXOPHONE**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Ar
- 70°° **BASSOON**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Ar
- 71°° **TRUMPET**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Tetzlaff
- 72°° **FRENCH HORN**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Binstock

- 73°° **TROMBONE**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Ar
- 74°° **TUBA**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Walton
- 75°° **PERCUSSION**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Fine
- 76°° **HARP**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Miller
- 77°° **ORGAN**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Fleischer
- 78°° **HARPSICHORD**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Ar
- 79°° **CLASSICAL GUITAR**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Ar
- 80°° **CLASSICAL ACCORDION**  
(2 cr; prereq entr exam or placement test; hrs ar; ScH 107) Malmberg, Hane
- 100°° **ADVANCED APPLIED MUSIC**  
Advanced literature in piano, voice, organ, and orchestral instruments. (2 cr; prereq entr exam; hrs ar; ScH 107) Staff
- 117 **VOCAL LITERATURE**  
Preparation and performance of representative solo vocal works from major and minor composers. (2 cr; prereq 12 cr in 12, or ♯; IV MTWTh; WuH 320) Sutton
- 124 **HISTORY OF OPERA**  
Opera as music and drama: production, styles, cultural background, from late 16th century to present—modern repertoire, broadcast by the Metropolitan Opera Company. (3 cr; prereq 9 cr in history of music or history of art or history of theater or European history from 1600, or ♯; III MTWThF; ScH 104) Sutton
- 127-128-129° **COMPOSITION**  
Original work in various forms. (2 cr each; prereq 99 and 123; VII MTWThF; ScH 205) Argento
- 130 **SYMPHONIES OF THE CLASSICAL ERA**  
Through Mozart and Haydn; evolution of form and style in relation to contemporary thought and art through the French Revolution. (3 cr; prereq 6 cr in music history or art history or political history since 1750 or English or German literature since 1750, or ♯; I MTWThF; WuH 320) Oberg
- 132 **SYMPHONIES OF THE ROMANTIC ERA**  
Schubert, Schumann, Mendelssohn, Berlioz, Liszt, Brahms, Franck, Dvorak, Tchaikovsky, Bruckner, Richard Strauss; their relation to the dominant romantic trends of the 19th century. (3 cr; prereq 6 cr in music history or art history or political history since 1750 or English or German literature since 1750, or ♯; II MTWThF; WuH 320) Oberg
- 163A **SEMINAR: CHORAL TECHNIQUES, REHEARSAL AND PERFORMANCE PRACTICE**  
Study of the art of choral conducting: coordination of hand techniques, breath and sound control, articulation, dynamics, etc.; preparation of choral programs; critical examination of scores for analysis of rehearsal and interpretative problems. Students work with selected groups from University choral ensembles. (2 cr; prereq ♯; II MTWTh; ScH 104) Schwartz
- 204°° **GRADUATE APPLIED MUSIC**  
Individual lessons. (4 cr; prereq entr exam; hrs ar; ScH 107) Staff
- 212° **SPECIAL PROBLEMS**  
(3-9 cr; prereq 110; hrs ar; ScH 107) Staff
- 227-228-229° **SEMINAR: COMPOSITION AND ORCHESTRATION**  
(3 cr each; prereq ♯; VII MTWThF; ScH 205) Argento

## Natural Science (NSci)

- 2 ORIENTATION IN THE NATURAL SCIENCES**  
See section on 10-week courses, page 137.

## Philosophy (Phil)

- 1A PROBLEMS OF PHILOSOPHY**  
Introduction; main fields of investigation; permanent problems; principal methods and schools of philosophy; historical and contemporary views. (3 cr; IV MTWThF; Ph 170) Hochberg
- 2A LOGIC**  
Difference between logical and fallacious reasoning; functions and uses of language; rules of good definition and sound argument. (3 cr)  
Sec 1, II MTWThF, Ph 133, Mason  
Sec 2, III MTWThF, ForH 130, Ar
- 3A ETHICS**  
Examination of problems that arise when human beings attempt to think systematically about conduct and values (are there absolute standards?), problem of free will, and survey of historical views about the right and the good. (3 cr; III MTWThF; VH 207) Murphy
- 53A HISTORY OF WESTERN PHILOSOPHY**  
Later modern philosophy from Kant through the 19th century. (3 cr; II MTWThF; ForH 349) Murphy
- 137 KIERKEGAARD**  
Detailed examination of major philosophical works. (3 cr; prereq 1 qtr history of philosophy or #; IV MTWThF; ForH 349) Walker
- 141 STUDIES IN CONTEMPORARY PHILOSOPHY**  
Intensive studies of the works of selected individual philosophers: Austin and Wittgenstein. (3 cr; prereq 52 or #; II MTWThF; ForH 285) Walker
- 150 ETHICAL THEORY**  
Distinguishing characteristics of a moral judgment; examination of representative theories. (3 cr; prereq 3 or #; IV MTWThF; ForH 175) Mason
- 160 PHILOSOPHY OF SCIENCE**  
Meaning, methods, implications of modern science. Basic concepts, presuppositions, and procedures. (3 cr; prereq 2 or #; II MTWThF; ForH 155) Hochberg

## Political Science (Pol)

- B THE STATE IN THE MODERN WORLD**  
(Part B of A-B) The development, principles, and operation of the modern nation state. (3 cr; II MTWThF; BlegH 235) Staff
- 2 AMERICAN GOVERNMENT AND POLITICS**  
(Part 2 of 1-2) Organization of national, state, and local governments; legislative, executive, and judicial branches and their procedures. (3 cr; I MTWThF; AndH 230) Crew
- 25 WORLD POLITICS**  
Introduction to contemporary international relations, policies of the great powers, nationalism, internationalism. (3 cr; III MTWThF; BlegH 135) Riggs
- 30 AMERICAN PUBLIC POLICY**  
Analysis of policy to meet major foreign and domestic issues facing the American political system; emphasis on forces molding government policy on civil rights, labor and business, military and diplomatic strategy, foreign aid. (3 cr; IV MTWThF; BlegH 225) Eystone



- 40 CONTEMPORARY POLITICAL IDEOLOGIES**  
 Liberalism, communism, Nazism, taking account of democratic and dictatorial regimes in theory and practice. Emphasis on ideas, role of policy, power nationally and internationally. (3 cr; II MTWThF; BlegH 250) Cooperman
- 115 STATE GOVERNMENT**  
 The states in the American federal system; intergovernmental relations with national and local governments; governmental institutions and processes; special reference to Minnesota. (3 cr; prereq 2 or #; III MTWThF; BlegH 205) Crew
- 137 AMERICAN POLITICAL PARTIES**  
 Role and functions of the party in American government; party composition and organization; process of nomination and policy formulation; regulation of party organization and activities. (3 cr; prereq 2 or #; III MTWThF; BlegH 140) Eyestone
- 162 RECENT POLITICAL THOUGHT**  
 Main currents from Marx to the present; Marx, Marxism, and their critics; non-Marxist socialism; syndicalism; anarchism; Catholic and Protestant theories; conservatism; pacifism; political thought in law and literature. (3 cr; prereq B or 9 cr in social science or #; IV MTWThF; BlegH 250) Cooperman
- 187 INTERNATIONAL ORGANIZATION I**  
 The organization of interaction among nation-states; decision making in international organizations; comparison of national and international political institutions; world organization for collective security and peaceful settlement of disputes. (3 cr; IV MTWThF; BlegH 140) Riggs

## Psychology

### Psychology (Psy)

- 1-2† GENERAL PSYCHOLOGY**  
 General introduction to study of human behavior. Prerequisite for all advanced courses in psychology. (3 cr for each; prereq soph or 3rd qtr fr with B avg; I-II MTWThF; NH 45) Shaw
- 4-5† INTRODUCTORY LABORATORY PSYCHOLOGY**  
 Experiments illustrating contemporary subject matter such as: human and animal learning, motivation, verbal behavior, problem solving, visual perception, psychological measurement, personality, and social psychology. (2 cr for each; prereq soph; III-V MTWThF; WeH 101) E Hyde
- 120-121† PERSONALITY**  
 Presentation and discussion of several major theories and concepts. (3 cr for each; prereq 9 cr in psychology; III-IV MTWThF; SciB 325) Tellegen
- 128-129 PSYCHOLOGY OF LEARNING**  
 Survey: experimental literature on classical conditioning and all types of instrumental learning. Critical evaluation of theories relevant to these types of learning. (3 cr for each; prereq 75 except for students in Sequence A and grads; I-II MTWThF; C 225) T Hyde
- 190 PROJECT IN PSYCHOLOGY**  
 Individual library study or experimental investigation. (Cr ar; prereq sr, #) Darley
- 215 SEMINAR: SPECIAL AREAS OF PSYCHOLOGY—DETERMINISTIC MODELS OF PSYCHOLOGICAL PROCESSES**  
 The application of the theory of finite state machines to memory, perception, and cognitive development. (3 cr; prereq college algebra, 100 or equiv or #) Shaw

### Personal Orientation (PO)

- 1 HOW TO STUDY**  
 Practical assistance to the student in developing efficient study habits, organizing materials, preparing for examinations, and improving the speed and comprehension

of reading. (2 cr, but credit does not count toward BA degree; limited to 30 students; I MTWThF; FolH 108) Crewe

## Public Administration (PA)

- 182B ADMINISTRATIVE INTERNSHIP**  
Field work in an approved administrative agency under the joint supervision of an employee of the agency and a member of the faculty. Rotation through various administrative assignments, solution of special problems, seminar discussion of experiences, and preparation of an internship report. (3 cr; prereq Δ; IX W, VIII-IX Th; SocSci 860) Likins
- 210 FOUNDATIONS OF PUBLIC ADMINISTRATION**  
An examination of the political and governmental factors which condition the structure and functioning of public administration in the United States. (3 cr; prereq grad; III-IV TTh; SocSci 1383) Jernberg
- 265 INTERGOVERNMENTAL ADMINISTRATIVE RELATIONS**  
Seminar examination and analysis of the evolution of intergovernmental relations in the United States and of the special administrative problems and issues, with particular attention to the fields of housing, urban development, health, education, and welfare. (3 cr; prereq Δ; I-V W; SocSci 1383) Mitau
- 270B PUBLIC ADMINISTRATION SEMINAR: FINANCE**  
Role of fiscal planning and management in the administrative process; organization for financial administration; budgetary theory; the budget process—planning, authorization, expenditure control; accounting and auditing; treasury management and debt administration; procurement; intergovernmental fiscal relations. (3 cr; prereq Δ; I-II TTh; BlegH 425) Jernberg
- 282A ADMINISTRATIVE INTERNSHIP**  
See section on 10-week courses, page 137.
- 283A-B RESEARCH SEMINAR: PUBLIC ADMINISTRATION**  
See section on 10-week courses, page 137.

## Romance Languages

### French (Fren)

- 2 BEGINNING FRENCH**  
(5 cr; prereq 1, or 1 yr high school French; I-II MTWThF; Aero 319) Fadell
- 25 INTERMEDIATE FRENCH**  
(5 cr; prereq 3, or 3 yrs high school French; I-II MTWThF; AH 350) Mantini
- 30 INTRODUCTION TO FRENCH LITERARY TEXTS**  
A variety of literary works representing the principal genres are examined through stylistic analyses and literary explications. Students learn critical terminology and discuss literary problems and techniques. (3 cr; prereq 25 or 4 yrs high school French or ‡; III MTWThF; Arch 130) Strong
- 54 FRENCH COMPOSITION**  
(3 cr; prereq 25 or equiv; I MTWThF; FolH 104) Rydell
- 57 ADVANCED FRENCH COMPOSITION**  
(3 cr; prereq 54; II MTWThF; Ph 236A) Rydell
- 58 ADVANCED FRENCH CONVERSATION**  
(3 cr; prereq 55 or ‡; IV MTWThF; NH 201) Francis
- 66 SURVEY OF FRENCH LITERATURE: THE AGE OF ENLIGHTENMENT**  
(3 cr; prereq 30; III MTWThF; NH 201) Highnam
- 109 STRUCTURE OF MODERN FRENCH: SYNTAX**  
(3 cr; prereq ¶57 or ‡; III MTWThF; FolH 110) Mantini

- 127 **CLASSICAL COMEDY: MOLIERE**  
(3 cr; III MTWThF; FolH 104) Francis
- 189 **INDEPENDENT READINGS FOR UPPER DIVISION STUDENTS**  
(1-3 cr; prereq § and consent of dept chm; hrs ar) Staff
- 260 **DIRECTED READINGS FOR GRADUATE STUDENTS**  
(1-3 cr; prereq §; hrs ar) Francis, Mantini

*Note*—The General Extension Division will offer French for graduate students (Fren 17A). Please address all inquiries to the General Extension Division.

### *Italian (Ital)*

- 2 **BEGINNING ITALIAN**  
(5 cr; prereq 1, or 1 yr high school Italian; III-IV MTWThF; Aero 327) Taddei

### *Portuguese (Port)*

See section on 10-week courses, page 137.

### *Spanish (Span)*

- 2 **BEGINNING SPANISH**  
(5 cr; prereq 1, or 1 yr high school Spanish; III-IV MTWThF; Phys 236A) Collins
- 25 **INTERMEDIATE SPANISH**  
(5 cr; prereq 3 or 3A, or 3 yrs high school Spanish; III-IV MTWThF; Arch 20) Dunlop
- 30 **INTRODUCTION TO SPANISH LITERARY TEXTS**  
Variety of literary works representing the principal genres are examined through stylistic analyses and literary explications. Students learn critical terminology and discuss literary problems and techniques. (3 cr; prereq 25 or 4 yrs high school Spanish or §; IV MTWThF; NH 209A) Sullivan
- 54 **SPANISH COMPOSITION**  
(3 cr; prereq 25 or equiv; II MTWThF; AH 150) Cooke
- 55 **SPANISH CONVERSATION**  
(3 cr; prereq 25 or equiv; III MTWThF; Arch 10) Suris
- 58 **ADVANCED SPANISH CONVERSATION**  
(3 cr; prereq 55; III MTWThF; Arch 25) Narváez
- 108 **STRUCTURE OF MODERN SPANISH: MORPHOLOGY**  
(3 cr; prereq 57 or § or ¶57; IV MTWThF; NH 107) Narváez
- 118 **THE DEVELOPMENT OF THE GOLDEN AGE: DRAMA FROM TORRES NAHARRO TO CALDERON DE LA BARCA**  
(3 cr; III MTWThF; FolH 103) Jones
- 185 **UNAMUNO AND THE EXISTENTIAL WRITERS**  
(3 cr; prereq one Upper Division literature course or §; V MTWThF; FolH 102) Sullivan
- 189 **INDEPENDENT READINGS FOR UPPER DIVISION STUDENTS**  
(1-3 cr; prereq § and consent of dept chm; hrs ar) Staff

**260 DIRECTED READINGS FOR GRADUATE STUDENTS**  
(1-3 cr; prereq #; hrs ar) Jones, Narváez, Sullivan

*Note*—The General Extension Division will offer Spanish for graduate students (Span 17A). Please address all inquiries to the General Extension Division.

## Scandinavian Languages

### *Finnish (Finn)*

- 1-2-3 **INTENSIVE BEGINNING FINNISH**  
See section on 10-week courses, page 137.

### *Swedish (Swed)*

- 1-2-3 **INTENSIVE BEGINNING SWEDISH**  
See section on 10-week courses, page 137.

## Slavic Languages

### *Russian (Russ)*

- 1-2-3 **INTENSIVE BEGINNING RUSSIAN**  
See section on 10-week courses, page 137.
- 4-5-6 **INTENSIVE INTERMEDIATE RUSSIAN**  
See section on 10-week courses, page 137.
- 25 **SCIENTIFIC RUSSIAN II**  
(See section on Special Programs) Concentration on the development of reading skill for students of science who have a knowledge of the structure of Russian. (5 cr; II-III MTWThF; Aero 317) Hudgins

## Social Science (SSci)

- 1 **PERSONALITY**  
Investigation of factors that influence individual human action. Topics studied include personality in nature, culture, society; personality as shaper of culture and history; American character; validation of theories and confirmation of findings. (3 cr; II MTWThF; BlegH 135) Utlaut
- 3 **COMMUNITY**  
Structures and patterns of human relations in traditional and modern societies. Varieties of group behavior: caste and class, kinship, urbanization, modernization, power distribution. Examination of social theories. (3 cr; III MTWThF; BlegH 230) Dolan
- 62 **STRUCTURE AND DYNAMICS OF POVERTY**  
Structural characteristics of poverty as described by social, legal, and economic criteria. Specific problems of poverty; unemployment, immobility, illiteracy, crime, and others. Private and public programs designed to alleviate poverty. Field work in depressed areas. (3 cr; prereq 9 cr in related social science; IV MTWThF; BlegH 240) Sykes

## Social Work (SW)

- Soc 90 AMERICAN SOCIAL WELFARE**  
(See Sociology listing) Wiebler
- Soc 91 INTRODUCTION TO SOCIAL WORK PROCESSES**  
(See Sociology listing) Wiebler
- 160 ADMINISTRATION IN SOCIAL WELFARE**  
Study of the process of transforming social policy into services with emphasis on human relations in administration. Open to those with some social science background who seek a better understanding of administration. (3 cr; II MTWThF; SocSci 860) Kidneigh
- 207 READINGS IN SOCIAL WORK**  
Independent study under tutorial guidance. (Cr and hrs ar; for grad students only; SocSci 909) Kidneigh

## Sociology (Soc)

- 1 INTRODUCTION TO SOCIOLOGY: MAN IN MODERN SOCIETY**  
Characteristics of human group life. Analysis of factors associated with development of human group life and man's social environment; structure of social environment and its influence upon individual's behavior. (3 cr; II MTWThF; AndH 210; CCTV) McNail
- 3 SOCIAL PROBLEMS**  
Survey; contemporary social problems; special emphasis on personal demoralization and social disorganization. (3 cr; III MTWThF; BlegH 5) Zwerman
- 90 AMERICAN SOCIAL WELFARE**  
Analysis of American social welfare as a basic social institution. (3 cr; prereq 3; VI MTWThF; CB 150) Wiebler
- 91 INTRODUCTION TO SOCIAL WORK PROCESS**  
Analysis of the nature of social work helping process through a study of development of social work theory and its implementation in field of practice. (3 cr; prereq 90 or consent of major adviser; IV MTWThF; AndH 230) Wiebler
- 141 THE FAMILY**  
Evolution of the family, development of unity or disunity, roles of the several members of the family, methods of investigation of the family. (3 cr; prereq 1 or 2; II MTWThF; AndH 330) Johnson
- 142 RELIGION AS A SOCIAL INSTITUTION**  
Structure and function of religious organizations in various types of societies, nature of religious leadership, type of religious participation, and relationship of religion to other social institutions. (3 cr; prereq 1 or 2; IV MTWThF; AndH 330) Johnson
- 144 SOCIAL STRATIFICATION AND MOBILITY**  
Relationship of social mobility to social stratification and social organization. Analysis of hierarchical structure of society in relation to class and status. (3 cr; prereq 1 or 2; III MTWThF; AndH 330) Ar
- 145 URBAN SOCIOLOGY**  
Introduction to study of cities; urban ecology; urban institutions and urban way of life. (3 cr; prereq 1 or 2; I MTWThF; BlegH 10) Zwerman
- 154 COMPARATIVE FAMILY ORGANIZATION**  
Comparison of family organization and modes of functioning in selected major world civilizations. Emphasis on interrelations of the family with the economic system and urbanization, and family influences on personality formation. (3 cr; prereq 1, Psy 1; I MTWThF; BlegH 235) Moge

# Speech, Communication, and Theatre Arts

## Speech (Spch)

- 2 COMMUNICATION IN THE MODERN WORLD: INTERPERSONAL COMMUNICATION**  
Description of structure of acts of communication and of factors influencing occurrence, form, and effects of such acts. Analysis of relationship of communication forms in social structure. (3 cr; I MTWThF; FolH 103) D H Smith
- 6†† FUNDAMENTALS OF SPEECH**  
Emphasis on investigation and persuasion ranging from informal committee session to formal meeting requiring parliamentary rules. (3 cr, §5; limited to 22 students; prereq 2 or §2; II MTWThF; Aero 321) D H Smith and staff
- 52 DISCUSSION AND CONFERENCE METHODS**  
Cooperative thinking in task-oriented groups. Planning, preparing for, participating in, and leading private and public meetings. (3 cr; prereq 5 or 6, or §; I MTWThF; FolH 105) Miller
- 65 INTRODUCTION TO BROADCASTING**  
Fundamentals of practice and theory in radio and television. Emphasis on projects and exercises in performance and scripting; introduction to studio equipment and procedures. Historical and sociological aspects of broadcasting. (3 cr; limited to 18 students; prereq 5 or 6 or §; IV MTWThF; MurH 302 and Aero 309) Bart
- 69 RADIO AND TELEVISION PRODUCTION**  
Introduction to the problems of production. Equipment and staff organization; interrelationships with program design. Exercises in production. (3 cr; limited to 18 students; prereq 65; V MTWThF; Aero 309) Bart
- 81 INTERPRETATIVE READING**  
Aesthetic theory of literature and of oral reading. Practice in reading for interpretation and mastery of technique. (3 cr; limited to 24 students; prereq 5 or 6; II MTWThF; Aero 313) Thompson
- 82 INTERPRETATIVE READING**  
Aesthetic theory of literature and of oral reading. Practice in reading for interpretation and mastery of technique. (3 cr; limited to 15 students; prereq 81; III MTWThF; Aero 321) Thompson
- 106 SMALL GROUP COMMUNICATION**  
Study of communication and dynamics within the small task-oriented group. Group cohesiveness, leadership, role structure, information processing and decision making. (3 cr; prereq 52 or §; IV MTWThF; FolH 102) Cashman
- 107 PLATFORM READING**  
Advanced course in oral interpretation of selected poems and plays. Speech melody, rhythm, platform techniques. Problems in aesthetic analysis. Lecture recitals. (3 cr; limited to 15 students; III MTWThF; FolH 102) Thompson
- 122 INTRODUCTION TO RESEARCH**  
Graduate research in speech; selection of topics and methods of investigation. Required of all graduate majors in speech. (3 cr; prereq sr, 5 or 6, Psy 2; VII MTWThF; FolH 104) Scott
- 181, 182, 183 READINGS IN SPEECH**  
Directed reading and preparation of reports on selected subjects. (Cr ar; prereq 9 cr in Upper Division speech and §) Staff
- 226 SEMINAR: COMMUNICATION AND NEGOTIATION**  
Study of the influence of communication patterns on bargaining outcomes. Formal negotiation as a model for situations of partial conflict. (3 cr; prereq 106, 116, 165 or §; II MTWTh; FolH 104) D H Smith

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†† Students in programs requiring 5 credits in speech fundamentals may fulfill the requirement by taking Spch 2 and Spch 6.

