

**LAKE  
ITASCA  
BIOLOGY  
SESSION**

**SUMMER 1971**

The Lake Itasca Biology Session offers the serious student of limnology, terrestrial biology and ecology unparalleled opportunities to pursue courses in environments which have been minimally disturbed by human activity. A broad array of classes for undergraduate and graduate students is taught in a personalized manner by a faculty recruited not only from the University of Minnesota but from various colleges and universities across the United States and Canada and at times from Europe. Independent studies for the advanced student or researcher are unlimited and may be carried on throughout the year.

If there are matters in this bulletin requiring further explanation or elaboration, please do not hesitate to seek additional information by writing to Field Biology Program, 302 Bell Museum of Natural History, University of Minnesota, Minneapolis, Minnesota 55455.

David F. Parmelee  
Chairman, Field Biology Program

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The contents of this bulletin and of other University bulletins, publications, or announcements are subject to change without notice.

# LAKE ITASCA BIOLOGY SESSION

First Term      June 16—July 23  
Second Term    July 25—August 30





# 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, the College of Agriculture, and the College of Forestry. By agreement, the University of Wisconsin is participating in the policy and planning of the Biology Session through membership on the advisory committee.

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.

## RESEARCH AND ACADEMIC OPPORTUNITIES

### THE ITASCA HABITATS

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 in to 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 chairman for research in various fields of terrestrial and freshwater biology at any season.

### COURSE WORK AND RESEARCH

The variety of courses available in both terms I and II allow for an entire summer, either of intensive work in a particular field of interest or a sampling of several types of field experiences.

Graduate and undergraduate students of biology will find an excellent field laboratory for both research and course work. Graduate students may devote themselves exclusively to research problem work.

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.

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 should make prior arrangements with the chairman.

#### **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 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.

### **Admission and 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 are advised to consult these regulations in the general *Summer Session Bulletin*.

The Board of Regents has committed itself and the University of Minnesota to the policy that there shall be no discrimination in the treatment of persons because of race, creed, color, sex or national origin. This is a guiding policy in the admission of students in all colleges and in their academic pursuits. It is also to be a governing principle in University-owned and University-approved housing, in food services, student unions, extracurricular activities and all other student and staff services. This policy must also be adhered to in the employment of students either by the University or by outsiders through the University and in the employment of faculty and civil service staff.

**Summer-Only Students**—Students with previous college work, who wish to attend the Summer-Session-only, may do so without filing applications, provided they are in good standing and are not candidates for a degree.

**Graduate Students**—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 or applications related to Graduate School admissions 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. Open only to students majoring in botany at the University of Minnesota.

Requests for information and applications for the above fellowships should be made to the Graduate School, University of Minnesota, Minneapolis, Minnesota 55455.

*The Josephine Herz Fellowship* to encourage an outstanding student in research on avian behavior.

*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 Chairman, Field Biology Program, 302 Bell Museum of Natural History, University of Minnesota, Minneapolis, Minnesota 55455.

#### **BIOLOGICAL RESEARCH STIPENDS**

Stipends of two 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 may enroll in one course and carry out advanced research work for credit; (b) 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 to Chairman, Field Biology Program, 302 Bell Museum of Natural History, Minneapolis, Minnesota 55455. They should be completed by March 15, 1971.

**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 23 of this bulletin and mail to 302 Bell Museum of Natural History, University of Minnesota, Minneapolis, Minnesota 55455. *This form must be accompanied by a recent transcript of academic record, a deposit of \$25, and a letter of evaluation from the student's adviser.* 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 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.

**REGISTRATION**

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.

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 130 Coffey Hall in St. Paul after May 17.

Registration by out-of-town students can be completed at the station on June 16, First Term, or July 25, Second Term. The necessary IBM cards will be held with the reservation.

A total of 10 quarter credits per term is considered a normal academic load. This may be accomplished by (a) registration for two courses (students should check the condensed class schedule on page 23 to avoid scheduling two classes on the same day); (b) registration for one course and a research problem which may be related to the course.

**Tuition Fees and Other Costs**

**Academic Fees**—The following fees, per term, are payable by each regular registrant on or before June 16 or July 25.

	5 credits	10 credits
Tuition .....	\$70.00	\$140.00
Student Services fee .....	12.50	12.50
Laboratory fee .....	8.50	8.50
<b>TOTAL .....</b>	<b>\$90.25</b>	<b>\$160.25</b>

A \$25 deposit is required of all persons making reservations for course work during the Biology Sessions. This fee will be returned if notice of cancellation is received before May 17 for the first term, or June 28 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 \$3 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 and the student services and laboratory fees per term.