- 234 SEMINAR: HISTORY AND CRITICISM OF PUBLIC ADDRESS**  
Methods of rhetorical criticism. Application of method in individually selected research projects. (3 cr; prereq 126A, 126B, or  $\Delta$ ; VI MTWThF; FolH 104) Scott
- 251 SEMINAR: LISTENING COMPREHENSION**  
Research problems and methods. Evaluation of published research. (1-3 cr; prereq undergrad speech major,  $\S$ ; III MTWThF; AgEng 221) Nichols
- 291, 292, 293 RESEARCH**  
Open to graduate students engaged in research on special problems. (Cr ar) Staff

## Speech Science, Pathology, and Audiology (SSPA)

- 99 INTRODUCTION TO SPEECH PATHOLOGY AND AUDIOLOGY**  
Survey of concepts basic to the understanding of normal and abnormal speech and hearing function. Introduction to the causes, characteristics, and modification of communication problems. (3 cr; no prereq; II MTWThF; FolH 105) McDermott
- 101, 102, 103 READINGS**  
Directed readings and preparation of reports on selected subjects. (Cr ar; prereq  $\#$ ) McDermott, Siegel
- 150 SPEECH RETARDATION**  
Theory and experimental research dealing with speech development as related to delayed or retarded speech. (3 cr; prereq 99; III MTWThF; NH 107) Siegel
- 183 LANGUAGE FOR THE HEARING IMPAIRED**  
Language problems resulting from impaired hearing. Survey of approaches of developing and teaching language to the hearing-impaired individual. (3 cr; prereq 170 or  $\#$ ; II MTWThF; FolH 102) Moores
- 190, 191, 192 CLINICAL METHODS AND PRACTICE IN AUDIOLOGY**  
Methods and supervised practice in analysis, diagnosis, and habilitation of communication disorders of persons with auditory impairments. (3 cr; prereq 173 or 174 or  $\#$ ; hrs ar) Hoel
- 204, 205, 206 RESEARCH**  
Open to graduate students engaged in research on special problems. (Cr ar) Chaiklin, Lassman, McDermott, Siegel
- 290, 291, 292 ADVANCED CLINICAL AUDIOLOGY**  
Supervised internship experiences for advanced graduate students working with communication disorders of persons with auditory impairments. (3 cr; prereq 190, 191, 192 and  $\#$ ) Hoel

## Theatre (Th)

- 12 LABORATORY SECTION: INTRODUCTION TO THE THEATRE**  
A laboratory in the practice of the arts and crafts of the theatre; scenery and particularly construction and painting, stage operation, theatre lighting, costuming or make-up. (1 cr; prereq 11; meets first day III, ScH 108, and then hr and rm ar) Scales
- 21 BEGINNING ACTING: CREATIVE APPROACH**  
Creation and presentation of original scenes and skits. Ability to respond to the imaginative situation with individuality and effectiveness is stressed. (3 cr; limited to 18 students; prereq fr with  $\Delta$  or soph, 12 or  $\S$ 12; II-III MTWThF; ScH 19) Grivna
- 24 STAGE MAKE-UP**  
Theory and practice in the art of stage make-up. (1 cr; limited to 15 students; prereq 12 or  $\S$ 12; VI-VII TTh; ScH 23) Muschamp
- 34 STAGECRAFT: CONSTRUCTION AND PAINTING**  
Theory and practice in construction, painting, and shifting of stage scenery. (3 cr,  $\S$ 74; limited to 20 students; prereq soph, 12; IV MTWThF; WeH 306) Vogel

**54 STAGE FENCING AND COMBAT**

History and execution; history of weapons through the ages; fighting and fencing with these weapons. Emphasis on their use in stage combat. (1 cr; limited to 12 students; prereq 12 or ¶12; VI MWF; WeH 302) Albers

**61 ADVANCED ACTING**

Characterization, styles of acting, and stage techniques. Presentation of scenes from great plays. (3 cr; limited to 20 students; prereq 22 or 23; III-IV MTWThF; WeH 302) Frost

**92 LIGHTING**

Theory and practice in applying methods and principles of lighting in theatre and television. (3 cr; prereq 12, 34, V MTWThF; ScH 108) Scales

*Note*—Of the following courses, Th 101, 102, 103, 118, 119, 120, 121, 123, 174, 175, and 176, the maximum number of credits for graduate degrees is: MFA, unlimited; MA Plan A, 6 credits; MA Plan B, 9 credits; and Ph.D., 18 credits.

**100 INTRODUCTION TO RESEARCH**

Graduate research in theatre; selection of topics and methods of investigation. Required of all graduate majors in theatre. (3 cr; prereq sr, 5 or 6, Psy 2; VII MTWThF; FolH 110) Scott

**101, 102, 103 THEATRE PRACTICUM**

Individual creative projects meeting approval of a faculty committee in one or more of these areas: playwriting, directing, acting, and design. Application forms in 102 Shevlin Hall. Approval of adviser and committee necessary before registration. (2-6 cr; prereq Δ and §) Ballet and staff

**112 STAGE DIRECTION**

Rehearsal problems and direction of one-act plays. (3 cr; limited to 18 students; prereq sr, 21, 6 cr from 90, 91 or 92 and §; IV MTWThF; ScH 19) Adey

**114 THEATRE MANAGEMENT AND PROMOTION**

Theory and practice in ticket office procedures, house management, publicity and promotion; special problems in college, community, children's and professional theatre. (3 cr; limited to 15 students; VI MTWThF; ScH 108) Loppnow

**131 CREATIVE DRAMATICS**

Principles and methods of developing original dramatizations with children. Observation of children's classes in creative dramatics. Readings, projects, term papers. (3 cr; limited to 60 students; prereq 12 or ¶12 or elementary education major, or #...21 recommended; IV MTWThF; FolH 104) Davis

**132 CHILDREN'S THEATRE**

Selection, direction, and production of plays for children's audiences. (3 cr; limited to 30 students; prereq 12 or ¶12 or §; II MTWThF MurH 302) Davis

**181, 182, 183 READINGS IN THEATRE ARTS**

Directed reading and preparation of reports on selected subjects. (Cr ar; prereq 9 cr in theatre arts and §; hrs ar) Staff

**281, 282, 283 RESEARCH**

Open to graduate students engaged in research on special problems. (Cr ar) Staff

## Statistics (Stat)

**101 INTRODUCTION TO DECISION THEORY**

Elements of probability, basic concepts in statistical decision theory, relationship to game theory, prediction and inference. (3 cr; prereq Econ 101A or Math 40 or Math 42 or Math 13 or §; I MTWThF; ForH 175) Ar

**122 THEORY OF STATISTICS**

Estimation, hypothesis testing, confidence intervals. (3 cr; for nonmajors; prereq 121. Math 43 or equiv; II MTWThF; ForH 175) Ar



**182 TUTORIAL COURSE**

Students whose needs are not met by current offerings may obtain content of regular courses or special areas by directed study. (3 cr; prereq #) Ar

**Studio Arts (Art)****20 BASIC DRAWING**

An introduction to studio work; exploration of contemporary and traditional methods. Work from nature, various drawing media. (3 cr; limited to 25 students) Sec 1, III-IV MTWThF, ArtB 150, Volpe

**25 DRAWING AND COLOR**

Continuing and elaborating upon drawing experiences of Art 23; serves as a bridge between Lower Division drawing courses and Upper Division painting, printmaking, and other courses where color is used. (3 cr; prereq 23; I-II MTWThF; ArtB 150) Volpe

**32-33 ELEMENTS OF PRINTMAKING**

(Sequence limited to 20 students) Priede

32 Foundation course. Familiarizes the student with the mediums of printmaking in general. Problems in engraving, etching, and other techniques employed in working on metal plate, as well as lithography, woodcuts, and combined processes. (3 cr; I-II MTWThF; ArtB 170)

33 A beginning course designed to introduce the various techniques of etching, engraving employed in working on metal plate. Woodcuts and lithography are included, and lectures and demonstrations are given. (3 cr; I-II MTWThF; ArtB 170)

**40-41 SCULPTURE**

(Sequence limited to 20 students) Kraning

40 Beginning course. Intensive study of structure in nature with emphasis on accurate observation. Construction in metal and plaster. (3 cr; I-II MTWThF; HolB 154)

41 Integrates basic principles examined in Art 40. Natural form is studied for sculptural possibilities. A more imaginative approach to the study of nature is encouraged. (3 cr; prereq 40; I-II MTWThF; HolB 154)

**60B-61B-62B WATER COLOR**

Introduction to transparent water color, gouache, casein, and tempera. General course introducing student to various drawing and painting mediums. Figure, still life, landscape, and abstract design. (3 cr; limited to 25 students; prereq 20, or equiv, with #; I-II MTWThF; ArtB 141) Chaffey

**70-71-72 OIL PAINTING**

Introduction to medium of oil; individual projects and instruction. (3 cr; limited to 25 students; prereq 55 or #; III-IV MTWThF; ArtB 161) Chaffey

**80A,C-81A,C-82A,C SCULPTURE**

(Sequence limited to 15 students; III-IV MTWThF; HolB 154) Kraning

80A Work with direct metal sculpture and constructions. Attention given to 20th-century tools and equipment. (3 cr; prereq 41)

80C Metal casting of sculpture. Lost-wax and sand casting techniques are employed. (3 cr; prereq 42)

81A Direct metal problems of sculptural expression and organization in relation to architecture. (3 cr; prereq 80A, 80B, 80C)

81C Problems concerned with cast metal sculpture for landscape architecture. (3 cr; prereq 80A, 80B, 80C)

82A Experimental work in direct metal. Class problems are assigned. (3 cr; prereq 81A)

82C Experimental work in cast metals. Class problems are assigned. (3 cr; prereq 81C)

**133-134-135 LITHOGRAPHY**

Introduction to lithography—planographic methods. (3 cr; prereq 32 or #;  
III-IV MTWThF; ArtB 170) Priede

**200-201-202 ADVANCED PROBLEMS IN PAINTING**

(3 cr; prereq #; hrs and rm ar) Chaffey

**203-204-205 ADVANCED PROBLEMS IN PAINTING**

(3 cr; prereq #; hrs and rm ar) Chaffey

# College of Medical Sciences

*For general information on the College of Medical Sciences, see section on Schools, Colleges, and Special Programs.*

## MEDICAL SCHOOL

### Anatomy (Anat)

#### ELECTIVE COURSES

- 156 **ADVANCED ANATOMY**  
Individual problems in gross anatomy, embryology, or neuroanatomy. (Cr and hrs ar; prereq #) Staff
- 204 **RESEARCH IN ANATOMY**  
Gross anatomy, cytochemistry, histology, endocrinology, embryology, hematology, or neuroanatomy. (Cr and hrs ar; prereq #) Staff

### Anesthesiology (Anes)

#### REQUIRED COURSES

- 101 **PRINCIPLES OF ANESTHESIA**  
(2 cr; prereq regis med) Van Bergen and staff

#### ELECTIVE COURSES

- 169 **RESEARCH IN ANESTHESIOLOGY**  
Anesthesia problems in experimental laboratory or in hospital. (Cr and hrs ar) Van Bergen and staff
- 181 **EXTERNSHIP IN ANESTHESIOLOGY**  
(6 cr; limited to 6 students; hrs ar) Van Bergen and staff
- 182 **EXTERNSHIP IN ANESTHESIOLOGY AND RESPIRATORY PROBLEMS**  
(6 cr; limited to 3 students; prereq 181) Van Bergen and staff

#### REQUIRED COURSES FOR GRADUATE STUDENTS

- 265 **GENERAL ANESTHESIA**  
Instruction and experience in general anesthesia. (12 cr) Van Bergen and staff
- 266 **REGIONAL ANESTHESIA**  
Observation, instruction, and administration of all types of local, regional, and spinal anesthesia. (4 cr) Van Bergen and staff
- 267 **PRE- AND POSTANESTHETIC EVALUATION**  
Selection of proper anesthetic agent and technique, premedication, and observation of recovery from anesthesia. (2 cr) Van Bergen and staff
- 268 **SEMINAR: ANESTHESIOLOGY**  
Review of literature, report of case problems, and discussion of research work in progress within the department. (2 cr) Van Bergen and staff

**269 RESEARCH IN ANESTHESIA**

Anesthesia problems in experimental laboratory or in hospital. (Cr and hrs ar)  
Van Bergen and staff

## **Biochemistry (MdBc)**

### **REQUIRED COURSES**

**101 BIOCHEMISTRY**

(7 cr; prereq 100; lect IV, VI MTWTh, II, III F, Owre 113; lab I-III MTWTh,  
MH 201) Ungar, Van Pilsum, Edstrom

### **ELECTIVE COURSES**

**153 PROBLEMS IN BIOCHEMISTRY**

Special work arranged with qualified students. May be taken one or both terms.  
(Cr and hrs ar; prereq 100, 101) Ungar, Van Pilsum, Edstrom

**205 RESEARCH IN BIOCHEMISTRY**

(Cr and hrs ar) Armstrong, Larner, Ungar, Wetlaufer, Wold, Van Pilsum, Edstrom

## **Laboratory Medicine**

### **Laboratory Medicine (LMed)**

**181 PROBLEMS IN CLINICAL LABORATORY MEDICINE**

(Cr and hrs ar; prereq #) Benson, Quie, Strandjord, Sundberg, E Yunis, J Yunis

**235 ADVANCED CLINICAL LABORATORY MEDICINE**

(Cr and hrs ar; prereq #) Benson, Quie, Strandjord, Sundberg, E Yunis, J Yunis

**236 RESEARCH: CLINICAL LABORATORY PROBLEMS**

(Cr and hrs ar; prereq #) Benson and staff

**251 RESEARCH: HUMAN GENETICS**

(Cr and hrs ar; prereq #) J Yunis

### **Medical Technology (MedT)**

**111 ADVANCED CLINICAL LABORATORY TECHNIQUES**

Assignment on individual basis for observation, study, and practice in special  
problems; techniques and methodology in one or two of the units of the clinical  
laboratories (chemistry, hematology, histology, immunology, or microbiology). (5 cr;  
prereq 110; hrs ar) Hovde and staff

## **Medicine (Med)**

### **Division of Internal Medicine**

#### **REQUIRED COURSES**

**104 INTRODUCTION TO INTERNAL MEDICINE**

(2 cr per qtr for 4 qtrs; prereq 101, LMed 102; 1:00-1:50 alt W; Todd Amph)  
Ebert and staff

- 112 **CLERKSHIP: INTERNAL MEDICINE**  
(16 cr; prereq regis med; 8:00-5:00 MTWThFS) Murray and staff

### ELECTIVE COURSES††

- 180 **EXTERNSHIP IN MEDICINE**  
Care of medical patients on an inpatient service at an advanced level of responsibility. University, Murray; Veterans Administration, Hall; Hennepin County General, Schultz; St. Paul-Ramsey, Taddeini; Mount Sinai, Lewis; and Northwestern, Watson. (6 cr per period; offered 3 elective periods; hrs ar)
- 181 **RESEARCH IN MEDICINE**  
Research opportunities in the following areas are available at University and affiliated hospitals (as above): gastroenterology, hypertension and sodium metabolism, lipid metabolism as related to atherosclerosis, liver disease, adrenal disease, carbohydrate metabolism and clinical diabetes, immunology and infectious diseases, cardiovascular and pulmonary disease, experimental hemodynamics, internal medicine. A detailed listing of these opportunities is available in the departmental office. (6 cr per period; offered 3 elective periods; hrs ar) Staff
- 184 **SPECIAL CLINICAL PROBLEMS**  
Opportunities for study in the following areas of clinical interests are available at University or affiliated hospitals (as above): clinical electrocardiography and vectorcardiography, clinical and basic problems in bile pigment and porphyrin metabolism, infectious diseases, endocrinology and metabolic disease including diabetes and thyroid disturbances, immunology and allergy, cardiovascular and pulmonary disease, clinical hemodynamics. A detailed listing of these opportunities is available in the departmental office. (6 cr per period; offered 3 elective periods; hrs ar) Staff
- 201 **CLINICAL MEDICINE**  
(Cr and hrs ar) Ebert and staff
- 202 **DISEASES OF THE CARDIOVASCULAR APPARATUS**  
(Cr and hrs ar) Frantz and staff
- 203 **RESEARCH IN MEDICINE**  
(Cr and hrs ar) Ebert and staff
- 205 **DISEASES OF CHEST**  
(Cr and hrs ar) Ebert, Hall, Lillehei
- 206 **CLINICAL CONFERENCE**  
Presentation of problem cases. Discussion of diagnosis and treatment and consideration of pertinent literature. (1 cr; 11:00-11:50 S; Eustis Amph) Ebert and staff
- 207 **CLINICAL PATHOLOGICAL CONFERENCE**  
Presentation of clinical features, necropsy findings, and discussion. Medical and surgical cases. (1 cr; 9:00-9:50 Th; Todd Amph) Dawson and staff
- 208 **CLINICAL RADIOLOGICAL CONFERENCE**  
Presentation and discussion of X-ray films from the Medical Service, with clinical correlation. (1 cr; 10:00-10:50 T; Todd Amph) Peterson, Ebert, and staff
- 210 **SEMINAR: INFECTIOUS DISEASE**  
(1 cr; hrs ar) Spink
- 211 **ELECTROCARDIOGRAPHIC CONFERENCE**  
(1 cr; 3:30-4:20 T; Todd Amph) Tuna and staff
- 214 **CARDIAC CONFERENCE**  
Weekly conference on clinical cardiovascular problems, held jointly by the Departments of Medicine, Surgery, and Radiology. (1 cr; 4:00-4:50 M; Todd Amph) Wang and staff

†† Prior arrangements with departmental office.