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 16 or July 25. Late fees will be charged as follows:

June 17-19 or July 26-28 ..... \$6.00

No registration will be accepted after June 16 or July 25 without the approval of the chairman of the Field Biology Program and the payment of the late fee.

**Room and Board Costs**—There is a \$20 per term service charge for dormitory facilities. An initial payment of \$95 for board is payable to the Itasca Dining Club which is run on an actual cost basis. These costs are payable at the beginning of each term.

**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.

### **On-Campus Arrangements**

#### **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 chairman for the students who form a cooperative Itasca Dining Club. Meals are carefully planned, well balanced, and prepared by experienced cooks.

#### **CABINS**

There are nine 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 applications well in advance of the session. The weekly charge for use of this area is \$15.

#### **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 Itasca Dining Club if prior arrangements are made.

#### **MAIL**

Mail for students should be addressed to: Itasca Biology Session, Lake Itasca P.O., Minnesota 56460.

#### **TRANSPORTATION**

Public transportation to the station is by bus to Park Rapids or Bemidji or by air to Bemidji. The depots are 24 and 42 miles from the station. Students will be met if prior arrangements are made with the chairman. State Highway 92 and U.S. Highway 71 provide easy access by car through the towns of Bagley, Bemidji, or Park Rapids.

#### **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. Domestic pets are not allowed on the station.

Off campus, and within park boundaries, the State Park regulations govern. The State Park entry sticker (\$3) must be bought for private cars at the park entrance.

#### **RECREATION**

Opportunities to relax by swimming, fishing, canoeing, and hiking in the park are excellent. Volleyball, softball, 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 chairman. This will not include such things as physical examinations, treatment of chronic conditions, nor will it include payment for drugs.

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Requests for additional bulletins, and specific inquiries as to courses, accommodations, equipment, etc., should be sent to the:

Chairman of Field Biology  
302 Bell Museum of Natural History  
University of Minnesota  
Minneapolis, Minnesota 55455



## Staff Members

**Robert Bandoni**, Professor, University of British Columbia, is an authority on the biology of the lower basidiomycetes. He is the author of *Guide to Common Mushrooms of British Columbia*.

**Ernest O. Beal**, Professor and Chairman, Department of Biology, Western Kentucky University, has major research interests in experimental approaches to the ecology, taxonomy, and evolution of aquatic vascular plants.

**Robert E. Beer**, Professor, University of Kansas, is an authority on systematics and ecology of phytophagous mites, and development and behavior of sawflies.

**Alan J. Brook**, Professor and Head, Department of Ecology and Behavioral Biology, University of Minnesota, specializes in freshwater algae; he has had extensive experience in the Sudan and Scotland which has led to many publications on the ecology and systematics of the algal floras of these areas. He is the author of the recent text, *The Living Plant*.

**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.

**Edwin F. Cook**, Professor, University of Minnesota, specializes in the taxonomy of Diptera and of immature aquatic insects.

**David W. French**, Professor and Associate Chairman 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*.

**Donald E. Gilbertson**, Assistant Professor, University of Minnesota, has conducted research on the metabolism and biochemical taxonomy of freshwater snails.

**David F. Grigal**, Assistant Professor, University of Minnesota, is interested in plant community—soil interrelationships and in nutrient cycling in forest ecosystems.

**Ronald H. Hofstetter**, Assistant Professor, University of Miami, studies the nature and evolution of patterns of plant communities in wetlands. His interests include the distribution and ecology of the moss genus *Sphagnum*.

**Omer R. Larson**, Associate Professor, University of North Dakota, has major interests in the taxonomy, distribution, and life cycles of helminth parasites and fleas of vertebrates.

**Robert K. Maxwell**, Assistant Professor, University of Minnesota, works with the physical transfer processes which operate between an organism and its surroundings.

**Robert O. Megard**, Assistant Professor, University of Minnesota, is studying nutrients and the growth of algae in lakes. Previously he has done research on biostratigraphy and sedimentation in lakes.

**Richard L. Meyer**, Associate Professor, University of Arkansas, 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.