## Division of Dermatology

### REQUIRED COURSES

- 123 **DERMATOLOGY, SYPHILOLOGY**  
(2 cr; prereq 101; 4:00-5:00 alt W; Eustis Amph) Lynch and staff
- 124 **SENIOR CLERKSHIP: DERMATOLOGY**  
(2 cr; prereq regis med; 8:00-9:00 MTThF, 1:00-5:00 MTTh, 9:00-11:00 Th, 1:00-4:00 W, 1:30-2:30 F; Eustis Amph) Lynch and staff

### ELECTIVE COURSES

- 182 **EXTERNSHIP IN DERMATOLOGY**  
(Cr and hrs ar) Lynch
- 183 **PROBLEMS IN DERMATOLOGY**  
(Cr and hrs ar) Lynch and staff
- 225 **CLINICAL DERMATOLOGY**  
(Cr and hrs ar) Lynch and staff
- 226 **SEMINAR: DERMATOLOGY**  
(Cr and hrs ar) Lynch and staff
- 227 **HISTOPATHOLOGY OF THE SKIN**  
(1 cr; hrs ar) Orkin and staff
- 228 **RESEARCH: DERMATOLOGY**  
(Cr and hrs ar) Lynch and staff
- 230 **FUNCTIONAL BIOLOGY OF THE SKIN**  
(Cr and hrs ar) Fusaro, Rukavina, and Smith

## Microbiology (MicB)

- 152 **SPECIAL PROBLEMS**  
(Cr and hrs ar; prereq #) Staff
- 153 **BIOLOGY OF MICROORGANISMS**  
(Same as Biol 52) Lectures and laboratory exercises in taxonomy, anatomy, physiology, biochemistry, and ecology of microbes, with emphasis on fundamental properties of bacteria, and a study of the major groups of bacteria and other protista. (4 cr, §Biol 52; prereq Biol 49 or 2, OrCh 62; lect VI MTWThF, Z 313; lab VII-VIII MTWTh, Mayo 205) Klein
- 201 **RESEARCH**  
(Cr and hrs ar) Staff

## Obstetrics and Gynecology (Obst)

### REQUIRED COURSES

- 120 **OBSTETRICS AND GYNECOLOGY**  
Physiology of pregnancy, labor and the puerperium. (4 cr; prereq 124; 2:15-3:00 W) Prem and staff
- 135 **CLINICAL CLERKSHIP IN OBSTETRICS AND GYNECOLOGY**  
Includes clinics in obstetrics and gynecology. (12 cr; prereq regis med) Prem and staff

## ELECTIVE COURSES

## 184 EXTERNSHIP IN OBSTETRICS AND GYNECOLOGY

Elective for junior and senior medical students and recent graduates. Course will consist of clinical work in obstetrics and gynecology. Under exceptional circumstances investigative work can be done. Registration may be for one or both terms. (Cr and hrs ar; limited to 10 students) Prem and staff

## COURSES FOR GRADUATE STUDENTS

- 201 ADVANCED OBSTETRICS AND GYNECOLOGY, PART I  
(Cr ar) Prem and staff
- 202 ADVANCED OBSTETRICS AND GYNECOLOGY, PART II  
(Cr ar) Prem and staff
- 203 ADVANCED OBSTETRICS AND GYNECOLOGY, PART III  
(Cr ar) Prem and staff
- 204 ADVANCED OBSTETRICS AND GYNECOLOGY, PART IV  
(Cr ar) Prem and staff
- 205 ADVANCED OBSTETRICS AND GYNECOLOGY, PART V  
(Cr ar) Prem and staff
- 206 ADVANCED OBSTETRICS AND GYNECOLOGY, PART VI  
(Cr ar) Prem and staff
- 207 ADVANCED OBSTETRICS AND GYNECOLOGY, PART VII  
(Cr ar) Prem and staff
- 208 ADVANCED OBSTETRICS AND GYNECOLOGY, PART VIII  
(Cr ar) Prem and staff
- 209 ADVANCED OBSTETRICS AND GYNECOLOGY, PART IX  
(Cr ar) Prem and staff
- 210 ADVANCED OBSTETRICS AND GYNECOLOGY, PART X  
(Cr ar) Prem and staff
- 211 ADVANCED OBSTETRICS AND GYNECOLOGY, PART XI  
(Cr ar) Prem and staff
- 212 ADVANCED OBSTETRICS AND GYNECOLOGY, PART XII  
(Cr ar) Prem and staff
- 219 RESEARCH  
(Cr ar) Staff
- 302 EXTERNSHIP  
(6 cr) Prem and staff
- 303 OBSTETRICS AND GYNECOLOGIC HISTOLOGY  
(6 cr; hrs ar) Prem and staff

## Ophthalmology (Oph)

- 200 CLINICAL OPHTHALMOLOGY  
(6 cr; 10:00-5:00 MTWThF; O-P Clin) Harris and staff
- 201 PRACTICAL OCULAR SURGERY  
(3 cr; 7:30-10:00 TWTh; Oper Rm) Harris and staff

## Otolaryngology (Otol)

## COURSES FOR GRADUATE STUDENTS

- 230 CLINICAL OTOTOLOGY  
(3 cr; 1:00-4:00 MTWThF; O-P Clin) Paparella and staff

- 231 **CLINICAL RHINOLOGY AND LARYNGOLOGY**  
(3 cr; 1:00-4:00 MTWThF; O-P Clin) Paparella and staff
- 232 **SURGERY OF EAR, NOSE, AND THROAT**  
(3 cr; 9:00-12:00 MTWThF; Oper Rm) Paparella and staff
- 241 **SEMINAR: CURRENT LITERATURE**  
(1 cr; 9:00-11:00 S; Mayo A675) Staff
- 248 **RESEARCH**  
(Cr and hrs ar) Staff

## Pathology (Path)

- 104 **AUTOPSIES**  
(Cr ar; prereq 102; hrs ar) Dawson
- 106 **DISEASES OF THE HEART**  
(1 cr; prereq 102; hrs ar) Edwards
- 111 **CONFERENCE ON AUTOPSIES**  
(1 cr; prereq 102; 12:30-1:30 T; JacH 178) Dawson
- 112 **DIAGNOSIS OF TUMORS**  
See section on 10-week courses, page 137.
- 113 **SURGICAL PATHOLOGY**  
(Cr ar; prereq 102; hrs ar) Hebbel
- 121 **DISEASES OF THE ALIMENTARY TRACT**  
(1 cr; prereq 102; hrs ar) Hebbel
- 150 **PROBLEMS IN PATHOLOGY**  
See section on 10-week courses, page 137.
- 201 **RESEARCH**  
Students with the necessary preliminary training may elect research either as a major or minor in pathology. (Cr and hrs ar; prereq #) Dawson, Hebbel

## Pediatrics (Ped)

### REQUIRED COURSES

- 120 **CLINICAL LECTURES IN PEDIATRICS**  
(2 cr; prereq regis med; 1:00-2:00 W; Eustis Amph) J Anderson and staff
- 135 **CLINICAL CLERKSHIP**  
(12 cr; prereq regis med) J Anderson and staff

### ELECTIVE COURSES

- 181 **EXTERNSHIP**  
Care of pediatric patients on an inpatient service at an advanced level of responsibility. Offered at University and affiliated hospitals. (Cr ar)
- 182 **SPECIAL CLINICAL PROBLEMS**  
Opportunities for study in the following areas of clinical interest are available at University and affiliated hospitals: pediatric cardiology, pediatric neurology, pediatric endocrinology and metabolism; and renal diseases. A detailed listing of these opportunities is available in the departmental office. (Cr ar)
- 183 **RESEARCH IN PEDIATRICS**  
Research opportunities in the following areas are available at University or affiliated hospitals: hematology, infectious disease, immunology and inflammatory diseases, renal diseases, metabolic and endocrinologic research. A detailed listing of these opportunities is available in the departmental office. (Cr ar)



## COURSES FOR GRADUATE STUDENTS

All pediatric medical fellows, medical fellow specialists, teaching assistants, and research assistants are required to register for one or more of the following courses. Credit obtained may be applied to the M.S. or Ph.D. degree. The clinical experience in these courses is obtained in the outpatient and inpatient services of the University of Minnesota Hospitals. Research opportunities will be provided by arrangement in either the basic science departments of the Medical School or in the laboratories of the Department of Pediatrics.

- 200 GRADUATE SEMINAR IN PEDIATRICS**  
(1½ cr; VIII T; Mayo 1450) J Anderson and staff
- 202 PEDIATRIC CLINIC**  
(5 cr; II-IV MTWThF; O-P depts of Hennepin County General Hospital or University Hospitals) J Anderson and staff
- 204 RESIDENCY IN PEDIATRICS**  
Three-month residency in pediatrics at University Hospitals, Hennepin County General Hospital, St Paul Children's Hospital, St Paul Ramsey Hospital. (7 cr; I-X MTWThF) J Anderson and staff
- 206 PEDIATRIC SPECIAL INTEREST**  
Pediatric graduate students who have completed at least 1½ years of their general graduate pediatric training may obtain advanced clinical and basic training in one or more of the following special fields: allergy, neurology, cardiology, psychiatry, pathology, endocrinology and metabolism, hematology. Clinical training in these areas is obtained in the inpatient and outpatient services of the University Hospitals and its affiliated hospitals. Training in the basic sciences related to these fields of special interest may be obtained in the pre-clinical divisions of the medical school. (Cr and hrs ar; prereq #) J Anderson and staff
- 208 PEDIATRIC RESEARCH**  
Special problems. Students may collaborate with members of the staff or with other students. (Cr and hrs ar; ped labs) J Anderson and staff

## Physical Medicine and Rehabilitation (PMed)

- 103 PHYSICAL THERAPY CLINIC**  
(Cr and hrs ar) Gullickson
- 161 CLINICAL MEDICINE IN REHABILITATION**  
(5 cr) Staff
- 180 PROBLEMS IN PHYSICAL THERAPY**  
(Cr ar; prereq physical therapist) Staff
- 181 EXTERNSHIP IN PHYSICAL MEDICINE AND REHABILITATION**  
(Cr ar; prereq regis med) Kottke, Kubicek
- 191 SEMINAR: REHABILITATION LITERATURE**  
(Cr ar; prereq regis med) Staff
- 200 PHYSICAL MEDICINE SERVICE**  
(Cr and hrs ar) Staff
- 204 CLINIC: PERIPHERAL VASCULAR DISEASE**  
(Cr and hrs ar) Gullickson
- 205 READINGS**  
(1 cr; I M) Kottke
- 206 CONFERENCE**  
(Cr and hrs ar) Staff
- 210 RESEARCH IN PHYSICAL MEDICINE**  
(Cr and hrs ar) Staff

- 212 **ELECTROMYOGRAPHY**  
(Cr and hrs ar) Kottke

## **Occupational Therapy**

- 94-95-96 **CLINICAL TRAINING IN OCCUPATIONAL THERAPY**  
A total of 9 months of supervised training in affiliated hospitals. (18 cr per qtr for senior OT students)

## **Physical Therapy**

- 83 **THEORY AND TECHNIQUE OF MUSCLE FUNCTION**  
(5 cr; lect II MTWTh, ChRC 208; lab III-IV MTWTh, II-IV F, ChRC 220)  
Pohtilla, Allison

## **Pharmacology (Phcl)**

- 109 **PHARMACOLOGICAL PROBLEMS**  
(Cr and hrs ar) Shideman and staff
- 203 **RESEARCH IN PHARMACOLOGY**  
(Cr and hrs ar) Shideman and staff

## **Physiology (Phsl)**

- 113 **PROBLEMS IN PHYSIOLOGY**  
(Cr and hrs ar) Staff
- 202 **READINGS IN PHYSIOLOGY**  
(Cr and hrs ar) Staff
- 203 **RESEARCH IN PHYSIOLOGY**  
(Cr and hrs ar) Staff

## **Psychiatry and Neurology (NPsy)**

- 101 **CLINICAL NEUROLOGY**  
(4 cr; prereq regis med or grad clin psychol; 8:00 am S) Baker
- 103 **CLINICAL CLERKSHIP**  
(12 cr) Staff
- 145 **READINGS IN PSYCHIATRY**  
(Cr ar) Staff
- 145X **READINGS IN NEUROLOGY**  
(Cr ar) Staff
- 151 **SURVEY OF NEUROPATHOLOGY**  
(Cr ar) Staff
- 181 **EXTERNSHIP IN NEUROLOGY**  
(Cr ar) Staff
- 182 **PROBLEMS IN BASIC AND CLINICAL NEUROLOGY**  
(Cr ar) Staff
- 191 **EXTERNSHIP IN ADULT PSYCHIATRY**  
(Cr ar) Staff

- 192 **EXTERNSHIP IN CHILD PSYCHIATRY**  
(Cr ar) Jensen
- 193 **PROBLEMS IN PSYCHIATRY**  
(Cr ar) Staff
- 202 **SPECIAL RESEARCH TOPICS**  
(Cr ar; prereq #) Staff
- 203 **PSYCHOMETRIC CLERKSHIP**  
(Cr ar) Staff
- 204 **INTERNSHIP IN CLINICAL PSYCHOLOGY**  
(2 or 4 cr; prereq PhD candidate in clinical psychology with #) Staff
- 208 **CLINICAL NEUROLOGY**  
(Cr ar) Baker and staff
- 209 **RESEARCH IN NEUROLOGY**  
(Cr ar) Baker and staff
- 212 **SURVEY OF NEUROPATHOLOGY**  
(1 cr) Sung
- 226 **NEUROLOGICAL-NEUROSURGICAL CONFERENCE**  
(1 cr) Baker and staff
- 231 **APPLIED ELECTROENCEPHALOGRAPHY, MYOGRAPHY**  
(Cr ar) Torres, Kennedy
- 233 **APPLIED NEUROPATHOLOGY**  
(Cr ar) Sung
- 251 **CLINICAL INPATIENT PSYCHIATRY**  
(Cr ar) Staff
- 252 **CLINICAL OUTPATIENT PSYCHIATRY**  
(Cr ar) Anderson and staff
- 253 **CLINICAL CHILD PSYCHIATRY**  
(Cr ar) Jensen and staff
- 254 **ADVANCED CLINICAL INPATIENT PSYCHIATRY**  
(Cr ar) Staff
- 255 **ADVANCED CLINICAL OUTPATIENT PSYCHIATRY**  
(Cr ar) Anderson and staff
- 256 **ADVANCED CLINICAL CHILD PSYCHIATRY**  
(Cr ar) Jensen and staff
- 257 **SPECIAL ASSIGNMENTS**  
(1 cr) Staff
- 258 **RESEARCH IN PSYCHIATRY**  
(Cr ar) Staff
- 260 **ORIENTATION TO CLINICAL PSYCHIATRY**  
(1 cr) Staff
- 291 **SEMINAR: CURRENT LITERATURE**  
(1 cr) Staff
- 292 **SPECIALIZED SUPERVISED PSYCHOTHERAPY**  
(1 cr) Hastings and staff

## Radiology (Rad)

### ELECTIVE COURSES FOR THIRD- AND FOURTH-YEAR STUDENTS

- 180 **EXTERNSHIP IN RADIOLOGY**  
(Cr and hrs ar)
- 181 **EXTERNSHIP IN DIAGNOSTIC RADIOLOGY**  
(Cr and hrs ar)

- 182 **EXTERNSHIP IN RADIATION THERAPY**  
(Cr and hrs ar)
- 183 **PROBLEMS IN RADIATION BIOLOGY AND RADIOACTIVE ISOTOPE METHODS**  
(Cr and hrs ar)
- 184 **PROBLEMS IN DIAGNOSTIC RADIOLOGY**  
(Cr and hrs ar)
- 186 **ROENTGEN TECHNIQUE**  
(Cr and hrs ar)

#### REQUIRED COURSES FOR GRADUATE STUDENTS

- 110 **RADIATION BIOLOGY INSTITUTE**  
Effects of irradiation on living systems. Radioisotopic procedures. Physics and chemistry fundamental to radiation biology and effects on all types of chemical and biological systems. (Cr and hrs ar)
- 111 **MEDICAL ROENTGENOLOGIC CONFERENCE**  
Weekly meetings with the medical staff at which all the important medical cases which have X-ray diagnostic procedures are reviewed from both the clinical and roentgenological points of view. (1 cr; III T; Todd Amph) Peterson and staff
- 124 **PEDIATRIC ROENTGENOLOGIC CONFERENCE**  
Weekly meetings with the pediatric staff at which all the important pediatric cases which have had X-ray diagnostic procedures are reviewed from both the clinical and roentgenological points of view. (1 cr; II T; Enstis Amph) Wolfson
- 135 **SURGICAL ROENTGENOLOGIC CONFERENCE**  
Weekly meetings with the surgical staff at which all the important surgical cases which have had X-ray diagnostic procedures are reviewed from both the clinical and roentgenological standpoints. (1 cr; II S; Todd Amph) Amplatz, Gedgaudas
- 163 **NEUROSURGICAL ROENTGENOLOGIC CONFERENCE**  
Weekly meetings with the neurosurgical staff at which all the important neurosurgical cases which have had X-ray diagnostic procedures are reviewed from both the clinical and roentgenological points of view. (1 cr; VI F; Todd Amph) Peterson
- 200 **RESEARCH IN ROENTGENOLOGY**  
Problems in roentgen diagnosis. (Cr ar) Peterson and others
- 202 **CARDIOVASCULAR ROENTGENOLOGIC CONFERENCE**  
(1 cr; VIII M; Todd Amph) Amplatz, Gedgaudas
- 204 **TUMOR CLINIC CONFERENCE**  
(Cr ar; IV M; Todd Amph) D'Angio
- 205 **RESEARCH: RADIATION THERAPY, NUCLEAR MEDICINE, RADIOBIOLOGY**  
(Cr ar) D'Angio, Loken
- 206 **ROENTGENOSCOPY**  
Theory and practical application of roentgenoscopy, particularly to diseases of the gastrointestinal tract, lungs, and heart. (3 cr) Peterson and others
- 209 **ROENTGEN DIAGNOSIS**  
Theory and practical application of roentgen diagnostic methods to medical cases in general. (3 cr) Peterson and others
- 210 **ROENTGEN TECHNIQUE**  
Theory and practical application of the principles of roentgen technique including the study of X-ray machines and X-ray tubes, exposure, technique, and darkroom work. (2 cr) Peterson and others
- 211 **DOSIMETRY OF INTERNAL, EXTERNAL RADIATION EMITTERS**  
(1 cr; 7:00-8:00 am W; Mayo B-142) Moore
- 212 **SEMINAR: RADIATION BIOPHYSICS AND NUCLEAR MEDICINE**  
Research approaches to problems in radiation biophysics; use of radioactive isotopes discussed. Recent advances reviewed. (1 cr; V M) Jacobson

- 236 RADIOISOTOPE SEMINAR**  
Recent developments in nuclear medicine. (1 cr; 12:00-1:00 W; Rigler Library)  
Loken
- 238 ROENTGEN-SURGICAL PATHOLOGY CONFERENCE**  
Weekly meetings with the surgical pathology staff at which surgical specimens and roentgenograms are reviewed from the pathologic and roentgenologic points of view. (1 cr; 4:00-6:00 Th; Todd Amph) Lober, Peterson, and others
- 240 RADIATION THERAPY CONFERENCE**  
Recent advances in clinical radiotherapy. (1 cr; 4:00-5:00 M; Rigler Library)  
D'Angio

## Surgery (Surg)

### Division of General Surgery

#### REQUIRED COURSES FOR UNDERGRADUATE SURGERY

- 135 CLINICAL CLERKSHIP**  
(16 cr; prereq regis med) Najarian and staff

#### ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS

- 181 CARDIOVASCULAR SURGERY**  
Clinical problems and participation in surgery. (Cr and hrs ar; for srs only)  
Varco, Castaneda
- 182 PROBLEMS IN CLINICAL INVESTIGATIONS AND PROBLEMS IN EXPERIMENTAL SURGERY**  
(Cr and hrs ar; University and affiliated hospitals) Najarian and staff
- 183 CLINICAL TISSUE TRANSPLANTATION**  
Participation in transplantation operations, ward rounds, and seminars. Additional time may be spent in the laboratories participating in experimental organ transplantation studies. (Cr and hrs ar) Najarian
- 184 EXTERNSHIP IN AFFILIATED HOSPITALS**  
(Cr and hrs ar) Najarian and staff

#### REQUIRED COURSES FOR GRADUATE STUDENTS

- 200 OUTPATIENT CLINIC IN SURGERY**  
Student is required to assist in the outpatient surgical clinic and to participate in diagnosis and treatment. (1 cr) Najarian and staff
- 202 APPLIED SURGICAL ANATOMY OF THE CADAVER**  
Surgical fellows prepare dissections with staff supervision. (1 cr; hrs ar) Najarian and staff
- 203 PROCTOSCOPY AND SIGMOIDOSCOPY**  
Diagnosis and treatment of lesions of the lower bowel. (1 cr; hrs ar) W Bernstein and staff
- 204 TUMOR CLINIC**  
Combined clinical-pathological consideration of tumors as seen by the general surgeon. Tumor Conference follows. (1 cr; hrs ar) Staff
- 205 SURGICAL DIAGNOSIS**  
Surgical fellow assists in the instruction of the clinical clerks and interns, and studies problems in diagnosis in Outpatient Department. (1 cr; hrs ar) Najarian and staff
- 208 STUDY OF SURGICAL PROBLEMS**  
Surgical fellow acts as house surgeon at University Hospitals. (1 cr; hrs ar) Najarian and staff

- 211 OPERATIVE SURGERY**  
Surgical fellow acts as the first assistant at operations in University Hospitals and later may be permitted to operate. (1 cr; hrs ar) Najarian and staff
- 214 SURGICAL WARD CONFERENCE**  
Presentation of interesting cases by the fellows. (1 cr; hrs ar) Najarian and staff
- 215 SURGICAL-ROENTGENOLOGICAL-PATHOLOGY CONFERENCE**  
Weekly reviews of selected surgical patients. (1 cr; hrs ar) Radiology, Pathology, and Surgery staffs
- 216 SURGICAL RESEARCH**  
Problems in experimental surgery. (1 cr; hrs ar) Najarian and staff
- 217 SURGICAL SEMINAR**  
Conferences for review of surgical literature, for presentation of cases, and as research. (1 cr; hrs ar) Najarian and staff
- 218 SURGICAL CLINICS—PATHOLOGIC CONFERENCE**  
Review of interesting cases by the medical, surgical, pediatrics, and pathology staffs. (1 cr; hrs ar) Najarian and staff
- 219 SURGERY-LITERATURE CONFERENCE**  
Leading surgical journals are assigned to the fellows who review and report selected articles at weekly conference. (1 cr; hrs ar) Najarian and staff
- 220 PERIPHERAL VASCULAR CONFERENCE**  
Vascular clinic with conference following. (1 cr; hrs ar) Najarian and staff
- 221 SURGERY-PHYSIOLOGY CONFERENCE**  
Seminar discussing the physiological aspects of surgery. (1 cr; VIII T) Najarian and staff
- COMPLICATIONS CONFERENCE**  
Discuss complications encountered postoperatively. (Cr and hrs ar) Najarian

## *Division of Neurosurgery*

### REQUIRED COURSES FOR UNDERGRADUATE STUDENTS

- 127 CLINICAL LECTURES IN NEUROSURGERY**  
(1 cr per yr; prereq regis med; W) Staff

### ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS

- 188 NEUROSURGERY EXTERNSHIP, UNIVERSITY HOSPITALS**  
(Cr ar; prereq regis med; MTWThF) Staff
- 189 NEUROSURGERY EXTERNSHIP, VETERANS ADMINISTRATION HOSPITAL**  
(Cr ar; prereq regis med; MTWThF) Staff
- 190 NEUROSURGERY INVESTIGATION**  
(Cr ar; prereq regis med; MTWThF) Staff

### REQUIRED COURSES FOR GRADUATE STUDENTS

- 305 NEUROSURGICAL DIAGNOSIS**  
The neurosurgical fellow assists in instruction of clinical clerks and interns, and studies problems in diagnosis in the Outpatient Department and in University Hospitals. (3 cr; MTWThF) French, Chou
- 308 STUDY OF NEUROSURGICAL PROBLEMS**  
The neurosurgical fellow acts as house surgeon at University Hospitals. (4 cr) French, Chou
- 311 OPERATIVE NEUROSURGERY**  
The neurosurgical fellow acts as first assistant at operations in University Hospitals, and later may be permitted to operate. (4 cr; MTWThF) French, Chou

- 316 **NEUROSURGICAL RESEARCH**  
Problems in experimental or clinical surgery. (3 cr; MTWThF) French, Chou
- 318 **NEUROSURGICAL CONFERENCE**  
A review of X-rays and case histories on neurosurgical service. (1 cr) French, Chou

### *Division of Orthopedic Surgery*

#### **ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS**

- 185 **EXTERNSHIP IN ORTHOPEDIC SURGERY AND FRACTURES**  
(Cr ar; prereq regis med) Staff

#### **REQUIRED COURSES FOR GRADUATE STUDENTS**

- 401 **ORTHOPEDIC CONFERENCE**  
Review of X-rays and case histories of patients on the orthopedic inpatient or outpatient service. (3 cr) Peterson, Moe, Kane, Patterson, and staff
- 403 **FRACTURES**  
The orthopedic fellow acts as house surgeon on the fracture service at Hennepin County General Hospital. (5 cr) Nydahl and staff
- 405 **ORTHOPEDIC DIAGNOSIS**  
The orthopedic fellow assists in instruction of clinical clerks and interns and studies problems in diagnosis in the Outpatient Department and in the University Hospitals. (3 cr) Moe, Kane, Patterson, and staff
- 407 **PEDIATRIC ORTHOPEDICS**  
The orthopedic fellow acts as house surgeon at Gillette State Hospital for Crippled Children. (5 cr) Moe and staff
- 408 **STUDY OF ORTHOPEDIC SURGERY PROBLEMS**  
The orthopedic fellow acts as house surgeon at the University Hospitals. (5 cr) Moe, Kane, Patterson, and staff
- 410 **ORTHOPEDIC PATHOLOGY**  
Seminar for systematic review of pathology of ossified tissues and soft tissues of the extremities. (2 cr) Moe, Kane, Patterson, and staff
- 411 **ORTHOPEDIC OPERATIVE SURGERY**  
The orthopedic fellow acts as first assistant at operations at the University Hospitals and later may be permitted to operate. (5 cr) Moe, Kane, Patterson, and staff
- 412 **ORTHOPEDIC ANATOMY**  
The orthopedic fellow dissects upper and lower extremities and aids in instruction of medical students in anatomy of the extremities. (2 cr) Moe, Kane, Patterson, and staff
- 416 **ORTHOPEDIC RESEARCH**  
Problems in experimental or clinical surgery. University Hospitals. (5 cr) Moe, Kane, and staff

### *Division of Urology*

#### **ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS**

- 180 **EXTERNSHIP IN UROLOGY**  
(Cr and hrs ar) Staff

## REQUIRED COURSES FOR GRADUATE STUDENTS

- 250 UROLOGICAL SURGERY**  
Urological fellow first assists at operations at the University Hospitals and later is permitted to operate under supervision of the staff. (4 cr; hrs ar) Staff
- 251 CYSTOSCOPY AND UROLOGICAL DIAGNOSIS**  
Urological fellow performs cystoscopies and other diagnostic procedures. (4 cr; hrs ar) Staff
- 252 UROLOGICAL CONFERENCE**  
Problems in diagnosis and treatment are discussed. (4 cr; hrs ar) Staff
- 253 RESEARCH IN UROLOGY**  
Problems in experimental and clinical surgery. (4 cr; hrs ar) Staff

## SCHOOL OF NURSING (Nurs)

- 82B NURSING TREATMENT AND DELEGATED MEDICAL ACTIVITY**  
Modification of nursing treatment and the planning and providing of delegated medical care. (4 cr; prereq 82A) Staff  
Sec 1, Lect II-III TTh, PoH 2309  
Sec 2, Lect II-III, TTh, Owre 113  
Sec 3, Lect II-III, TTh, Owre 117  
Sec 4, Lect II-III, TTh, MH 118  
Sec 5, Lect II-III, TTh, PoH 2317  
Lab II-IV, VI-VIII, MW
- 92B NURSING SYNTHESIS IN THE COMMUNITY**  
See section on 10-week courses, page 137.

## SCHOOL OF PUBLIC HEALTH (PubH)

- 53 INTRODUCTION TO PUBLIC HEALTH**  
Basic concepts of disease prevention and control through community programs. (5 cr; prereq 3, 50 or equiv and a course in bacteriology; I-II MTWThF; Owre 111) G Anderson
- 65 FIELD PRACTICE IN PUBLIC HEALTH NURSING**  
See section on 10-week courses, page 137.
- 95 HUMAN NUTRITION**  
Particular reference to public health. Nutritional values of foods, food utilization and requirements, food management, nutrition education. (3 cr; prereq courses in chemistry and biology, or #; I MTWThF; Owre 113) Stief
- 100A ELEMENTS OF PUBLIC HEALTH**  
Occurrence and prevention of communicable, degenerative, and industrial diseases; protection of food, water, and milk; maternal and child health. (3 cr; prereq 3, 50 and a course in microbiology; I-II MTWThF; Owre 111) G Anderson
- 102 ENVIRONMENTAL HEALTH**  
Methods for promoting man's health and comfort by controlling environment. (3 cr; prereq #; I-II MTWThF; Mayo 1250) Bond, Michaelsen, and staff
- 107 MATERNAL AND CHILD HEALTH**  
Health needs and services for mothers and children in public health programs. (3 cr; prereq #; hrs ar) Bridge, May
- 123 TOPICS IN PUBLIC HEALTH**  
Selected readings in public health with discussion based on these readings. (Cr ar; prereq #) Staff
- 138°° HOSPITAL ENGINEERING PROBLEMS**  
The application of environmental engineering, sanitation and maintenance principles and techniques, with particular reference to effective planning, administration, and operation of hospitals. (Cr ar; prereq #) Michaelsen, Nyquist, and others



- 172B° STUDIES IN PUBLIC HEALTH NURSING**  
See section on 10-week courses, page 137.
- 179B LONG-TERM PATIENT CARE AND REHABILITATION**  
See section on 10-week courses, page 137.
- 190°° FIELD PRACTICE IN PUBLIC HEALTH EDUCATION**  
See section on 10-week courses, page 137.
- 200 RESEARCH**  
Opportunities will be offered by the School of Public Health and by various co-operating organizations for qualified students to pursue research work. (Cr ar) Staff
- 230°° FIELD PRACTICE IN ENVIRONMENTAL HEALTH**  
(Cr ar; prereq #) Bond, Paulus, Greene, DeRoos, Peterson
- 232°° FIELD WORK IN GROUNDWATER DEVELOPMENT**  
Development of groundwater sources with special reference to construction of wells, field tests, and public health problems involved. (Cr ar; prereq grad engineer, 231) Bond, Singer, staff, visiting lecturers
- 234 WATER QUALITY RESEARCH**  
Design, logistical planning, and implementation of an independent short-term research activity basic to water quality evaluation. Literature review, statistical design and data processing. Field testing of sampling and laboratory operations. (6 cr; prereq #) Olson, Odlaug, Ruschmeyer, Swain, Trihey

### *Biometry (PubH)*

- 110B BIOMETRY II**  
Further consideration of testing statistical hypothesis and interval estimation; regression analysis; correlation; use of ratios; analysis of variance; contrasts and multiple comparison techniques. (3 cr; prereq 110A, ¶111B; IV MTWThF; ForH 120) McHugh
- 111B BIOMETRY LABORATORY II**  
Application of concepts of testing and estimation concerning the parameters of the basic probability models; application of regression to bioassay; examples of the use and misuse of ratios; application of analysis of variance to bioassay. (2 cr; prereq ¶110B; III TThF and 7 hrs per wk ar during morning, afternoon hrs by special ar only; ForH 80) Jeffries
- 120E° BIOMEDICAL COMPUTING**  
See section on 10-week courses, page 137.
- 180 INTRODUCTION TO BIOMETRY**  
Variation; frequency distribution; probability; estimation; significance tests; binomial, normal, Poisson distributions; serial dilutions; most probable number. (6 cr; prereq environmental health students only, others #; III MTWThF, Owre 111, plus 9 hrs per wk lab ar, Mayo 1220) Martin
- 211 SEMINAR: BIOMETRY**  
(Cr ar) Brown

# Mortuary Science (Mort)

*For general information on the Department of Mortuary Science, see section on Schools, Colleges, and Special Programs.*

**2 INTRODUCTION TO RESTORATIVE ART**

Basic drawing, color theory, anatomical drawing and modeling. (4 cr; III-V, MTWTh; JacH 388) Burger

**14 MORTUARY LAW**

Licensing; restrictions on mortuary sites; business organization; duties, rights, and liability for final disposition; tort liability; cemetery law; wills and administration of estates; business law. (5 cr; I-II MTWThF; VH 113) Grayson

**77 CLINICAL TRAINING**

Practical experience in embalming; evaluations of theory. (2 cr; prereq 56 or #; hrs and rm ar) Stroud

# Institute of Technology

For general information on the Institute of Technology, see section on Schools, Colleges, and Special Programs.

## COLLEGE OF ENGINEERING

### Aeronautics and Engineering Mechanics

#### Mechanics and Materials

#### 36 DYNAMICS

Introduction to vector calculus. Kinematics. Application of principles of particle motion. Conservation principles. Dynamics of particle systems and plane rigid bodies. Technical applications. (4 cr; §Phys 100 or §Phys 100A; prereq Math 32 or ¶Math 32 and Phys 21; I-II MWF, II TTh; AE 21)

#### 37 DEFORMABLE BODY MECHANICS

Introductory treatment of stress and strain at a point. Stress-strain relation in two dimensions. Linear theory of torsion. Bending stresses. Deflection of determinate and indeterminate beams. Instability. (4 cr; prereq 35, Math 31 or ¶Math 31; III-IV MWF, III TTh; AE 21)

### Civil Engineering and Hydraulics (CE)

#### 64A ENGINEERING GEOMETRICS

The geometric design of engineering projects; horizontal and vertical curves; grades; fitting of structural elements to the topography; earthwork and drainage analysis; detailed site plans for construction; computations for construction layout; layout. (3 cr; prereq 61A; lect I-II MW, lab VI-IX MW; Ex 265) Fant

#### 82 INTERMEDIATE STRUCTURAL ANALYSIS

Analysis of continuous beams and trusses. Slope deflection method. Moment distribution method. Portal frames and multi-story frames. Tapered and haunched members. Wind stress analysis. (4 cr; prereq 81; lect III-IV MWF, lab III TTh; Ex 177)

### Electrical Engineering (EE)

#### 31 CIRCUIT ANALYSIS

Steady-state AC analysis of linear passive circuits; instantaneous and average power. Complex frequency; natural and forced response. Magnetically coupled circuits. (3 cr; prereq 30; lect I-II MWF; Arch 50) Ar

Rec 1, I-II T, ME 208

Rec 2, I-II Th, ME 208

#### 31A ELECTRICAL ENGINEERING LABORATORY

Laboratory to accompany 31. (1 cr; prereq 30A, ¶31) Ar

Lab 1, III-IV MW, EE 118

Lab 2, V-VIII M, EE 118

Lab 3, I-IV T, EE 118

Lab 4, V-VIII T, EE 118

Lab 5, V-VIII W, EE 118

Lab 6, I-IV Th, EE 118

- 76 ELECTROMAGNETIC FIELDS**  
Applications of electrostatic, magnetostatic, and electromagnetic field theory. (4 cr; prereq 75; lect I-II MWF, rec I-II TTh; ME 302) Ar
- 86 JUNIOR ELECTRICAL ENGINEERING LABORATORY**  
Experimental study of electromagnetic fields and linear systems. (2 cr; prereq 76 or ¶76, 107 or ¶107) Ar  
Lab 1, V-VIII MW, EE 216  
Lab 2, V-VIII MW, EE 205  
Lab 3, V-VIII TTh, EE 205
- 107 LINEAR SYSTEM ANALYSIS**  
Development of time-invariant linear models for electrical, mechanical, thermal, and acoustic systems; analysis of the models in time and frequency domains. Applications of transform techniques to linear systems. (3 cr; prereq 31, Math 60A; III-IV MWF; Arch 55) Ar

## Mechanical Engineering

### Mechanical Engineering (ME)

- 30A THERMODYNAMICS**  
Properties, equations of state, and processes of thermodynamic systems and devices. Application of first and second laws correlating energy with heat, work, and mass transfer. Equilibrium and irreversibility. (4 cr; prereq Phys 23, Math 32; II MTWThF, V MWF; ME 221) Ibele
- 34 MEASUREMENTS LABORATORY II**  
Static and dynamic characteristics of generalized measurement systems. Electro-mechanical transducers. Measurement of temperature, pressure, vacuum, humidity, density, viscosity, heating valves, speed, power, force, stress, strain, and radioactivity. (2 cr; prereq 30A or ¶30A; lect III TTh, ME 221; lab VI-VIII TTh, ME 370) McFarland
- 90 INDUSTRIAL ASSIGNMENT, PART II**  
See section on 10-week courses, page 137.
- 91 INDUSTRIAL ASSIGNMENT, PART II**  
See section on 10-week courses, page 137.
- 92 INDUSTRIAL ASSIGNMENT, PART II**  
See section on 10-week courses, page 137.
- 93 INDUSTRIAL ASSIGNMENT, PART II**  
See section on 10-week courses, page 137.
- 134 THERMODYNAMICS OF FLUID FLOW**  
Thermodynamic analysis of internal flow of viscous and compressible fluids. Applications to various flow processes and components in engineering systems. (3 cr; prereq 31A, CE 101 or equiv; I MTWThF and 1 hr ar; ME 221) Goldstein
- 170 MANUFACTURING PROCESSES**  
Analysis and description of the physical and economic principles underlying manufacturing processes. Illustration of the principles as they are applied in basic manufacturing operations. (4 cr; prereq MetE 56; lect V MTWThF and 1 hr ar; ME 106; lab VI-VIII TTh, ME 70) Holthy
- 197 SYSTEM ANALYSIS AND CONTROL**  
Study of basic theory of linear feedback control systems. The transfer function representation of solid body, fluid, pneumatic, and electro-mechanical components. On-off, proportional, floating, and rate response in control systems, including industrial instrumentation. (3 cr; prereq 23; lect III MTWThF and 1 hr ar; ME 221) Ogata

**Industrial Engineering (IE)**

- 100 INTRODUCTION TO INDUSTRIAL ENGINEERING ANALYSIS**  
 Management and decision making, analytical methods in production management, design of production systems, operation and control of production systems. (3 cr; prereq ME 99 or ‡; lect IV MTWThF and 1 hr ar; ME 106) Johnson

**SCHOOL OF ARCHITECTURE (Arch)**

- 81 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.
- 82 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.
- 83 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.
- 91 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.
- 92 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.
- 93 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.
- 111 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.
- 112 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.
- 113 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.
- 121 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.
- 122 ARCHITECTURAL DESIGN**  
 See section on 10-week courses, page 137.

**SCHOOL OF CHEMISTRY****Analytical Chemistry (AnCh)**

- 111 PHYSICOCHEMICAL METHODS OF ANALYSIS**  
 Optical and electrochemical methods and methods of separation. Lecture. (3 cr; prereq 47 and PCh 101; V-VI MWF; C 325) Staff
- 112 PHYSICOCHEMICAL METHODS OF ANALYSIS**  
 Quantitative application of electrochemical, optical, and other physical techniques. Laboratory. (3 cr; prereq 111 or ‡111; I-III MTWThF; C 310) Staff
- 211 PHYSICOCHEMICAL METHODS OF ANALYSIS**  
 Optical and electrochemical methods and methods of separation. Lecture. (4 cr; prereq 111 or ‡; V-VI MWF plus 2 hrs ar; C 325) Staff
- 212 PHYSICOCHEMICAL METHODS OF ANALYSIS**  
 Quantitative application of electrochemical, optical, and other physical techniques. Laboratory. (3 cr; prereq 211 or ‡211; I-III MTWThF; C 310) Staff
- 202 SPECIAL TOPICS**  
 Analytical topics not covered in regular courses are selected after discussion with instructor. (Cr ar; prereq ‡; hrs ar) Staff
- 302 RESEARCH IN QUANTITATIVE ANALYSIS**  
 (Cr and hrs ar) Staff

## General Chemistry (GeCh)

### 5 GENERAL PRINCIPLES OF CHEMISTRY

General laws of chemistry, principles of structure, and chemical behavior of matter. (5 cr; for premedics, predentals, etc.; prereq 4; lect I MTWThF, SciCB 325; rec V MWF, lab VI-VIII MWF, C ar) Staff

### 15 GENERAL PRINCIPLES OF CHEMISTRY

Basic principles and concepts of chemistry with a similar but more rigorous treatment than that of GeCh 5. (4 cr; limited to College of Engineering students; prereq 14; lect I MTWThF, SciCB 375; rec V MWF, lab VI-VIII MWF, C ar) Staff

### 25 GENERAL PRINCIPLES OF CHEMISTRY

Basic principles and concepts of chemistry with a similar but more rigorous treatment than that of GeCh 5. (3 cr; for chemistry and chemical engineering majors; prereq 24; lect I MTWThF, SciCB 375; rec V MWF, lab VI-VIII MWF, C ar) Staff

## Organic Chemistry (OrCh)

### 62 ELEMENTARY ORGANIC CHEMISTRY

Important classes of organic compounds, both aliphatic and aromatic, together with some heterocyclic compounds. Laboratory work includes the preparation of typical substances. (5 cr; for all colleges; prereq 61 or 41; lect I MTWThF, C 325; rec II TTh, C 325; lab II-IV MWF, C 390; lab conf III TTh, C 325) Bach

### 97 SENIOR THESIS

A written final senior thesis report is required. (Cr ar; prereq #, 4th yr) Staff

### 302 RESEARCH IN ORGANIC CHEMISTRY

(Cr ar; prereq 238 and  $\Delta$ ) Staff

### GRADUATE THESIS IN ORGANIC CHEMISTRY

(0 cr; prereq  $\Delta$ ) Staff

## Physical Chemistry (PCh)

### 105A, 106A-B LABORATORY

(1, 2, or 3 cr; prereq 101 or 102 or 101A or 108 for 105A...105A for 106A; VI-VIII MW; C 190) Schrader

### 108 ELEMENTARY PHYSICAL CHEMISTRY

(3 cr; prereq 107; I MTWThF; C 111) Schrader

## SCHOOL OF EARTH SCIENCES

## Geology and Geophysics (Geo)

### 2 HISTORICAL GEOLOGY

Evolution of the earth from its origin to the present with special attention to the succession of physical and biological events of the past 600 million years. (4 cr; limited to 60 students; prereq 1 or 11; lect II MTWThF; P 110) Sloan

Lab 1, III-IV MWF, ForH 85

Lab 2, VI-VII MWF, ForH 85

### 62 INTRODUCTORY MINERALOGY

Introduction to crystallography, crystal chemistry, and mineralogy. Descriptive and determinative mineralogy. Study of minerals in natural rock systems. (5 cr;

prereq I or II or #, 1 term of college chemistry, Math 15; lect III MTWThF, P 110; lab VI-VIII MTWTh, P 100) Bartels

**103 GEOLOGIC PROBLEMS**  
(Cr and hrs ar; prereq #)

**122C HISTORICAL GEOLOGY FOR TEACHERS**

An introduction to the origin of the earth, the physical evolution of its crust through geological time, and the biological changes that occurred during its history. (4 cr, §old Geol 2, §old Geol B, Geo 2, Geo 22; limited to 12 students; only for students holding degrees in education; prereq I or II or 109C or #; lect II MTWThF, seminar V TTh, P 110; lab III-IV MWF, ForH 85) Sloan

**162 MINERALOGY**

Introduction to crystallography, crystal chemistry, and mineralogy. Descriptive and determinative mineralogy. Study of minerals in natural rock systems. (4 cr, §62; not open to geology, geophysics, and geological, mineral, and metallurgical engineering majors; open to majors in the College of AFHE and postgrad students in education; prereq I or II or #, a term of college chemistry, Math 15; lect III MTWThF, P 110; seminar V TTh, P 125; lab VI-VIII MTWTh, P 100) Zoltai, Bartels

## SCHOOL OF MATHEMATICS (Math)

**T (Arts) TRIGONOMETRY**

Analytic trigonometry emphasizing identities, equations, and properties of the functions; right and oblique triangles without logarithmic computation. (3 cr [open for cr if taken before 43, even to students with high school trigonometry]; prereq plane geometry and high school higher algebra, ¶10 allowed; II MTWThF; E 215) Ar