**Lewis W. Oring**, Associate Professor, University of North Dakota, has studied the behavior of closely related birds occupying similar niches in Sweden and Canada. He is currently evaluating the efficiency of communication systems with regard to the environment in which they occur.

**Gerald B. Ownbey**, Professor, University of Minnesota, has made extensive studies of the vascular plants of the Upper Midwest and Rocky Mountain regions and specializes in the cytotaxonomy of several genera of higher plants.

**David F. Parmelee**, Professor and Chairman of Field Biology Program, University of Minnesota, has studied the distribution, ecology, and behavior of arctic birds and specializes in shorebirds.

**William D. Schmid**, Associate Professor, University of Minnesota, has studied comparative physiology of anurans and is currently studying water balance in small mammals of the Itasca region.

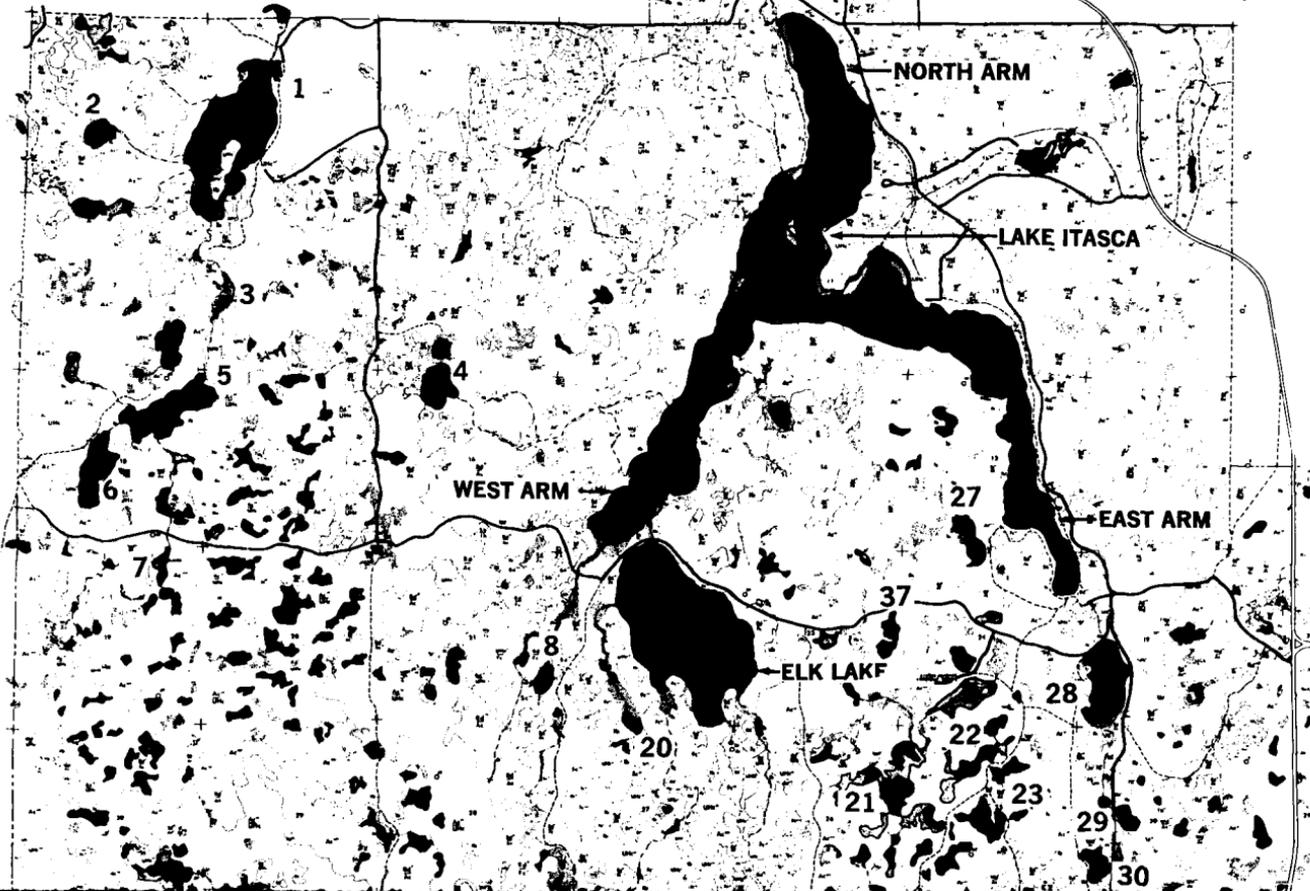
**A. J. Sharp**, Alumni Distinguished Service Professor of Botany, University of Tennessee, is an authority on mosses. He was president of the Botanical Society of America in 1965 and has made extensive studies in North America, Central America, Far East, and Asian countries.

**Creighton T. Shay**, Assistant Professor of Anthropology, University of Manitoba, conducted his Ph.D. research on an early bison kill site within Itasca Park. He is presently involved in studies of vegetation history and human ecology in southern Manitoba.

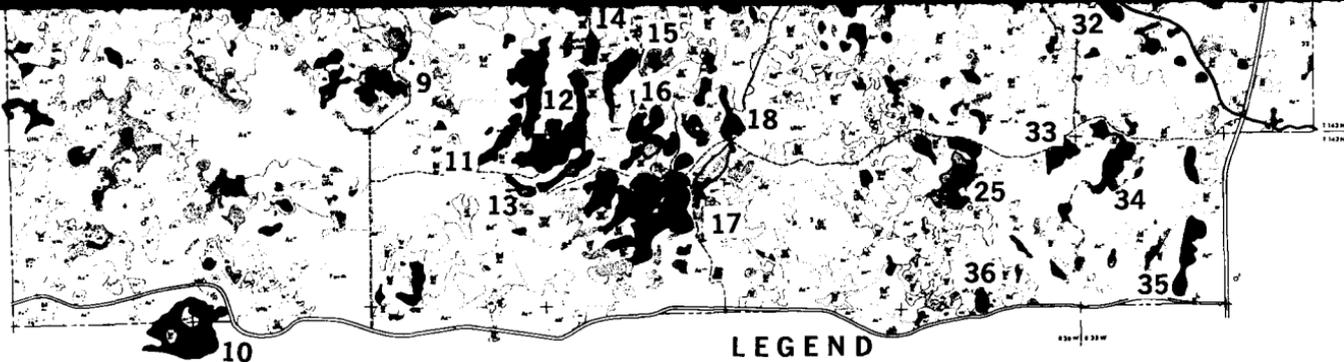
**John R. Tester**, Professor, University of Minnesota, has investigated prairie ecology and vertebrate distribution and abundance in the Itasca area and is actively working in radiation ecology and on studies of home range and behavior of mammals using telemetry techniques.

**James C. Underhill**, Professor, University of Minnesota, specializes in the distribution and variation in fishes and amphibians.

**Dwain W. Warner**, Professor and Curator of Birds, University of Minnesota, is engaged in research on the systematics and ecology of birds, especially blackbirds and owls, and in the long-distance dissemination of microorganisms by birds.



1. Squaw Lake
2. Myrtle Lake
3. Tamarack Lake
4. Bohall Lake
5. North Twin Lake
6. South Twin Lake
7. Dead Beaver Lake
8. Nicollet Lake
9. Kirk Lake
10. Two Island Lake
11. Augusta Lake
12. Morrison Lake
13. Horn Lake
14. Triplet Lakes
15. Little Elk Lake
16. Mikenna Lake
17. Hernando Desoto Lake
18. Picard Lakes
19. Radisson Lake
20. Hall Lake
21. Clark Lake
22. Deer Park Lake
23. Myrtle Lake
24. McKay Lake
25. Gilfillan Lake
26. Budd Lake
27. Lyendecker Lake
28. Mary Lake
29. Twin Lakes
30. Deming Lake
31. Arco Lake
32. Josephine Lake
33. Iron Corner Lake
34. Sibillant Lake
35. Little Mantrap Lake



### 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
- (2½-acre minimum used for forest type classification)

#### Nonforest:

- gr — Upland grass
- ub — Upland brush
- lb — Lowland brush
- .. — Marsh (sedge, cattail)
- /// — Aquatics

#### STAND SIZE CLASS

- a — 0-1" dia., breast ht.
- b — 1-5" "
- c — 5-9" "
- d — 9+ " "

#### CROWN DENSITY CLASS

- ° — 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
- o<sup>12</sup> — Photo center and photo number
- + — Section corner
- GrP — Gravel pit
- 234 — Sample stand age

#### EXAMPLES OF VEGETATION CLASSIFICATION:

No. 1 — "Aspen stand, 5-9" dbh (diameter at breast height) class, 65% crown density, no understory present."  
Ac"

No. 2 — "Red pine overstory with 9+ dbh class, 15% crown density, understory of 5-9" dbh balsam fir."  
Rd'  
Fc

#### SCALE 1:15,840



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 College of Forestry assisted in the compilation, drafting and editing of this map: Dennis R. Bodine, Duane A. Huckell, Joseph J. Ulliman.