**Z (Arts) PREPARATORY MATHEMATICS**

Designed to supplement the background in algebra for those students whose background is insufficient. Covers most of the material of the high school elementary and higher algebra courses, with emphasis on the latter. (0 cr; I-II MTWThF; Arch 5) Ar

**5B (Arts) FOUNDATIONS OF ARITHMETIC**

Includes topics from the following: Definitions of rational and irrational numbers; definitions of addition, subtraction, multiplication, and division of fractions; methods for operations on rational and real numbers; the real number line and inequalities; topics from geometry and congruences. (3 cr; available for graduation cr only for elementary education students in the College of Education; prereq 5A; III MTWThF; Arch 5) Ar

**10A (Arts) ALGEBRA, ANALYTIC GEOMETRY, AND ELEMENTARY FUNCTIONS**

(First course of a 2-quarter sequence, specifically designed for students in the pre-business administration curriculum and for other students requiring an introduction to algebra, analytic geometry, elementary functions, and calculus of one and several variables; students who plan to take several quarters of mathematics should register for the Math 15, 42-43-44 sequence.) Inequalities and elementary set theory, functions and graphs, quadratic equations in two variables, conic sections, complex numbers, theory of equations, mathematical induction, general systems of linear equations, combinations, permutations and probability, vectors and lines and planes in space. (5 cr, §15, §10, §21A; prereq high school higher algebra and T or high school trigonometry and satisfactory mathematics placement score; III-IV MTWThF; E 325) Ar

**15 (Arts) COLLEGE ALGEBRA**

A standard college algebra course for students planning to take the sequence in analytic geometry and calculus. Functions and graphs, quadratic equations in one and two variables, progressions, complex numbers, inequalities, theory of equations, permutations and combinations, binomial theorem, probability, mathematical induction, determinants. (5 cr, §10, §10A, §21A; prereq high school higher algebra and T or high school trigonometry and satisfactory mathematics placement score; III-IV MTWThF; E 215) Ar

- 22A (IT) ANALYSIS II: ANALYTIC GEOMETRY AND CALCULUS**  
 Functions and derivatives, limits, continuity, slopes, tangents, differentiation of algebraic functions, applications, differentials, the indefinite integral, physical and geometrical applications. (5 cr; primarily for IT students; prereq 21A; I-II MTWThF; E 229) Ar
- 23A (IT) ANALYSIS III: ANALYTIC GEOMETRY AND CALCULUS**  
 The definite integral, the fundamental theorem, differentiation of transcendental functions, methods of integration, parametric equations and polar coordinates, application of integration to physical and geometrical problems in two and three dimensions. (5 cr; prereq 22A; III-IV MTWThF; E 302) Ar
- 31 (IT) CALCULUS IV: CALCULUS AND ANALYTIC GEOMETRY**  
 Study of solid analytic geometry and vectors in space involving dot and cross products, planes, quadric surfaces, derivatives of vector functions. Definition of double and triple integrals. Iterated integrals in rectangular, polar, cylindrical, and spherical coordinates. Applications to moments and centroids. Partial differentiation including the chain rule, implicit functions, directional derivative, maxima and minima. (5 cr; prereq 23A; I-II MTWThF; E 203) Ar
- 32 (IT) CALCULUS V: CALCULUS, LINEAR ALGEBRA, DIFFERENTIAL EQUATIONS**  
 Standard topics of infinite series including tests for convergence and divergence. Power series, and Taylor expansions. Introduction to linear algebra. Matrices, determinants, and theorems on systems of algebraic equations. Differential equations involving the standard first order types plus higher order linear equations with constant coefficients. (5 cr; prereq 31; III-IV MTWThF; E 203) Loye
- 33 (IT) CALCULUS VI: VECTOR CALCULUS AND DIFFERENTIAL EQUATIONS**  
 Functions defined by integrals, differentiation under the integral sign, improper integrals, the Gamma function. Vector field theory, divergence and curl, surface integrals. Green's and Stokes's theorems. Linear systems of differential equations with constant coefficients, matrix methods. Series solution of differential equations. (5 cr; prereq 32; I-II MTWThF; E 225) Ar
- 40A (Arts) INTRODUCTION TO CALCULUS OF ONE AND SEVERAL VARIABLES**  
 (Second course of a 2-quarter sequence, specifically designed for students in the pre-business administration curriculum and for other students requiring an introduction to algebra, analytic geometry, elementary functions, and calculus of one and several variables. Students who plan to take several quarters of mathematics should register for the Math 15, 42-43-44 sequence) Limits and derivative, differentiation of the elementary functions of one and several variables with applications to rates of change, maxima and minima, approximations by differentials, integration with standard forms and applications to area and volume, simple differential equations. (5 cr, §40, §42, §22A; prereq 10A, 10, or 15, and T or high school trigonometry; I-II MTWThF; E 226) Ar
- 42 (Arts) ANALYTIC GEOMETRY AND CALCULUS I**  
 (Course description covers sequence 42-43-44) A full-year course in the elements of analytic geometry and calculus. Plane analytic geometry including straight line, conic sections, parametric representations, polar coordinates, translation and rotation of axes. Introduction to solid analytic geometry, functions and limits, differentiation of algebraic, trigonometric, exponential, and logarithmic functions with applications to velocity and acceleration, rates, maxima and minima, curve tracing, indeterminate forms, approximations by differentials. Introduction to partial differentiation. Integration by standard forms with applications to area, volume, work, moments. Improper integrals. Infinite series. Taylor's theorem. Multiple integrals in two and three dimensions. Math 43-44 are available for Upper Division credit to all except mathematics and physics majors. (5 cr, §40, §40A, §22A; prereq 10, 10A or 15 and either T or high school trigonometry; may enter 43 from 40 or 40A if grade in 40 or 40A is A or B; III-IV MTWThF; E 226) Ar
- 43 (Arts) ANALYTIC GEOMETRY AND CALCULUS II**  
 (See Math 42 for course description) (5 cr; prereq 42 or 40 or 40A with grade of B; III-IV MTWThF; E 225) Ar
- 44 (Arts) ANALYTIC GEOMETRY AND CALCULUS III**  
 (See Math 42 for course description) (5 cr; prereq 43; III-IV MTWThF; E 229) Ar



- 55 (Arts) INTERMEDIATE CALCULUS**  
Advanced topics in partial differentiation, total differentials, directional derivatives, maxima and minima of functions of several variables, applications of multiple integrals, Taylor's theorem for functions of several variables, elements of differential equations. (3 cr; prereq 44; IV MTWThF; E 315) Ar
- 106 (Arts) DIFFERENTIAL EQUATIONS**  
Problem course; methods for solving ordinary differential equations of various types with necessary theory for developing these methods. (3 cr, §32; prereq 55; IV MTWThF; E 320) Ar
- 109 (Arts) THEORY OF NUMBERS**  
Elementary properties of integers; prime and composite numbers; Euclid's algorithm; congruences; the theorems of Fermat and Wilson; primitive roots; indices; Diophantine equations. (3 cr; prereq 31 or 44; III MTWThF; Arch 45) Ar
- 125B (Arts) CRITICAL REASONING IN MATHEMATICAL ANALYSIS**  
Notions of limit, sequence, series, function, derivatives, and integral. Gives more mature understanding of these concepts. Techniques of developing accurate proofs; intuition and logic in connection with these techniques. (3 cr; prereq 125A; II MTWThF; Ph 145) Ar
- 131B (Arts) LINEAR ALGEBRA AND GROUP THEORY**  
Finite dimensional vector spaces; linear transformations and matrices over the real or complex fields; linear equations; determinants; characteristic values; canonical forms; bilinear and quadratic forms; applications. (3 cr, §142-143, §149, §180; prereq 31 or 44; V MTWThF; E 226) Harper
- 132C (IT) AN INTRODUCTION TO PROBABILITY**  
See section on 10-week courses, page 137.
- 140 PROJECTIVE GEOMETRY**  
Geometric properties invariant under projective transformations; theorems of Desargues, Pascal, and Brianchon, and applications. Methods used in some quarters are mainly synthetic; in other quarters they are mainly analytic. (3 cr; prereq 32 or 44; II MTWThF; E 320) Ar
- 149 (IT) DETERMINANTS AND MATRICES**  
Determinants, matrices, linear equations, vector spaces, quadratic and bilinear forms, characteristic roots, applications to systems of ordinary differential equations. (3 cr, §63, §131A; prereq 32 or 55; I MTWThF; E 315) Polansky
- 153 (IT) ADVANCED CALCULUS II**  
Infinite series, computation with series, series with variable terms, uniform convergence, power series. Improper integrals. Fourier series and orthogonal functions. Fourier integrals. Special functions. (3 cr, §108; prereq 151; III MTWThF; E 315) Polansky
- 168B APPLICATIONS OF COMPLEX VARIABLES**  
Conformal mapping, Schwarz-Christoffel transformations, Laplace transforms, and applications. (3 cr; prereq 168A or §; IV MTWThF; Arch 45) Ar
- 185-186 (IT) NUMERICAL ANALYSIS IN ENGINEERING**  
Given together as a continuous sequence, meeting 2 hours per day. Approximation of functions and least squares. Approximate solution of ordinary and partial differential equations, Moulton's, Runge's relaxation and iteration methods. Calculation of eigenvalues of matrices and differential problems, Rayleigh-Ritz method. Integral equations. Programming of computers. (6 cr; prereq 184 or §; III-IV MTWThF; Ex 193) Ar

## SCHOOL OF PHYSICS AND ASTRONOMY

### Physics (Phys)

#### 2 INTRODUCTORY PHYSICS

Introduction lectures on the principles of physics and physical phenomena underlying these principles. Electricity and magnetism. (3 cr; prereq 1 or §; lect I MTWThF; Ph 133) Ar

- 2A INTRODUCTORY PHYSICS LABORATORY**  
Laboratory course in conjunction with Phys 2. (1 cr; combination of 2 and 2A may be applied toward group requirements in CLA; prereq 2 or ¶(2) Ar
- 23 GENERAL PHYSICS, PART II**  
See section on 10-week courses, page 137.
- 23A PHYSICS LABORATORY, PART II**  
See section on 10-week courses, page 137.
- 50 INTERMEDIATE GENERAL PHYSICS, PART II**  
See section on 10-week courses, page 137.
- 50A PHYSICS LABORATORY, PART II**  
See section on 10-week courses, page 137.
- 123C STATISTICAL THERMODYNAMICS**  
See section on 10-week courses, page 137.
- 148C ADVANCED PHYSICS LABORATORY**  
See section on 10-week courses, page 137.

# College of Veterinary Medicine††

All classes scheduled by arrangement.

## Veterinary Anatomy (VAna)

### 191° TOPICS IN ORGANOLOGY

Lecture and laboratory presentations regarding selected organ systems of domestic and laboratory animals. (1-5 cr; regis for more than 1 term permitted; prereq 151 or equiv, §) Weber, Fletcher

## Veterinary Microbiology and Public Health (VBac)

### 128° PROBLEMS IN VETERINARY BACTERIOLOGY AND PUBLIC HEALTH

(Cr ar; prereq 103 or equiv, §) Pomeroy, Anderson, Lindorfer, Loken, Diesch, Marquart, Maheswaran

### 201° ADVANCED POULTRY DISEASES

Investigations of specific infectious disease problems of poultry. (Cr ar; prereq 131, §) Pomeroy, Higbee, Nelson, Bergeland

### 205° ADVANCED VETERINARY BACTERIOLOGY

Special topics, techniques, collateral reading, and conferences. (Cr ar; prereq §) Pomeroy, Anderson, Loken, Lindorfer, Diesch

## Veterinary Medicine (VM)

### 122A-B CLINICS

Medical, obstetrical, radiological, surgical, and laboratory examination of diseases of animals. (3 cr; for 4th yr VMed; prereq 121) Low and others

### 202° ADVANCED DIAGNOSIS AND THERAPEUTICS OF ANIMAL DISEASES

Detailed examination, discussion, treatment, and prevention of animal disease problems. (Cr ar; prereq 104, 132, §) Sorensen, Low, Mather, L Johnson, Finco

## Veterinary Obstetrics (VObs)

### 204° SPECIAL PROBLEMS IN ANIMAL REPRODUCTION

(Cr ar; prereq §) Zemjanis

## Veterinary Pathology and Parasitology (VPaP)

### 157 VETERINARY NECROPSIES

Necropsy techniques, examination of tissue sections, and preparation of records. (1-5 cr; prereq 153 or equiv, Δ) Staff

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†† Tuition fees per term in College of Veterinary Medicine are \$76.50 for resident and \$190 for nonresident students and incidental fee per term is \$15.25. Students taking less than a full program will pay at the summer rate or academic year rate, whichever is higher.

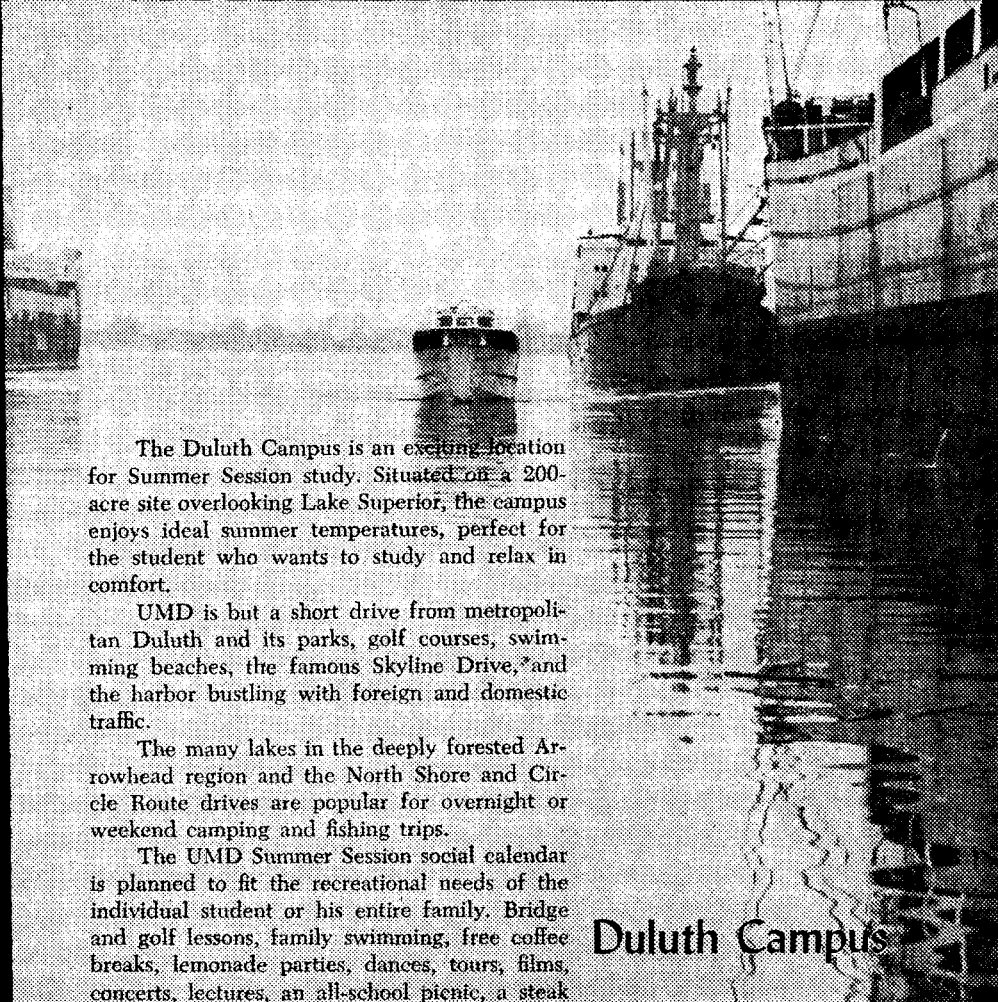
- 158° **SURGICAL PATHOLOGY**  
Preparation and interpretation of surgical and necropsy specimens. (3 cr; prereq 157, §, Δ) Bergeland and staff
- 160° **DIAGNOSTIC PATHOLOGY**  
Interpretation of history, necropsy findings, laboratory findings, and histopathology in the diagnosis of animal diseases. (5 cr; prereq 157, §, Δ) Bergeland and staff
- 241° **PROBLEMS IN VETERINARY PARASITOLOGY**  
(Cr ar; prereq 102 or equiv, §) Griffiths

## Veterinary Physiology and Pharmacology (VPP)

- 171° **PROBLEMS IN VETERINARY PHARMACOLOGY**  
(Cr ar; prereq 152 or equiv, §) Hammond, Stowe
- 231° **RESEARCH IN ANIMAL PHYSIOLOGY**  
(Same as AnSc 231) Individual research under faculty direction. Topics to be determined by consultation and may be a specialized aspect of a thesis problem or an independent problem of mutual interest to graduate student and adviser. (Cr ar; prereq §; hrs ar) Staff

## Veterinary Surgery and Radiology (VSR)

- 210° **ADVANCED VETERINARY RADIOLOGY**  
Lecture and laboratory. Radiological diagnostic procedures and interpretation as applied to veterinary medicine. (2 cr; prereq 121 or equiv, §) Hanlon
- 220° **ANESTHESIA**  
Selection of proper anesthetic agent; administration of local, regional, and general anesthesia in large or small animals. (Cr ar; prereq 103 or equiv, §) Arnold, Usenik, Gourley
- 225° **ADVANCED SMALL ANIMAL SURGERY**  
Surgery of the various systems in small animals with preoperative and postoperative evaluation and treatment. (Cr ar; prereq 103 or equiv, §) Gourley
- 230° **ADVANCED LARGE ANIMAL SURGERY**  
Surgery of the various systems in large animals with preoperative and postoperative evaluation and treatment. (Cr ar; prereq 103 or equiv, §) Arnold, Usenik, Myers



The Duluth Campus is an exciting location for Summer Session study. Situated on a 200-acre site overlooking Lake Superior, the campus enjoys ideal summer temperatures, perfect for the student who wants to study and relax in comfort.

UMD is but a short drive from metropolitan Duluth and its parks, golf courses, swimming beaches, the famous Skyline Drive,\*and the harbor bustling with foreign and domestic traffic.

The many lakes in the deeply forested Arrowhead region and the North Shore and Circle Route drives are popular for overnight or weekend camping and fishing trips.

The UMD Summer Session social calendar is planned to fit the recreational needs of the individual student or his entire family. Bridge and golf lessons, family swimming, free coffee breaks, lemonade parties, dances, tours, films, concerts, lectures, an all-school picnic, a steak cook-out, and a wilderness canoe trip are a few of the regularly scheduled activities.

Since 1947 when UMD was established, more than \$25 million has been expended on the complex of 14 buildings which serve departments within four academic divisions. Outstanding structures include Kirby Student Center, Tweed Art Gallery, and the Marshall W. Alworth Planetarium.

More than 200 courses are scheduled for both Summer Session terms at the undergraduate and graduate levels. Students may earn credits in 34 major fields toward the A.A., B.A., or B.S. degrees and in 12 areas of concentration for the M.A. or M.S. degrees.

*A separate Summer Session bulletin, including all courses offered on the Duluth Campus, is available. For a copy of this bulletin, and for more detailed information, write: UMD Summer Session, Communications Center, University of Minnesota, Duluth, Duluth, Minnesota 55812.*

Duluth Campus

## Graduate Program

The Graduate School offers, on the Duluth Campus, a master of arts degree with majors in art, in education, in educational administration, in curriculum and instruction, in educational psychology (counseling), in English, and in American history. These studies are designed to serve elementary school teachers and principals, secondary school teachers and principals, counselors, and persons interested in the field of rural education. Students may complete all course work at Duluth. The Graduate School also provides all the course work necessary for the completion of a master of science degree in analytical, inorganic, organic, or physical chemistry and physics. These courses are for college teachers and those planning additional graduate study or careers in industry. The program is under the jurisdiction of the dean of the Graduate School and is similar to parallel programs on the Twin Cities Campus. A complete description of graduate requirements and courses is given in the latest Duluth *General Bulletin*, available at the News Service office, Communications Center, and in the *Bulletin of the Graduate School*.

Students who have not already applied for admission to the Graduate School and who contemplate a program of graduate studies at Duluth may request information and application forms from the Office of the Academic Dean, University of Minnesota, Duluth, Duluth, Minnesota 55812. This office also may be consulted for information concerning selection of courses and other degree requirements.

Application must be submitted *complete in every detail*—two official transcripts of all college work and, if required, test results, references, or other information—at least 4 weeks prior to the opening of the quarter or summer term in which the student expects to register. Students who wish to become candidates for the Master's degree or who wish to receive graduate credit for their course work *must* make application for admission to the Graduate School. (See section on Graduate School)

## Master's Degree in Art

A graduate major, emphasizing studio work, is offered leading to the master of arts degree in art. The program is designated primarily for public school art teachers, but others may be admitted when the program seems particularly adaptable to the educational purposes of the student. Both art history and art education are available as related fields.

Courses are so scheduled that a degree program may be completed during a series of summer sessions and/or the regular session. Inquiries concerning the specific program should be directed to: Department of Art, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Master's Degree in English**

A graduate major is offered, leading to a Master's degree in English. This program, designed primarily for secondary school English teachers, will emphasize a comprehensive coverage of the entire field of English literature. A program of courses is planned for the Summer Session so that a candidate may complete the requirements in 3 or 4 summers. Inquiries concerning the details of the program should be directed to English Department, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Master's Degree in Chemistry**

The major in chemistry is a Plan A program; that is, research leading to a thesis is required. A student can major in analytical, inorganic, organic, or physical chemistry.