#### PROJECT SUPERVISION AND MAP COMPILATION

Professor Merle P. Meyer, College of Forestry,  
University of Minnesota

#### AERIAL PHOTO INTERPRETATION

Research Ass't. Gary R. Jensen, College of  
Forestry, University of Minnesota



# Courses of Instruction

# means consent of instructor.

Classes begin at 8:00 a.m. and continue all day.

## Botany (Bot)

- 5-801 (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 course in taxonomy; TF; I term) Ownbey
- 5-805 (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 course in taxonomy; WS; II term) Beal
- 5-811 (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; MTh; I term) Meyer
- 5-815 (157). BRYOPHYTES.** Field and laboratory study of the mosses and liverworts of Minnesota with an emphasis on their local ecology and taxonomy. (5 cr; limited to 20 students; prereq 10 cr in biology or #; MTh; II term) Sharp
- 8-990 (299). RESEARCH PROBLEMS.** (Cr ar; prereq #) Staff

## Ecology and Behavioral Biology (Ecol)

- 5-018 (138). WETLAND ECOLOGY.** Nature, origin, and development of lake, marsh, swamp, and bog ecosystems; environmental control and productivity. (5 cr; limited to 15 students; prereq 15 cr in biology, introductory chemistry, or #...Biol 3-041 [80] recommended; TF; II term) Hofstetter
- 5-019 (139). PALEOECOLOGY.** Problems and techniques in the reconstruction of past plant communities and ecosystems from fossil evidence in deposits of quaternary age. Field and laboratory methods in pollen and plant macrofossil analysis. In 1971, topics in human paleoecology will be included. Text: Faegri and Iversen, *Textbook of Pollen Analysis*. (5 cr; limited to 15 students; prereq Ecol 3-001 [50] or Biol 3-041 [80] and Bot 3-201 [52] or equiv; WS; II term) Shay
- 5-026 (126). ENVIRONMENTAL MEASUREMENT AND ANALYSIS III.** Principles of biometeorology and basic measuring systems are applied to the terrestrial and aquatic habitats found in the Itasca region. (5 cr; limited to 15 students; prereq 1 yr physics, course in meteorology and #; WS; I term) Maxwell

- 5-812 (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; WS, I term; MTh, II term) Underhill, Brook
- 5-813 (120). ADVANCED LIMNOLOGY.** Current topics in limnological research with emphasis on the analysis of aquatic productivity. Lectures, laboratory, and field work. (5 cr; limited to 15 students; prereq Ecol 5-812 [119] or Bot 5-811 [155] or equiv; WS; II term) Megard
- 5-814 (135). COMMUNITY STRUCTURE AND FUNCTIONING.** Communities represented in Itasca Park and vicinity and their dynamic relationships. Also, the relationships of local communities to the flora and fauna of Minnesota as a whole. Use of modern methods of community analysis and measurement of environmental factors. (5 cr; limited to 20 students; prereq course in ecology; MTh; I term) Buell
- 5-815 (136). FIELD ETHOLOGY.** Studies of behavioral evolution, causation, and development stressing the relationship between environment and behavior. Field research techniques emphasized. Texts: Manning, *An Introduction to Animal Behavior*, and Tinbergen, *Social Behaviour in Animals*. (5 cr; limited to 15 students; prereq Zool 5-834 [135] or equiv; TF; I term) Oring
- 5-817 (162). VERTEBRATE ECOLOGY.** Field work on populations and their relationships to local environments; habitat analysis and ecological research methods. Individual and team research projects, field trips, and lectures. (5 cr; limited to 15 students; prereq course in ecology; MTh, I term; TF, II term) Schmid, Tester
- 5-890 (195). PROBLEMS.** (Cr ar; prereq #) Staff