The program is suited for students who wish to go on for further study elsewhere, as well as for those who plan to make a career of teaching chemistry in liberal arts colleges, junior colleges, and state colleges, and for those who desire advanced training for a career in industry. Summer work at the Duluth Campus during both terms will involve the research phase of the M.S. degree.

## **Master's Degree in History**

A graduate major is offered leading to the master of arts degree in American history. This program is designed to serve those interested in pursuing either the Plan A or Plan B programs of the Graduate School of the University of Minnesota.

## **Master's Degree in Educational Administration**

A master of arts degree with a major in educational administration is available to students desiring to qualify for certification as elementary or secondary school principals. A rather wide variety of courses is offered during the summer. Inquiries should be addressed to either the Department of Elementary Education, or the Department of Secondary Education, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Counselor Education**

A complete Master's degree program in school guidance and counseling is available on the Duluth Campus. Major courses in educational psychology, and various required related courses, are offered in both summer terms.

Certain courses in this program may have limited enrollments or require special arrangements. Therefore, persons interested should make every effort to consult with the adviser prior to and during registration. In addition, course descriptions and prerequisites should be studied carefully. Correspondence

should be addressed to Director of Counselor Training, Department of Psychology, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Economic Education**

A special program in economic education for employed teachers and adults is scheduled for the First and Second Terms of the 1968 Summer Session. During the First Term, Econ 150A and B, Current Economic Issues (6 graduate or undergraduate credits), will be offered beginning on Tuesday, June 18, at 5:30 p.m., with additional hours arranged. During the Second Term, Econ 150C and D, Current Economic Issues (6 graduate or undergraduate credits), will be offered beginning on Tuesday, July 23, at 5:30 p.m., with additional hours arranged.

The courses for the First and Second Terms will be separate and unrelated, and students may take either summer term independently. This program is intended to make students aware of the major economic problems, their causes, and alternative solutions. Information may be obtained from: Division of Social Sciences, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Remedial Reading**

Experienced teachers who desire to meet requirements for certification as elementary remedial reading teachers, secondary reading teachers (developmental or remedial), or reading consultants, supervisors, or coordinators will find appropriate courses available during the summer. All persons holding such positions in Minnesota must meet specific requirements.

Certain courses in this program may have limited enrollment or may require the making of special arrangements. Persons, therefore, who are interested in enrolling in this program, or who wish to have an evaluation of transcripts for the purpose of outlining a pattern of requirements, should write: Reading Clinic, Division of Education and Psychology, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Programmed Instruction**

Classroom teachers and other school personnel who are interested in developing or using programmed teaching materials should note the offering of EdCI 112, Programmed Instruction in the Classroom, during the First Term. Principles and techniques will be discussed and there will be opportunities for construction of programmed materials for classroom use.

## **Special Education**

**Teaching Mentally Retarded Children**—Teachers wishing endorsement for a special certificate to teach the mentally retarded will find the following



courses pertinent: CPsy 179, Clinical Procedures with Children; EdCI 145, Reading Difficulties; EdCI 179, Education of Mentally Retarded Children in the Elementary School; EPsy 110, Educational Measurement in the Classroom; EPsy 116, 116A, Statistical Methods in Education; EPsy 159, Personality Development and Mental Hygiene; EPsy 182, Education of Exceptional Children; EPsy 193, Psychology of Human Learning; Spch 119, Speech Improvement and Management of the Speech Handicapped in the Classroom. Questions about the minor and about state certification should be directed to Special Education Laboratory, 14 Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455.

**Speech Correction**—Opportunity is provided for observation at the annual clinic for children with speech and hearing disorders, held June 17 to July 26. Supervised clinical experience with University credit may also be attained, based upon teaching experience and course background. Those interested in such an experience may obtain details from the clinic director.

## Special Courses in Beginning and Intermediate French and Spanish

**Beginning French and Spanish**—Ten-week courses will be offered to provide the student with basic proficiency in French or Spanish with special emphasis on the spoken language. The classes will meet five times a week, 3 hours per day; 2 hours will be spent in the classroom, 1 hour in the language laboratory. Upon completion of the course, the student will have earned 15 credits. This is equivalent to the regular first-year sequence (Fr 1-2-3 or Span 1-2-3). Credit for the First Term will not be granted without completion of the Second Term. A student should not take any other courses.

**Intermediate French and Spanish**—Ten-week courses will be offered to provide advanced training with a grammar review, further development of the spoken language, and special emphasis on the development of reading skills. The class will meet five times a week, 1½ hours a day with the time being equally divided between the language laboratory and the classroom. Upon completion of the course, the student will have earned 6 credits. This is equivalent to the regular second-year sequence (Fr 4-5-6 or Span 4-5-6). A student should plan to attend both summer terms.

## Courses for Recent High School Graduates

Many courses are open to students who have graduated from high school but who have not taken any university work. These courses enable a person to strengthen areas in which he is weak, or to pursue his special interests. They also allow a student to accelerate his program—and this possibility may be especially attractive to a person intending to enter one of the professions or graduate study.

## **Courses for New Engineering Students**

Engineering courses with mathematics prerequisites are planned, assuming the student begins his studies at the level of Math 15 (or higher). Students unsure of their high school mathematics preparation would profit by taking Math 14 First or Second Term. Math 15 will be offered Second Term for those wishing to start their engineering studies in the fall quarter with advanced standing in mathematics.

## **Workshop in Advanced Painting**

The 20th annual summer painting workshop will be conducted by Mr. Ben Cunningham, well-known New York artist. Mr. Cunningham has taught painting in the New York School of Fine and Industrial Arts and at New York's Pratt Institute. Currently, he is teaching at the Cooper Union School of Art and Architecture in New York City.

He has exhibited in numerous major exhibitions and is represented in the collections of the Museum of Modern Art and the Guggenheim Museum of New York City, San Francisco Museum of Art, and in the collection of the Container Corporation of America. Many examples of his paintings have been reproduced in magazines, textbooks, and catalogs.

Mr. Cunningham will be teaching in Duluth for the second successive summer and is the latest on a distinguished list of artists, including Charles Burchfield, Max Weber, Philip Evergood, Yasuo Kuniishi, and Morris Kanter, who have taught on this campus over the past 20 years.

This painting workshop will again be offered during the Second Term. Enrollment will be limited and interested students should write to Department of Art, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Workshop in Ceramics**

Angelo Garzio, nationally known ceramist, and professor of ceramics at Kansas State University, will conduct a First-Term workshop. The classes may be taken for graduate or undergraduate credit. Enrollment will be limited, and interested students should write to Department of Art, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Summer Workshops—University of Minnesota, Duluth**

For complete information about the following workshops and institutes write: C. M. Milbrath, Regional Director, Conferences, Institutes, and Special Projects, 106 Lab School, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Aerospace Workshop**

An aerospace workshop (Ed 89) will be conducted for elementary and secondary school teachers from June 17 to 28. The 3 credit course includes: instruction in basic knowledges and skills; attitudes about aviation and aerospace activities; and the total impact of air and space vehicles upon young people in a changing world. There will be flight indoctrination in both light and heavy aircraft, as well as a field trip to a missile site and a visit to a major Air Force installation at no cost to participants.

The course will satisfy professional growth credits, as well as certification for teaching aerospace subjects in evening school classes. Since the class size is limited, early registrants will be given preference.

## **Home Economics Tailoring Workshop**

Mrs. Marjorie Arch, nationally known teacher of the Edna Bryte Bishop Clothing Construction Method, will conduct a home economics institute, "The Latest Selection and Construction Techniques for Tailoring." It will be held Monday and Tuesday, July 22-23, on the Duluth Campus in the Home Economics Building. This noncredit program is available to teachers and other interested persons. A minimal registration fee will be charged.

## **Institutes on the Education of the Gifted**

Four 2-week courses will be conducted jointly by the ESEA Title III Project, "Special Education for the Gifted Through Television," and the Educational Research and Development Council of Northeast Minnesota. Mrs. Mary M. Pilch, project director and director of the institutes, is a nationally known specialist in the development and administration of educational programs for the gifted. A faculty of ten will assist her. Demonstration classes of gifted students, aged 8-15, will be included.

Starting dates for each of the four institutes are: July 1, July 15, July 29, and August 12. Registrants are required to preregister in teams of two from a school district and will live on campus. Daily schedule of sessions will be from 8 a.m. to 4:30 p.m. Participants will receive a weekly stipend of \$75 from which they will pay a registration fee of \$50, and room and board at the dormitory (approximately \$50). Each institute will be limited to 100 participants representing 50 school districts. Early registration is imperative. Three graduate credits (EPsy 183) are offered.

## **Sex and Family Life Workshop**

During the week of June 17-28, a workshop dealing with sexual attitudes, problems, and education of adolescents and young adults will be held on the Duluth Campus. The workshop is for those persons who work with young peo-

ple and therefore must be both comfortable and knowledgeable with the subject of sexual behaviors and patterns. Emphasis will be placed on understanding and appreciation of man as a sexual creature, and the younger generation's view of the place of sex in dating, engagement, and marriage. This workshop carries 3 graduate or undergraduate credits.

## Workshops in Music Education

**Instrumental Music Clinic**—(Noncredit—June 10-14—James Murphy) The clinic will focus upon band scoring and orchestrations. Considerable time will be devoted to football band scoring for pops and possible compositions. (Six way scoring for out-of-doors). Stage band directing will receive special attention.

**Choral Directors Workshop**—(Ed 140—3 graduate credits—June 10-21) Roger Tenney, 1967 USA teacher of the year, and supervisor of vocal music at the Owatonna Public Schools, will be coordinator for this workshop. It will focus upon singing through a wide range of choral repertoire using new choral music. Emphasis will be placed upon "the high school voice," demonstrations of private teaching techniques or vocal techniques used in a choral situation appropriate to the young student. Additional emphasis will be placed on small ensemble materials, the voice lesson, tone production, and other vocal techniques. Demonstrations will show how to incorporate style, form, and theory during an actual rehearsal.

**Elementary Education Workshop: Teaching by Inquiry**—(3 graduate credits—July 8-19—Conducted by Mrs. Mona Dayton, USA teacher of the year in 1965, and William Gemeinhardt, assistant professor of Elementary Education at UMD). The workshop will emphasize individualizing instruction, using techniques applicable to all grade levels. It will attempt to answer the questions: How can we personalize teaching?—How can we incorporate time to wonder?—Can the teacher help students to establish thinking patterns of inquiry? Many innovative approaches will be explored such as team teaching, how to use TV effectively, and nongraded approaches. Through the open approach the workshop will endeavor to enhance the skill of the teacher to take advantage of opportunities for instant creativity.



Morris Campus

# Morris Campus

## FIRST TERM

### Division of Humanities

**Art 45 WATERCOLOR PAINTING**

A course in studio art which introduces the beginning student to the medium and materials of watercolor and provides the student already familiar with the medium further practice and development. Problems of visual form and perception will be dealt with in relation to the subjects of still-life and landscape and to the materials and techniques of watercolor. (3 cr; II MTWThF; Hum 5) Peterson

**Engl 40A READINGS IN TWENTIETH-CENTURY LITERATURE**

A study of contemporary British and American prose fiction selected, arranged, and discussed to enhance the student's pleasure in and understanding of imaginative literature generally. (3 cr; I MTWThF; Hum 11) Nachbar

**Engl 87 THE SMALL TOWN IN AMERICAN FICTION**

A study of the imaginative conception of the small town presented by such American authors as James Fenimore Cooper, Mark Twain, Harold Frederic, E. A. Robinson, Sherwood Anderson, Sinclair Lewis, and William Faulkner. (3 cr; II MTWThF; SocSci 136) Gremmels

**Fren A BEGINNING FRENCH**

Designed to give the student control over basic grammar, reading, and writing and to teach him to handle a simple conversation in French. (7½ cr; 9:00-12:00 MTWThF; Hum 211) F Farrell

**Spch 75 CHILDREN'S THEATRE**

A study of the background and development of children's theatre in the United States and problems involved in the selection and production of plays for children's audiences. (3 cr; I MTWThF; MusH 109) Fosgate

**Spch 81 ORAL INTERPRETATION I**

Theory and practice in the oral interpretation of literature. Includes the oral tradition of literature, theories of interpretation, selection and evaluation of materials for presentation, analysis, preparation, exercises, and directed practice. Emphasis is on the interpretation of prose and poetry for all ages. (3 cr; II MTWThF; Hum 105) Lammers

### Division of Social Sciences

**Hist 55 AMERICA IN TRANSITION: 1877-1917**

Organization of labor, industry, and agriculture; disappearance of the frontier; Populist movement; imperialism in the late 19th century; Progressive movement; foreign policies of Roosevelt, Taft, and Wilson to 1917. (3 cr; IV MTWThF; SSci 136) Ahern

**Hist 65 RENAISSANCE AND REFORMATION II**

History of European cultural, religious, political, and economic developments from 1517 to 1648. (3 cr; prereq 1 or §; III MTWThF; SSci 130) Underwood

**Pol 52 AMERICAN CONSTITUTIONAL SYSTEM**

Judicial interpretation of the constitution, separation of governmental powers, relation of state and national governments, control of interstate commerce, jurisdiction of courts. (3 cr; prereq 5 or §; III MTWThF; Hum 11) Landever

**Soc 54 PREJUDICE AND DISCRIMINATION IN INTERGROUP RELATIONS**

Analysis of the phenomena and theories relevant to prejudice and discrimination. Critical appraisal of current and theoretical approaches to resolving this problem. (3 cr; I MTWThF; Hum 105) Najmi

**Soc 60 SOCIAL PSYCHOLOGY**

Research and theory regarding the relation of the individual to social groups. Emphasis on socialization processes; effects of social interaction and isolation; effects of extreme social situations, conflict, and rapid cultural change upon the individual. Specific methods for acquiring knowledge in social psychology will be discussed. (3 cr; prereq 1 or 2; IV MTWThF; SSci 130) Nord

## Division of Science and Math

**Math 1 CONTEMPORARY CONCEPTS IN MATHEMATICS**

Designed to give the student an overview of many areas of mathematics without requiring previous mathematics background. Some of the topics that will be developed are mathematical history, mathematical philosophy, the real number system, and set notation. There will also be an introduction to such areas as statistics, calculus, and non-Euclidean geometries. (5 cr [no elective cr for mathematics majors or minors]; 1 hr video tape and 1 hr discussion; I-II MTWThF; Hum 111) Brenden

**Geol 1 EARTH FEATURES AND THEIR MEANINGS**

Introductory course. General education elective. Explanation of the natural landscape as produced by such agents as the atmosphere, water, glacier, volcanoes, and mountain-building forces acting on the materials of the earth. (3 cr; I MTWThF; Sci 105) Brauer

**Geol A GENERAL GEOLOGY LABORATORY**

Field and laboratory studies of rock minerals and landforms, including interpretation of topographic and geologic maps. (2 cr; II-III MTTh; Sci 312) Brauer

## Division of Education

**Ed 80 HISTORY AND PHILOSOPHY OF EDUCATION**

A survey of fundamental philosophical views and a study of the relationship of these views to one's own educational beliefs and teaching method. (3 cr; III MTWThF; Sci 105) Hinmon

**Ed 81 ELEMENTARY SCIENCE CURRICULA**

A study of the objectives, content, and method of recently developed science curricula. (3 cr; IV MTWThF; Hum 111) Hinmon

## SECOND TERM

### Division of Humanities

**Fren B BEGINNING FRENCH**

Continuation of Fren A, First Term. (7½ cr; 9:00-12:00 MTWThF; Hum 211) Schwank

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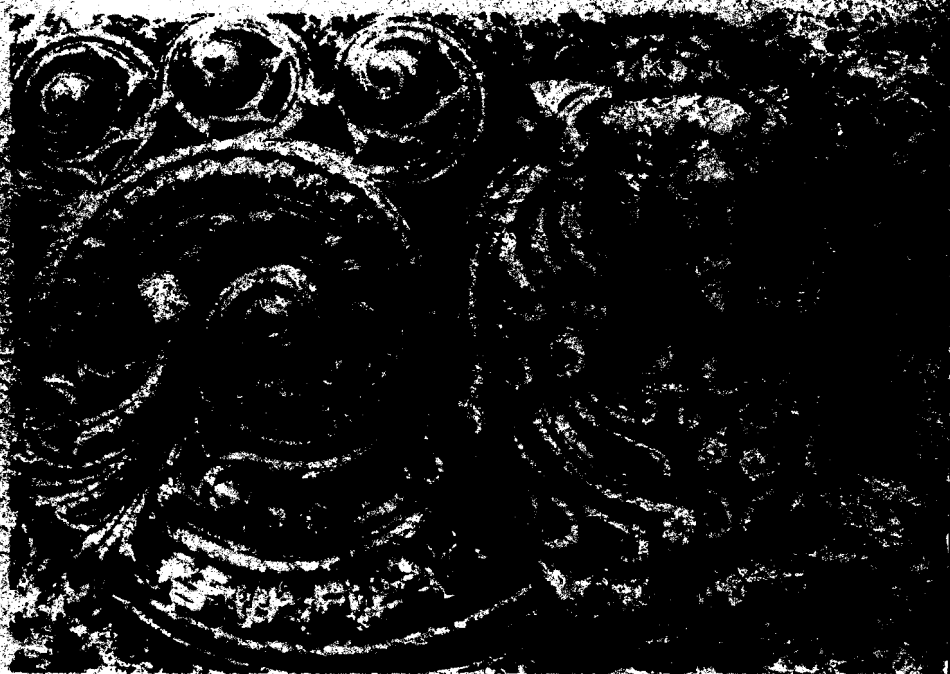
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# UNIVERSITY OF MINNESOTA

Founded in the faith that men are enriched by understanding.

Dedicated to the advancement of learning and the culture of the state.

Devoted to the instruction of youth and the welfare of the state.





LAKE ITASCA BIOLOGY SESSION

Summer Session • 1968

First Term • June 12 - July 18

Second Term • July 21 - August 26





**GENERAL  
INFORMATION**

Sponsored by the Summer Session at the Lake Itasca Forestry and Biological Station, the Biology Session is a joint enterprise of various departments of the College of Biological Sciences and of the College of Agriculture, Forestry, and Home Economics. By agreement, the University of Wisconsin is participating in the policy and planning of the Biology Session through membership on the advisory committee.

**Location**

The Lake Itasca Forestry and Biological Station is on the east shore of Lake Itasca in Itasca State Park—just a mile from the headwaters of the Mississippi River in northwestern Minnesota.

**Transportation**

Public transportation to the station is by bus to Douglas Lodge—about 4 miles from the station—where students will be met by station transportation. State Highway 92 and U.S. Highway 71 provide easy access by car through the towns of Bagley, Bemidji, or Park Rapids.

**Mail**

Mail for students should be addressed to: Itasca Biology Session, Lake Itasca P.O., Minnesota 56460.

**Inquiries**

Requests for bulletins for the Biology Session should be addressed to:

Dean of the Summer Session  
6860 Johnston Hall  
University of Minnesota  
Minneapolis, Minnesota 55455

Specific inquiries as to courses, accommodations, equipment, etc., should be sent to the:

Director of Field Biology  
112 Snyder Hall  
University of Minnesota  
St. Paul, Minnesota 55101





**FIELD STUDY  
OPPORTUNITIES**

Itasca Park—one of national renown—embraces 50 square miles of forests with an excellent system of roads and trails. Within this area are many lakes of different types providing unusual field opportunities for work in limnology, phycology, aquatic insects and fungi as well as related fields. The forests of the park are unique. Here the northern coniferous and deciduous types of the central hardwood region meet. In addition the many bog areas provide a wide variety of plant communities for study. Itasca's forests have been protected for over a half century and many never cut—here truly is an unexcelled array of virgin timber stands and the communities developing into similar types.

Forty miles to the west a spectacular break from the forests to the prairies occurs where true prairie associations can be found on the bed of ancient Lake Agassiz. To the north lie the Red Lakes and immense expanses of northern bog types.

This meeting of the three great plant regions of the eastern United States provides not only varied ecosystems, but also a singular range of fauna and flora with southern, northern, and western origins. Opportunities to study birds closely during June and July are particularly outstanding. An abundance of interesting animals such as nesting bald eagles, breeding loons, beaver, raccoons, and deer affords many striking behavior and ecological problems for study.

**INDEPENDENT  
INVESTIGATORS**

Qualified investigators may arrange with the director for research in various fields of terrestrial and freshwater biology at any season of the year.

## **COURSE WORK AND RESEARCH**

Both graduate and undergraduate students of biology will find an excellent field laboratory for research and course work. Graduate students may devote themselves exclusively to research problem work under staff supervision and guidance. Students in forestry, plant pathology, soils, fisheries, and wildlife management will find course work closely related to their field as well as a broad spectrum of essential background courses in botany, entomology, or zoology.

Certain courses (Bot 116 and 112; Bot 155 and Ecol 152; Ent 59 and 129; Zool 135 and Ecol 162; Zool 72 and Ecol 119) are scheduled in terms I and II so that the student may experience an entire summer of intensive work in his particular field of interest.

To teachers of biology in high schools and colleges, the session offers opportunity for course work, advanced study, and improvement through independent research. The necessary training for conducting classes in the field is also provided.

Advanced students and research workers needing laboratory space and special equipment and those wanting to carry on research during the entire year should make prior arrangements with the director and the instructor involved.