### **Entomology (Ent), Fisheries, and Wildlife (FW)**

- 5-020 (159). 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 habitats of local species under ecological conditions governing the distribution of insect fauna of the region. Text: Borror and DeLong, *An Introduction to the Study of Insects*. (5 cr; limited to 15 students; prereq 10 cr in biology; TF; I term) Beer
- 5-130 (129). AQUATIC ENTOMOLOGY.** Identification and biology of aquatic and littoral insects in all stages. Text: Usinger, *Aquatic Insects of California*. (5 cr; limited to 15 students; prereq Ent 5-020 [159] or equiv; MTh; II term) Cook
- 5-904 (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, fisheries, and wildlife. (Cr ar; prereq #) Staff

## **Plant Pathology (PIPa)**

**5-102 (156). INTRODUCTORY MYCOLOGY.** 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; WS; II term) Bandoni

**8-110 (207). PROBLEMS IN MYCOLOGY.** Individual research work in taxonomy and biology of special groups of fungi. (Cr ar; prereq #) Staff

## **Soil Science (Soil)**

**5-114 (130). SPECIAL PROBLEMS IN SOILS.** Research, reading, instruction. (Cr ar; prereq #) Grigal

**5-532 (137). SOILS AND THE ECOSYSTEM.** The functional and structural aspects of soils as a component of the ecosystem. Interrelationships of soil and vegetation on the landscape. (5 cr; limited to 20 students; may be taken in place of Ecol 5-819 [127]; prereq course in ecology; MTh; I term) Grigal

## **Zoology (Zool)**

**5-814 (115). NATURAL HISTORY OF INVERTEBRATES.** Advanced taxonomic and ecological survey of the local fauna and independent ecological studies of several taxonomic groups. Texts: Eddy and Hodson, *Taxonomic Keys of the Common Animals of Minnesota*, and Pennak, *Freshwater Invertebrates of the United States*. (5 cr; limited to 20 students; prereq Biol 1-002 [2] or equiv; TF; I term) Gilbertson

**5-819 (119). NATURAL HISTORY OF VERTEBRATES.** Taxonomic and biological survey of the local fauna, detailed and independent study of the vertebrate classes, exclusive of the birds. (5 cr; limited to 20 students; prereq Biol 1-002 [2] or equiv; MTh; II term) Underhill

**5-834 (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 Biol 1-002 [2] or equiv; WS; I term) Warner

**5-843 (143). ANIMAL PARASITES.** Parasites of local fauna with special reference to helminths. Text: Cheng, *The Biology of Animal Parasites*. (5 cr; limited to 15 students; prereq Biol 1-002 [2] or equiv; TF; II term) Larson

**8-990 (299). GRADUATE RESEARCH.** (Cr ar; prereq #) Staff

## PROPOSED COURSE PROGRAMS

In order that students may plan more effectively to utilize the academic resources of the Biology Sessions, the following projected program of courses is presented. Courses will be offered as indicated although shifts may be made to take advantage of especially competent staff or to meet enrollment needs.

### Annual Course Offerings

Bot 5-801 (116), 5-805 (112), 5-811 (155)  
Ecol 5-812 (119), 5-813 (120), 5-814 (135), 5-815 (136),  
5-817 (162)  
Ent 5-020 (159), 5-130 (129)  
PIPa 5-102 (156)  
Soil 5-532 (137)  
Zool 5-814 (115), 5-819 (119), 5-834 (135), 5-843 (143)

### Courses for 1972

Bot 5-821 (159)	Lichens
Ecol 5-816 (152)	Ecology of Freshwater Algae
Ecol 5-818 (163)	Quantitative Ecology
For 5-252 (146)	Aerial Photo Interpretation

### Courses for 1973

Bot 8-970 (297)	Special Topics: Biology of the Ferns
Ecol 5-026 (126)	Environmental Measurement and Analysis III
Zool 5-107 (107)	Protozoology