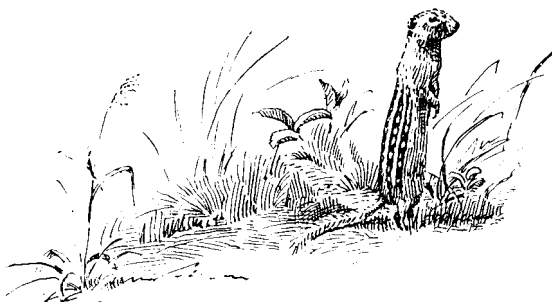
## **INSTRUCTIONAL FACILITIES**

Ten well-equipped laboratories are located in five buildings. Much of the instruction is in the field where many varied habitats are within walking distance of the campus.

A fine herbarium of the region, collections of insects, bird skins, and small mammal skins are available for study. Four complete sets of aerial photos of the park area made in 1938, 1951, 1959, and 1966 are maintained at the station with adequate stereoscopic equipment.

The station equipment includes most of the necessary compound and dissecting microscopes, binoculars, collecting equipment, various types of nets, rowboats, and launches, and the minor accessories for instruction and research.

The library has ample room for study and excellent series of journals as well as books basic to field work. Other books and journals are available from the University libraries.



## REGISTRATION INFORMATION

### Admission

Courses are open to all qualified graduate and undergraduate students who have had the usual preliminary courses in biological subjects. General rules for admission of undergraduates to the Summer Session apply to the Biology Session. Students with previous college work, who wish to attend the Summer Session only, may do so without filing credentials, provided they are in good standing and are not candidates for a degree. Students are advised to consult these regulations in the general *Bulletin of the Summer Session*.

Graduate  
School

Students planning to use credits earned in Summer Session toward a graduate degree or who expect to receive graduate credit for such work should apply for admission directly to the Graduate School. Graduate students in good standing in a degree program at another recognized graduate school may apply for admission as transient students on Transient Graduate Form 218. All applications must be submitted complete in every detail at least 4 weeks prior to the opening of the summer term in which the student expects to register.

All correspondence related to Graduate School admissions and all applications should be directed to the Graduate School, 322 Johnston Hall, University of Minnesota, Minneapolis, Minnesota 55455.

Scholarships

The following awards are available for qualified students:

*Alexander P. Anderson and Lydia Anderson Fellowships* at \$350 each. These are available only to persons holding a degree from the University of Minnesota.

The *Caroline M. Crosby Memorial Fellowship in Botany* provides for tuition, room and board, travel, and miscellaneous expenses up to \$400.

The *Josephine Herz Fellowship* to encourage an outstanding student in research on avian behavior.

Requests for information and applications for the above fellowships should be made to the Graduate School, University of Minnesota, Minneapolis, Minnesota 55455.

The *Fishery and Wildlife Management Summer Scholarships* for tuition and fees provided by the Minnehaha Chapter, Izaak Walton League, Question Club of Minneapolis, and the Wildlife Managers Club. Write to Director, Field Biology Program, 112 Snyder Hall, University of Minnesota, St. Paul, Minnesota 55101.

Biological  
Research  
Stipends

Stipends of three categories are available in the Summer Biological Research Program sponsored by the National Science Foundation at the station as follows: (a) predoctoral graduate students who will enroll in one course and carry out advanced research work for credit; (b) postdoctoral research workers who will enroll in one course and carry out research work under the guidance of a senior staff member; this work may or may not be for academic credit; (c) independent investigators who will carry out field or laboratory work that is best suited to the individual's objectives and the research opportunities available.

The amounts available to individuals will vary by category. Arrangements can be made to engage in research projects all summer. The program includes funds for tuition and fees.

Application forms for these stipends may be secured by writing the Director, Field Biology Program, 112 Snyder Hall, University of Minnesota, St. Paul, Minnesota 55101. They should be completed by March 15, 1968.

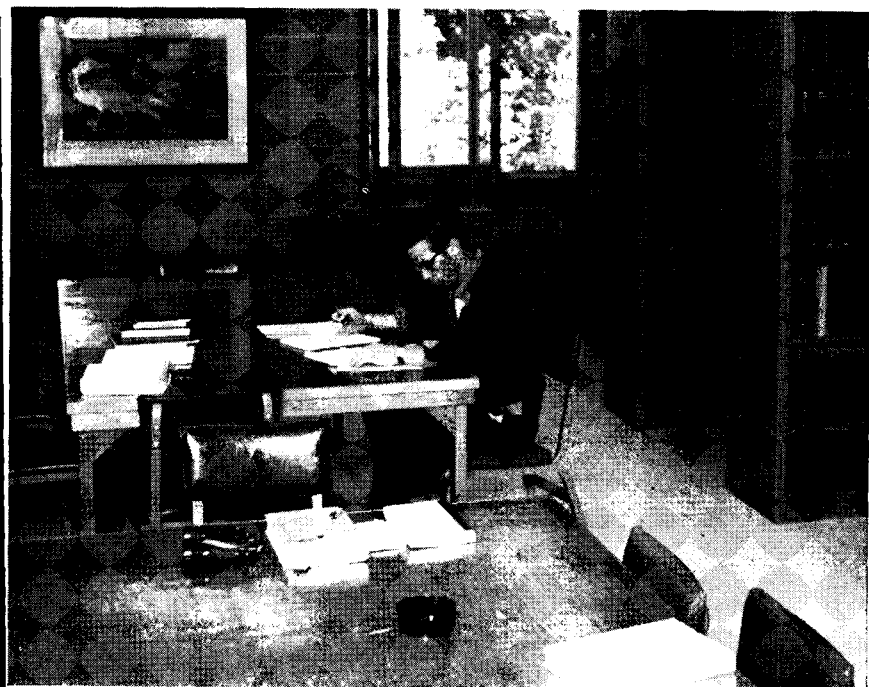
Reservations

Since both the housing facilities and the size of each class are limited, early application for reservations is recommended. Please complete the Request for Reservation form found on page 27 of this bulletin and mail to 112 Snyder Hall, St. Paul, Minnesota 55101. *This form must be accompanied by a recent transcript of academic record and a deposit of \$25.* The deposit will apply toward tuition fees at the time of registration or will be returned to the student if space is not available.

Assignments to classes and housing will be made as soon as possible after April 1 and will be considered on the basis of prerequisites for the courses desired, scholarship, and date of application.

Tallied  
Courses

All students must tally for courses given at the station. IBM class reservation cards will be held for students who have been notified of acceptance after submission of the Request for Reservation.



#### Registration

Whenever possible, students should complete their registration at the Office of Admissions and Records on the Twin Cities Campus (either Minneapolis or St. Paul). The IBM class reservation cards may be picked up at 220 Coffey Hall in St. Paul after May 13.

Registration by out-of-town students can be completed at the station on **June 12, Term I** or **July 21, Term II** where the necessary IBM cards will be held with the reservation.

#### Normal Load

Two courses per term, totaling 10 quarter credits, are considered a normal load. Advanced students may take two courses and in addition, 1 or 2 credits of a well-delimited research problem. Special permission must be secured from the director for a lighter or a heavier load.

Academic  
Fees

The following fees, per term, are payable by each regular registrant on or before June 12 or July 21:

Tuition fee .....	\$63.00
Incidental fee .....	13.50
Laboratory fee .....	8.50
	<hr/>
	\$85.00

A \$25 deposit is required of all persons making reservations for course work during the Biology Session. This fee will be returned if notice of cancellation is received before May 20 for the first term, or July 5 for the second term. When registration is completed, the \$25 will apply to the tuition fee.



Persons registering at the University of Minnesota for the first time will pay a \$1 record service fee.

Students enrolled in the Graduate School who have completed all of their graduate work with the exception of their thesis will be allowed to register for *thesis work only* upon the payment of \$31 tuition per term and the incidental fee.

Independent investigators will pay a research table fee of \$5 per week.

**Late Fees** Tuition and fees are payable at the time of registration on or before June 12 or July 21. After June 13 or July 22, late fees will be charged as follows:

June 13-15 or July 22-24 ..... \$3.00

No registration will be accepted after June 13 or July 22 without the approval of the director of the Field Biology Program and the payment of the late fee.

**Room and Board Costs** There is a \$15 per term service charge for dormitory facilities. An initial payment of \$80 for board is payable to the director at the beginning of each term. The kitchen is run on an actual cost basis.

**Transportation Costs** University vehicles are available for class field trips. A charge, on an actual cost basis, will be made to each student using them.

**BOARD AND LODGING**  
**Meals** Meals are served to both on-campus and off-campus students in an attractive dining hall located on the lakeshore. The kitchen is operated by the director for the students who form a co-operative Itasca Dining Club. Meals are carefully planned, well-balanced, and prepared by experienced cooks. Fresh meat, vegetables, and fruit are served daily.





**Cabins** There are seven cabins for men, each accommodating eight students, and six cabins for women, each accommodating six students. Women's cabins are equipped with toilets and lavatories. A central bathhouse with laundry facilities is located near each of these groups of cabins.

**Married Student Accommodations** Married students who wish to bring their families may find accommodations off campus in one of the many resorts in the vicinity. A list of addresses of these facilities will be furnished on request. The station maintains a tent and trailer camp area with a modern bathhouse and outlets for water and electricity. Students wishing to use this facility should make application well in advance of the session. The weekly charge for the use of this area is \$12.

**Accommodations for Visitors** There are no facilities at the station for taking care of guests of students. Students expecting guests must make arrangements for their housing off campus. It is possible to provide meals for guests at the dining hall if prior arrangements are made.

**PERSONAL  
NEEDS**

Students must provide their own pillows, bed linen, towels, and blankets. Since the nights are often cool, it is suggested that you bring two or three wool blankets. Essential personal equipment includes serviceable clothing, especially shoes or boots for field work, a warm jacket, rain gear, a swimming suit, flashlight, notebooks, pocket field manuals, and the equipment necessary for individual work in the field or laboratory.

A branch of the University bookstores is maintained at the station during the sessions to make books and student supplies readily available.

**RULES OF CAMP**

Rules of camp are kept at a minimum. Students are expected to keep their own quarters clean and orderly. You may bring your car but no garages are provided. Weekend absences and extended field trips must be reported in advance.

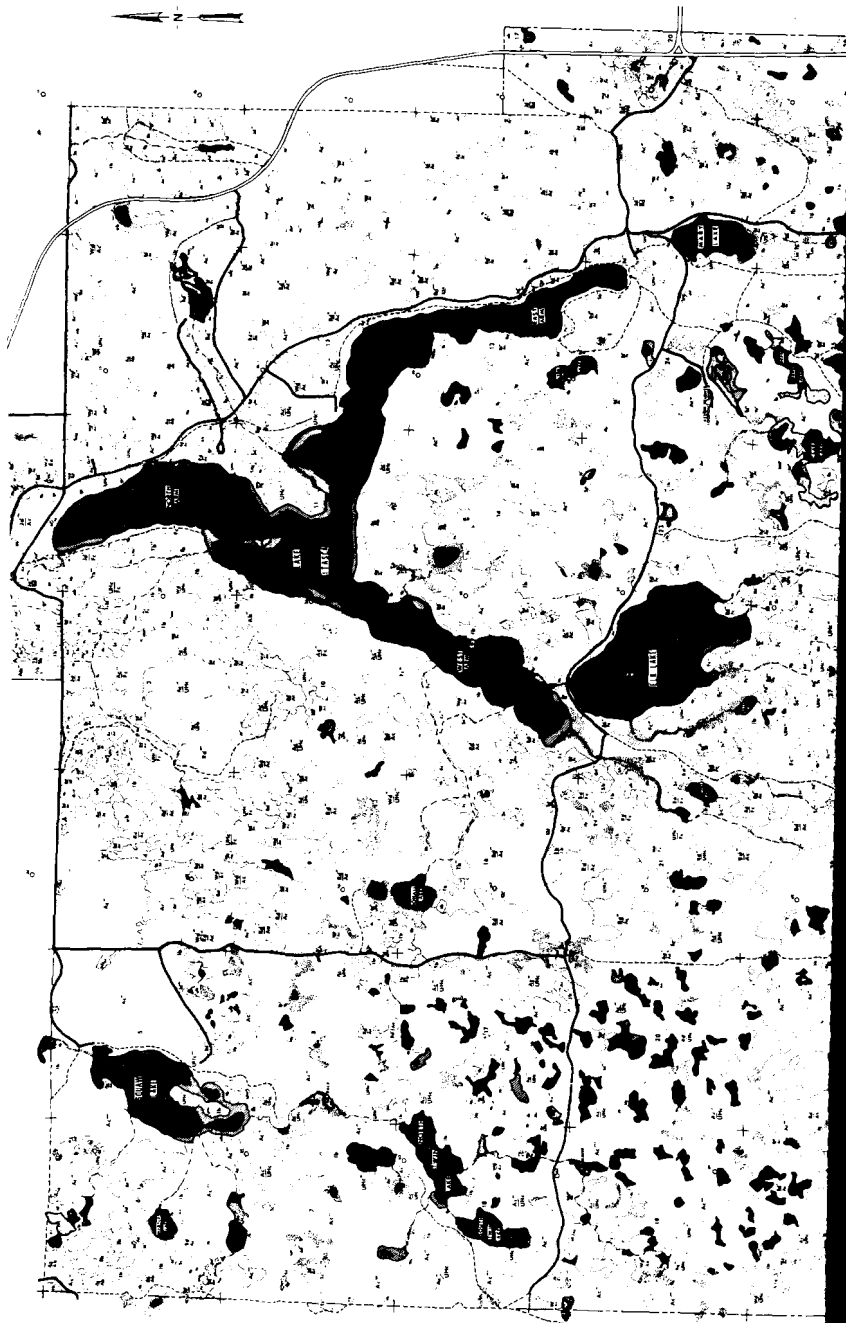
Off campus, and within park boundaries, the State Park regulations govern. The State Park entry sticker (\$2) must be bought for private cars at the park entrance. If you bring a boat or canoe, a seasonal use permit (\$5) must be purchased at Park Headquarters.

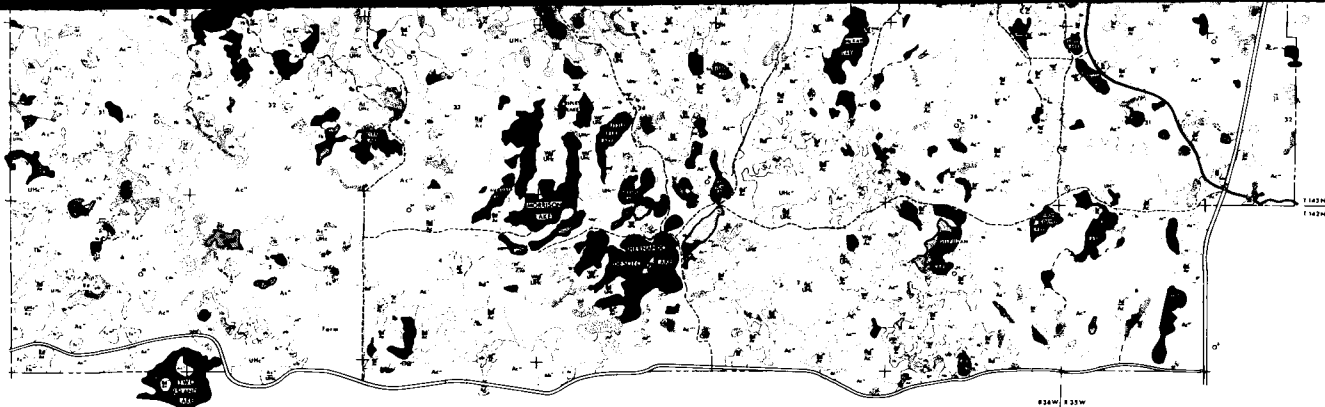
**RECREATION**

Opportunities to relax by swimming, fishing, canoeing, and hiking in the park are excellent. Volley ball, soft ball, and horseshoe equipment is available at the station. Evening social events may be planned by the students. Weekly evening lectures by staff or visiting scientists and outstanding films on field biology will be scheduled.

**HEALTH SERVICE**

Students will be furnished medical care and up to 15 days of hospitalization at the nearest medical facility in case of emergency illness or accident and on approval of the director. This will not include such things as physical examinations, treatment of chronic conditions, nor will it include payment for drugs.





### LEGEND

#### VEGETATION TYPE

##### Forest:

- A -- Aspen, paper birch
- LH -- Lowland hardwoods
- UH -- Upland hardwoods
- O -- Oak
- J -- Jack pine
- R -- Red pine
- W -- White pine
- F -- Balsam fir and/or white spruce
- S -- Black spruce
- T -- Tamarack

(2-1/2 acre minimum used for forest type classification)

##### Nonforest:

- gr -- Upland grass
- ub -- Upland brush
- lb -- Lowland brush
- MS -- Marsh (sedge, cattail)
- /// -- Aquatics

#### Examples of Vegetation Classification:

No 1 - "Aspen stand, 5-9" dbh (diameter at breast height) class, 85% crown density, no understorey present"

Ac"

No 2 - "Red pine overstorey with 9+ dbh class, 15% crown density, understorey of 5-9" dbh balsam fir"

Bd"  
Pc

#### STAND SIZE CLASS

- a -- 0-1" dia, breast ht.
- b -- 1-5" "
- c -- 5-9" "
- d -- 9+ " "

#### CROWN DENSITY CLASS

- 0 -- Under 10% (applies to pine only)
- " -- 10-30%
- " -- 40-70%
- " -- Over 70%

#### OTHER FEATURES

- Stream
- Open water
- Foot trails, abandoned or limited use roads
- Park access roads
- Highway
- 12 Photo center and photo number
- + Section corner
- GrP Gravel pit
- 234 Sample stand age

SCALE 1:15,840



#### Project Supervision and Map Compilation

Professor Merle P. Meyer  
School of Forestry,  
University of Minnesota

#### Aerial Photo Interpretation

Research Ass't Gary R. Jensen  
School of Forestry,  
University of Minnesota

Map prepared from 1:15,840 scale infrared minus-blue aerial photographs flown August 16, 1966, with a 6.0" focal length camera. This project was made possible by a University of Minnesota Graduate School Grant to Professors W. H. Marshall and M. P. Meyer. The following students at the School of Forestry assisted in the compilation, drafting and editing of this map: Dennis R. Bodine, Duane A. Huckell, Joseph J. Ullman.

STAFF  
MEMBERS

**Lewis J. Berner**, professor, University of Florida, has worked extensively with the ecology and systematics of mayflies in the southeastern United States.

**Alan J. Brook**, professor, University of Minnesota, has studied algae in Scotland and the Sudan and is carrying out intensive research on the ecology and systematics of these plants in the Itasca region.

**Murray F. Buell**, professor, Rutgers University, has been concerned with the study of vegetation, having worked primarily with forest communities of northern Minnesota, eastern North Carolina, and New Jersey.

**Dale Chelberg**, associate professor, Mankato State College, specializes in the systematics and ecology of freshwater crustacea.

**Gerald A. Cole**, professor, Arizona State University, has major interests in freshwater crustaceans, endemism in desert waters, and is a contributor to the *Limnology of North America*.

**Edwin F. Cook**, professor, University of Minnesota, specializes in the taxonomy of Diptera and of immature aquatic insects.

**Rouse S. Farnham**, associate professor, University of Minnesota, conducts research and teaches soil classification and organic soils. He specializes in both basic and applied peat research.

**David W. French**, professor and associate director of the Biology Session, University of Minnesota, specializes in forest pathology and wood products deterioration, and is an author of *An Introduction to Forest Pathology*.

**Mary K. Hartz**, assistant professor, Muskegon Community College, has had extensive research and teaching experience in the Itasca area.

**Omer R. Larson**, assistant professor, University of North Dakota, has major interests in the taxonomy, distribution, and life cycles of helminth parasites in vertebrates.

**William H. Marshall**, professor and director of field biology, University of Minnesota, has published articles on ecology of mammals and birds in Minnesota.

**John F. Mehner**, professor and chairman, Department of Biology, Mary Baldwin College, has published on the behavior of robins and carried out intensive studies on the evening grosbeak in Itasca Park.

**Richard L. Meyer**, assistant professor, Chico State College, is engaged in research on the Chrysophytes of the Itasca region and was a member of an expedition investigating the phytoplankton of the Indian Ocean.

**Philip C. Miller**, assistant professor, San Diego State College, is interested in combining at the macroscopic level, theories of physical micrometeorology with classical ecological problems.

**Ross D. Moir**, professor, Brandon University, has conducted floristic research in New Mexico, the north central plains, and the subarctic of northwestern Ontario.

**Robert W. Seabloom**, associate professor, University of North Dakota, has conducted research on mammalian distributions, life histories, and activity patterns. He is also currently working on several aspects of mammalian cytotaxonomy.

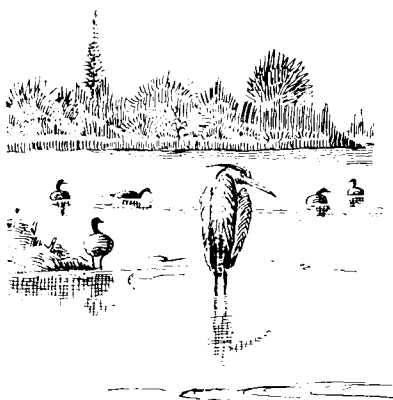
**Donald B. Siniff**, assistant professor, University of Minnesota, specializes in analyses of populations and ecological data and has worked in Alaska and Minnesota.