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# Graduate Student Theses

- 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.
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- DEAN, RUSSELL A. High temperature tolerances of anuran amphibians. M.S. Thesis. University of North Dakota. 1966.
- DOERNIER, RICHARD L. A revision of the Nearctic species of *Hydrellia* (Diptera: Ephydriidae). Ph.D. Thesis, Iowa State University. 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.
- MASCHWITZ, DAVID E. Studies on insect dissemination of wood rotting fungi. M.S. Thesis. 1967.
- MEIEROTTO, RICHARD R. The distribution of small mammals across a prairie-forest ecotone. Ph.D. Thesis. 1967.
- WARNER, GLORIA M. The role of birds in the dissemination of fungi. M.S. Thesis. 1967.
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- FISHBECK, DALE W. A study of some phases in the ecology of *Rana sylvatica* Le Conte. Ph.D. Thesis. 1968.
- HAGGERTY, SHARON M. The ecology of the franklin's ground squirrel (*Citellus franklinii*) at Itasca Park, Minnesota. M.S. Thesis. 1968.
- PHILLIPS, GARY L. *Chrosomus erythrogaster* and *C. eos* (Osteichthyes: Cyprinidae): taxonomy, distribution, ecology. Ph.D. Thesis. 1968.
- BREDAHL, EDWARD A. A study of water balance in hibernating and nonhibernating *Citellus franklinii*. Ph.D. Thesis, University of North Dakota. 1969.
- EWERT, MICHAEL ALLYN. Seasonal movements of the toads *Bufo americanus* and *B. cognatus* in northwestern Minnesota. Ph.D. Thesis. 1969.
- HOFSTETTER, RONALD H. Floristic and ecological studies of wetlands in Minnesota. Ph.D. Thesis. 1969.
- 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. 1969.
- WILLIAMS, PATRICK K. Ecology of *Bufo hemiophrys* and *B. americanus* tadpoles in northwestern Minnesota. M.S. Thesis. 1969.
- HEDEEN, STANLEY E. The ecology and life history of the mink frog, *Rana septentrionalis* Baird. Ph.D. Thesis. 1970.
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- URBAN, RICHARD D. A study of the *Potamopsammon* of the Mississippi and Wild Rice Rivers. Ph.D. Thesis, University of North Dakota. 1970.

# Condensed Course Schedule\*

## I TERM

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Bot 5-811 (155)	Bot 5-801 (116)	Ecol 5-026 (126)	Bot 5-811 (155)	Bot 5-801 (116)	Ecol 5-026 (126)
Ecol 5-814 (135)	Ecol 5-815 (136)	Ecol 5-812 (119)	Ecol 5-814 (135)	Ecol 5-815 (136)	Ecol 5-812 (119)
Ecol 5-817 (162)	Ent 5-020 (159)	Zool 5-834 (135)	Ecol 5-817 (162)	Ent 5-020 (159)	Zool 5-834 (135)
Soil 5-532 (137)	Zool 5-814 (115)		Soil 5-532 (137)	Zool 5-814 (115)	

## II TERM

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Bot 5-815 (157)	Ecol 5-018 (138)	Bot 5-805 (112)	Bot 5-815 (157)	Ecol 5-018 (138)	Bot 5-805 (112)
Ecol 5-812 (119)	Ecol 5-817 (162)	Ecol 5-019 (139)	Ecol 5-812 (119)	Ecol 5-817 (162)	Ecol 5-019 (139)
Ent 5-130 (129)	Zool 5-843 (143)	Ecol 5-813 (120)	Ent 5-130 (129)	Zool 5-843 (143)	Ecol 5-813 (120)
Zool 5-819 (119)		PIPa 5-102 (156)	Zool 5-819 (119)		PIPa 5-102 (156)

\* Schedule only one course per day.

## Request for Reservation — ITASCA BIOLOGY SESSION

Name \_\_\_\_\_ Date \_\_\_\_\_

Current Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone: Office \_\_\_\_\_ Home \_\_\_\_\_

Status: Grad., Adult Special, Freshman, Sophomore, Junior, Senior (circle one)

University or College now attending: \_\_\_\_\_

If U. of M., college last enrolled in \_\_\_\_\_ Year \_\_\_\_\_

Reserve a place in following course(s) 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 payable to University of Minnesota) to be credited to the tuition fee on completion of registration. A letter of evaluation from my adviser and a recent transcript of my academic record is enclosed or will be sent directly. (circle one)

Please mail this form to:

Chairman, Field Biology Program  
 302 Bell Museum of Natural History  
 University of Minnesota  
 Minneapolis, Minnesota 55455





# UNIVERSITY OF MINNESOTA BULLETIN

MARCH 29, 1971

(2)