**John W. Thieret**, professor, University of Southwestern Louisiana, has made extensive studies of the flora of Illinois and of the Northwest Territories of Canada. He is currently preparing a flora of the state of Louisiana.

**John W. Thomson**, professor, University of Wisconsin, specializes in research on the taxonomy and ecology of lichens of North America and the Arctic, and also teaches higher plant taxonomy, having published in that field as well as in lichenology. He is the author of the recent book, *The Lichen Genus Cladonia in North America*.

**James C. Underhill**, professor, University of Minnesota, has specialized in distribution problems and the limnological factors influencing the variation of fishes.

**Dwain Warner**, associate professor, University of Minnesota, is conducting research on the systematics and ecology of migrant birds, especially black birds and owls.



**COURSES OF  
INSTRUCTION**

# Means "consent of instructor."

**BOTANY**

**112. Aquatic Flowering Plants.** The higher plants of aquatic and marsh habitats. Identification and collection; association of species; relations to the habitat; adaptive morphology and food value to wildlife. Text: Fassett, *Manual of Aquatic Plants*. (5 cr; limited to 20 students, prereq #; MTh; II term) Thieret

**116. Summer Flora of Minnesota.** A survey of the summer flowering plants and ferns of the state with particular reference to the local flora. Collection and identification of species; distribution in Minnesota; literature and taxonomic methods. Text: Gleason and Cronquist, *Manual of Vascular Plants of Northeastern United States*. (5 cr; limited to 20 students; prereq #; TF, I term; WS, II term) Thomson, Moir

**155. Freshwater Algae.** The morphology and taxonomy of freshwater algae with particular attention to the collection and identification of local algae. Text: Smith, *Freshwater Algae of the United States*. (5 cr; limited to 20 students; prereq 10 cr in botany, biology, or zoology, or #; MTh, I term; TF, II term) Brook, Meyer

**99. Research Problems.** (5 cr; prereq major in biological sciences, #) Staff

**299. Research Problems.** (Cr ar; prereq grad) Staff

**ECOLOGY AND  
BEHAVIORAL  
BIOLOGY**

**119. Aquatic Ecology.** The conditions for life in the water and distribution of aquatic animals. Text: Ruttner, *Fundamentals of Limnology*. (5 cr; limited to 20 students; prereq 15 cr in biology or #; WS; I and II term) Underhill

**135. Ecology of the Itasca Region.** The plant communities represented in Itasca Park and vicinity and their dynamic relationships. Also the relationships of the local communities to the vegetation of Minnesota as a whole. Use of modern methods of vegetational analysis and measurement of environmental factors. (5 cr; limited to 20 students; prereq #; MTh; I term) Buell



136. **Avian Behavior.** Field studies stressing courtship, nesting, and other facets in the breeding behavior of birds in the Itasca area. Text: Tinbergen, *Social Behavior in Animals*. (5 cr; limited to 15 students; prereq Zool 75-76 or 135, or #; WS; I term) Mehner

140. See Soil 137

152. **Ecology of Freshwater Algae.** Aspects of algal ecology in lakes and ponds with special reference to phytoplankton, benthos, and periphyton; also in streams, bogs, soils, and other terrestrial habitats. Field and laboratory instruction in relevant research techniques. Text: Fogg, *Algal Culture and Phytoplankton Ecology*. (5 cr; limited to 20 students; prereq 150 or 155 or #; MTh; II term) Brook

158. See For 158

162. **Vertebrate Ecology.** Field work on populations and their relationships to local environments; habitat analysis and ecological research methods. Text: Odum, *Fundamentals of Ecology*. Individual and team research projects, field trips, and lectures. (5 cr; limited to 20 students; prereq Biol 80 or equiv; MTh, I term; WS, II term) Seabloom, Siniff, Marshall

195. **Problems in Ecology and Behavioral Biology.** (Cr ar; prereq #) Staff

ENTOMOLOGY,  
FISHERIES, AND  
WILDLIFE

59. **Field Entomology.** The insect fauna in various natural habitats of the park and surrounding areas. The course includes field trips, collection and classification of insects, as well as studies of general morphology, life histories, and habits of local species under ecological conditions governing the distribution of insect fauna of the region. Text: Borrer and Delong, *An Introduction to the Study of Entomology*. (5 cr; limited to 15 students; prereq Biol 2 or equiv; WS; I term) Berner

124. **The Biology of Immature Insects.** A field and laboratory course treating of habits, habitats, life history, and identification of immature insects with

particular emphasis on aquatic forms. Text: Peterson, *Larvae of Insects, Parts I and II*. (5 cr; limited to 15 students; prereq 59 or 74 or equiv or #; TF; I term) Berner

**129. Aquatic Entomology.** Identification and biology of aquatic and littoral insects in all states. (5 cr; limited to 15 students; prereq 59 or 74 or equiv or #; MTh; II term) Cook

**196. Special Problems in Entomology, Fisheries, and Wildlife.** Advanced work with ample opportunity for individual research, especially in various phases of faunistic studies in terrestrial, aquatic, and forest entomology, and fisheries and wildlife. (Cr ar; prereq #) Staff

#### FORESTRY

**158. Theory and Practice in Environmental Measurement.** Studies of the physical factors of the forest environment emphasizing energy budget, water budget, and microclimate variations. Modern field instrumentation will be stressed. Texts: Platt and Griffiths, *Environmental Measurement*, and Geiger, *The Climate Near the Ground* (rev. ed.). (5 cr; limited to 20 students; prereq college physics, ecology, or physiology; TF; II term) Miller

**215. Research Problems in Forest-Tree Physiology.** Individual research work in physiology of forest vegetation. (Cr ar; prereq #; II term) Miller

#### PLANT PATHOLOGY and PHYSIOLOGY

**156. Study of Fungi for Advanced Students.** General characters of fungi; especially those used in identification; cultural and taxonomic procedures and practices. (5 cr; limited to 15 students; prereq 9 cr in botany, or #; WS; II term) French

**210. Special Problems in Mycology.** Individual research work in taxonomy and biology of special groups of fungi. (Cr ar; prereq grad, Myc 107; II term) French, Johnson

#### SOIL SCIENCE

**130. Special Problems in Soils.** Research, reading, instruction. (Cr ar; prereq #; I term) Farnham

**137. Soils and the Ecosystem.** The formation and distribution of soils in relationship to vegetation, climate, and other soil-forming factors. The interrelationships of soils in the ecosystem. (5 cr; limited to 20 students; prereq Bot 50 or equiv or #; TF; I term) Farnham

## ZOOLOGY

**72. Natural History of Invertebrates.** A taxonomic and ecological survey of the local fauna, including life histories and habitats. Text: Eddy and Hodson, *Taxonomic Keys of the Common Animals of Minnesota*; Pennak, *Freshwater Invertebrates of the United States*. (5 cr; limited to 10 students; prereq Biol 2 or #; MTh, I term; TF, II term) Cole, Chelberg

**115. Advanced Natural History of Invertebrates.** Advanced taxonomic and ecological survey of the local fauna and independent ecological studies of several taxonomic groups. Text: Eddy and Hodson, *Taxonomic Keys of the Common Animals of Minnesota*; Pennak, *Freshwater Invertebrates of the United States*. (5 cr; limited to 10 students; prereq 15 cr in zoology or #; MTh, I term; TF, II term) Cole, Chelberg

**135. Field Ornithology.** Field and laboratory studies of ecology and life histories of the birds in the Itasca Park region. Text: Welty, *Life of Birds*. (5 cr; limited to 15 students; prereq 15 cr in zoology or #; TF; I term) Warner

**143. Animal Parasites.** Parasites of local fauna with special reference to helminths. Text: Chang, *The Biology of Animal Parasites*. (5 cr; limited to 15 students; prereq 15 cr incl Biol 2 or 50; MTh; II term) Larson

**99. Individual Work.** (Cr ar; prereq Biol 2 or 50 and #) Staff

**299. Graduate Research.** (Cr ar; prereq #) Staff

## GRADUATE STUDENT THESES

- MCANDREWS, J. H. Post-glacial vegetation history of the prairie-forest transition of northwestern Minnesota. Ph.D. Thesis. 1963.
- FORBES, RICHARD B. Ecological studies of the eastern and least chipmunk. Ph.D. Thesis. 1964.
- FROYD, JAMES D. Studies of the biology of hypoxylon canker of aspen. M.S. Thesis. 1964.
- MANION, PAUL D. Epidemiology and edeology of nectria canker. M.S. Thesis. 1964.
- BAKER, RICHARD G. Present vegetation related to macroscopic plant remains in surface samples from Floating Bog Bay, Lake Itasca, Minnesota. M.S. Thesis. 1965.
- DANGER, DENNIS L. An examination of the summer science institutes at Itasca State Park (1954-63). M.S. Thesis. 1965.
- CHRISTIANSON, LEE. A comparison of the Calcanea of two species of *Peromyscus* from northern Minnesota. M.S. Thesis. 1965.
- CLINE, DAVID R. Woodland pond habitat selection in ducks. M.S. Thesis. 1965.
- MEYER, R. L. The cytology, morphology, and life-history of certain chrysophyceae. Ph.D. Thesis. 1965.
- BERNARDIN, PAUL ARTHUR. O.P. A study of some of the ecological factors influencing Jack-Pine Budworm (*Choristoneura Pinus* Freeman) populations. M.S. Thesis. 1966.
- CHAPMAN, MARY. Isolation and experimental studies on some *Trichomyces*. M.S. Thesis. 1966.
- DEAN, RUSSELL A. High temperature tolerances of anuran amphibians. M.S. Thesis. 1966.
- ETNIER, DAVID A. The biology of hybrid sunfishes of the genus *Lepomis* in three Minnesota lakes. Ph.D. Thesis. 1966.
- HOHN, BONNIE M. A study of the movements and activity patterns of the thirteen-lined ground squirrel, *Citellus tridecemlineatus*. M.S. Thesis. 1966.
- WUJEK, DANIEL E. Ultrastructure of selected flagellated Chrysophytes. Ph.D. Thesis. 1966.
- ZINER, MARVIN DALE. A taxonomic study of *Picea mariana*: *P. Glauca* in the Lake Itasca Region in Minnesota. M.A. Thesis. 1966.
- COATS, ROBERT N. Evaluation of an ecological nutrient gradient in the central pine section of Minnesota. M.S. Thesis. 1967.
- COLLINS, THOMAS W. Oxygen-uptake, shell morphology and desiccation of the fingernail clam, *Sphaerium occidentale* Prime. Ph.D. Thesis. 1967.
- KELLEHER, KEVIN EDMOND. Distribution of breeding birds in deciduous forests at the prairie-hardwood forest ecotone in northwestern Minnesota. Ph.D. Thesis. 1967.
- MOYLE, PETER B. Ecology of the fishes of an oligotrophic Minnesota lake, with special reference to the minnows (Cyprinidae): *Notropis volucellus*, *N. cornutus*, and *Pimephales notatus*. Ph.D. Thesis. 1967.
- OHMANN, LEWIS F. Random tree distribution in jack pine plains near Itasca State Park, Minnesota. M.S. Thesis. 1967.
- PHILLIPS, GARY L. *Chrosomus erythrogaster* and *C. eos* (Osteichthyes: Cyprinidae): taxonomy, distribution, ecology. M.S. Thesis. 1967.

## RECENT RESEARCH PUBLICATIONS

- DENNIS, CLIFFORD J. Observations on Treehopper behavior (*Homoptera, membracidae*). Amer. Midl. Nat., 71:452-459. 1964.
- SCHMID, WILLIAM D. and JAMES UNDERHILL. Sodium transport by the skin of amphibian species from different habitats. Ecology, 45:864-865. 1964.
- TESTER, JOHN R. and W. J. BRECKENRIDGE. Population dynamics of the Manitoba Toad, *Bufo Hemiophrys*, in northwestern Minnesota. Ecology, 45:592-601. 1964.
- TESTER, JOHN R. and W. J. BRECKENRIDGE. Winter behavior patterns of the Manitoba Toad, *Bufo Hemiophrys*, in northwestern Minnesota. Annales Academie Scientiarum Fennicae, Ser. A, IV Biologica 71-31:423-431. 1964.
- BLOOM, WILLIAM L. Karyotypes in the Alismataceae of Itasca State Park. Michigan Botanist, 4:87-91. 1965.
- COLE, G. A. and J. C. UNDERHILL. The summer standing crop of sublittoral and profundal benthos in Lake Itasca, Minnesota. Limnology and Oceanography, 10:591-597. 1965.
- ETNIER, DAVID A. An annotated list of the *Trichoptera* of Minnesota, with description of a new species. Ent. News, 86(6):1965.
- HICKEY, J. J., J. T. EMLEN, and S. E. KENDEICH. Early summer bird life of Itasca State Park. Loon, 37(1):3-15. 1965.
- JOHNSON, ARTHUR A. *Hydromermis itascensis* sp. n. (Nematoda: Mermithidae) a parasite of *Glyptotendipes lobiferus* (Say) (Diptera: Chironomidae) and the taxonomic status of *Gastromermis*. Journal of Parasitology, 51:53-56. 1965.
- MANION, P. D. and D. W. FRENCH. Canker diseases of trembling aspen. Minn. Farm and Home Sci., 22(4):13-14. 1965.
- MEYER, RICHARD L. The cytology, morphology and life-history of *Poteriochromonas nutans* Jane. Amer. J. Bot., 52(6):644. 1965.
- PEARSON, L. C. and D. B. LAWRENCE. Lichens as microclimate indicators in northwestern Minnesota. Amer. Midl. Nat., 72(2):257-268. 1965.
- SCHMID, WILLIAM D. Distribution of aquatic vegetation as measured by line intercept with SCUBA. Ecology, 46(6):816-823. 1965.
- SCHMID, WILLIAM D. Energy intake of the mourning dove, *Zenaidura macroura marginella*. Science, 150(3700):1171-72. 1965.
- SCHMID, WILLIAM D. High Temperature Tolerances of *Bufo hemiophrys* and *Bufo cognatus*. Ecology, 46:559-560. 1965.
- SCHMID, WILLIAM D. Some aspects of the water economies of nine species of anuran amphibians. Ecology, 46:261-269. 1965.
- TESTER, J. R., A. PARKER, and D. B. SINIFF. Experimental studies on habitat preference and thermoregulation of *Bufo americanus*, *B. hemiophrys*, and *B. cognatus*. J. Minn. Acad. Sci., 33(1):27-32. 1965.
- THOMPSON, DANIEL Q. Food preferences of the Meadow Vole (*Microtus pennsylvanicus*) in relation to habitat affinities. Amer. Midl. Nat., 74:76-86. 1965.

- UNDERHILL, JAMES and JOHN DOBIE. The fishes of Itasca. Conservation Volunteer, May-June:14-29. 1965.
- BROWDER, LEON W., J. C. UNDERHILL, and D. J. MERRELL. Mid-dorsal stripe in the Wood Frog. *J. Hered.*, 57(2):65-67. 1966.
- DAVIDSON, DONALD W. Some living stumps of red pine (*Pinus resinosa* Ait.) at Itasca State Park, Minnesota. *Bulletin of Torrey Botanical Club*, 93(6):458-460. 1966.
- FORBES, RICHARD B. Fall accumulation of fat in chipmunks. *J. of Mamm.* 47(4):715-716. 1966.
- FORBES, RICHARD B. Studies of the biology of Minnesotan Chipmunks. *Amer. Midl. Nat.*, 76(2):290-308. 1966.
- FORBES, RICHARD B. Notes on a litter of Least Chipmunks. *J. Mamm.*, 47(1):159-161. 1966.
- HOHN, BONNIE M. and W. H. MARSHALL. Annual and seasonal weight changes in a thirteen-lined ground squirrel population, Itasca State Park, Minnesota. *J. Minn. Acad. Sci.*, 33(3):102-106. 1966.
- JANSSEN, C. R. Recent pollen spectra from the deciduous and coniferous deciduous forests in northeastern Minnesota—a study in pollen dispersal. *Ecology*, 45(5):804-825. 1966.
- LARSON, OMER R. Some helminths of Itasca Park fishes. *J. Minn. Acad. Sci.*, 33(2):99-101. 1966.
- MCANDREWS, JOHN H. Postglacial history of prairie, savanna, and forest in northwestern Minnesota. *Mem. Torrey Bot. Club*, 22(2):1-72. 1966.
- MEGARD, ROBERT O. and J. SHAPIRO. A mobile limnological laboratory. *Limnol. Oceanogr.*, 11:420-422. 1966.
- ORR, HOWARD D. Behavior of translocated white-footed mice. *J. Mamm.*, 47(3):500-506. 1966.
- FORBES, RICHARD B. Some aspects of the water economics of two species of chipmunks. *J. of Mamm.*, 48(3):466-468. 1967.
- FROYD, J. D. and D. W. FRENCH. Ejection and dissemination of ascospores of *Hypoxylon pruinautum*. *Can. J. Bot.*, 45:1507-1517. 1967.
- GARNER, JASPER H. B. Some notes on the study of bark fungi. *Can. J. Bot.*, 45:540-541. 1967.
- HEDEEN, STANLEY. Feeding behavior of the great blue heron (*Ardea herodias* L.). *Loon*, 39(4). 1967. (In press.)
- IVERSON, S. L., R. W. SEABLOOM and J. M. Hnatiuk. Small-mammal distribution across the prairie-forest transition of Minnesota and North Dakota. *Amer. Midl. Nat.*, 78:188-197. 1967.
- JANSSEN, C. R. A comparison between the recent regional pollen rain and the subrecent vegetation in four major vegetation types in Minnesota. *Review of Palaeobotany and Palynology*, 2:331-342. 1967.
- JANSSEN, C. R. Stevens Pond: A postglacial pollen diagram from a small typha swamp in northwestern Minnesota interpreted from pollen indicators and surface samples. *Ecological Monographs*, 37:145-172. 1967.

- JORDAN, O. RAY. The occurrence of *Thamnophis sirtalis* and *R. radix* in the prairie-forest ecotone west of Itasca State Park, Minnesota. *Herpetologica*, December 1967. (In press.)
- MCANDREWS, JOHN H. Paleocology of the seminary and mirror poll past deposits, in: Mayer-Oakes, eds., *Life, Land and Water*. University of Manitoba Press. 1967.
- MEGARD, ROBERT O. Limnology, primary productivity, and carbonate sedimentation of Minnesota lakes. Interim Report No. 1, Limnological Research Center, University of Minnesota, p. 698. 1967.
- MEGARD, ROBERT O. Three new species of *Alona* (Cladocera, Chydoridae) from the United States. *Int. Revue ges. Hydrobiol.*, 52:37-50. 1967.
- MEYER, MERLE P. and D. W. FRENCH. Detection of diseased trees. Photogrammetric Engineering, 1035-1040. September 1967.
- PHILLIPS, GARY L. Sexual dimorphism in the Western Blacknose Dace, *Rhinichthys atratulus meleagris*. *J. Minn. Acad. Sci.*, 34:11-13. 1967.
- SHAW, ROSS F. The occurrence of Opalinids in amphibians from northern Minnesota. *Journal of Protozoology*, 14:38. 1967.
- WUJEK, DANIEL E. *Microglena punctifera* (O.F.M.) Ehrenberg in the United States. *Trans. Amer. Microsc. Soc.*, 86(3):340-341. 1967.
- MEYER, R. L. and A. J. BROOK. Freshwater algae from the Itasca State Park, Minnesota. *Trans. Amer. Microsc. Soc.*, 1968. (In press.)

#### I TERM

CONDENSED COURSE SCHEDULE	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Bot 155	Bot 116	Ecol 136	Bot 155	Bot 116	Ecol 136
	Ecol 135	Ent 124	Ent 59	Ecol 135	Ent 124	Ent 59
	Ecol 162	Soil 137	Ecol 119	Ecol 162	Soil 137	Ecol 119
	Zool 72/115	Zool 135		Zool 72/115	Zool 135	

#### II TERM

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Bot 112	Bot 155	Bot 116	Bot 112	Bot 155	Bot 116
Ecol 152	Zool	Ecol 119	Ecol 152	Zool	Ecol 119
Ent 129	72/115	Ecol 162	Ent 129	72/115	Ecol 162
Zool 143	For 158	PIPa 156	Zool 143	For 158	PIPa 156

**Request for Reservation—ITASCA BIOLOGY SESSION**

Name \_\_\_\_\_ Date \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_ Zip Code \_\_\_\_\_

Status: Grad.; Adult Special; Freshman; Sophomore; Junior; Senior (circle one)

College now attending: \_\_\_\_\_

U. of M. college last enrolled in \_\_\_\_\_ year \_\_\_\_\_

Reserve a place in following two courses for me:

I Term: Dept. \_\_\_\_\_ No. \_\_\_\_\_ and Dept. \_\_\_\_\_ No. \_\_\_\_\_

II Term: Dept. \_\_\_\_\_ No. \_\_\_\_\_ and Dept. \_\_\_\_\_ No. \_\_\_\_\_

(see condensed course schedule to avoid conflicts)

I wish a reservation in a student cabin, campground site, or a resort list (circle one)

Enclosed find \$25 deposit (check or money order to University of Minnesota) to be credited to the tuition fee on completion of registration, and a recent transcript of my academic record.

**Please mail this form to: Director, Field Biology Program  
112 Snyder Hall  
University of Minnesota  
St. Paul, Minnesota 55101**