MJ



**1971  
SUMMER  
SESSION**

# UNIVERSITY OF MINNESOTA

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Volume LXXIV

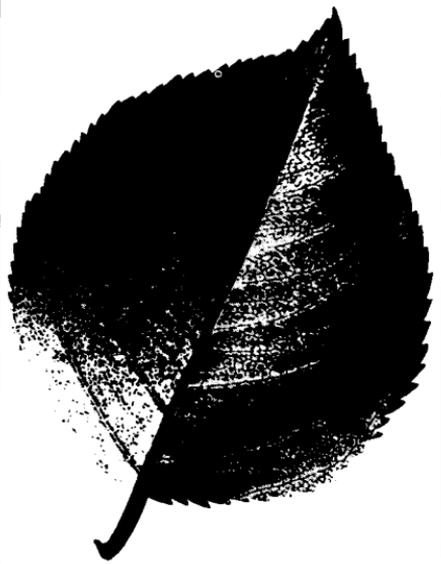
Number 2

March 29, 1971

### UNIVERSITY OF MINNESOTA BULLETIN

Published by the University of Minnesota, Office of Admissions and Records, 105 Morrill Hall, Minneapolis, Minnesota 55455, February through September inclusive. One issue in February, one issue in March, three issues in April, four issues in May, four issues in June, two issues in July, three issues in August and two issues in September. Second class postage paid at Minneapolis, Minnesota. Send change of address notices and other communications to Office of Admissions and Records, Minneapolis, Minnesota 55455.

The contents of this bulletin and of other University bulletins, publications, or announcements are subject to change without notice.



UNIVERSITY OF MINNESOTA

# 1971 SUMMER SESSION

FIRST TERM  
JUNE 14-JULY 16

SECOND TERM  
JULY 19-AUGUST 20

# Calendar

## FIRST TERM

May 24- June 3	Monday- Thursday	Advance Registration for First Term
June 14	Monday	Orientation and Registration; fees due
June 15	Tuesday	First Term classes begin
July 5	Monday	Holiday
July 12-16	Monday- Friday	Advance Registration for Second Term
July 16	Friday	Classes end at close of VI hour First Term closes

## SECOND TERM

July 19	Monday	Orientation and Registration; fees due
July 20	Tuesday	Second Term classes begin
August 20	Friday	Classes end at close of VI hour Commencement, 4 p.m. 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 14, 1971, and registrations subsequent to Monday, July 19, 1971.

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

All students not regularly enrolled spring quarter 1971 must be prepared to show their United States Social Security numbers.



## 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 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:

- 0-000 to 0-998 no credit
- 1-000 to 1-998 for freshmen and sophomores
- 3-000 to 3-998 for juniors, seniors, and fifth-year students
- 5-000 to 5-998 for juniors, seniors, fifth-year students, graduate students, and professional students
- 8-000 to 8-998 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 1-011 or 1-017 and Psy 1-002 (you must have had either course 1-011 or 1-017 of the same department and Psychology 1-002).

When no abbreviated departmental 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 DEPARTMENTAL ABBREVIATION CODE

Following is the list of abbreviated departmental prefixes used in conjunction with course numbers:

Acct, Accounting	Fren, French
AdPy, Adult Psychiatry	FS, Foreign Study
AEM, Aerospace Engineering and Mechanics	FSci, Food Science and Industries
Afro, Afro-American Studies	FW, Fisheries and Wildlife
AgEc, Agricultural and Applied Economics	GC, General College
AgEd, Agricultural Education	GE, General Engineering
AgEn, Agricultural Engineering	GCB, Genetics and Cell Biology
Agro, Agronomy and Plant Genetics	Geog, Geography
AmIn, American Indian Studies	Geo, Geology and Geophysics
AmSt, American Studies	Ger, German
Anat, Anatomy	Grk, Greek
Anes, Anesthesiology	
AnSc, Animal Sciences	HE, Home Economics
Anth, Anthropology	Heb, Hebrew
Arab, Arabic	HED, History and Philosophy of Education
Arch, Architecture	HEEd, Home Economics Education
ArEd, Art Education	Hist, History
Arth, Art History	Hlth, School Health Education
ArtS, Studio Arts	Hndi, Hindi
Ast, Astronomy	Hort, Horticultural Science
	Hum, Humanities
Ben, Bengali	Hydr, Hydromechanics
BFin, Finance	
BioC, Biochemistry (Agricultural)	IE, Industrial Engineering
Biol, Biology	Ind, Industrial Education
BLaw, Business Law	Indc, Indic
Bot, Botany	Ins, Insurance
BsEd, Business Education	IR, Industrial Relations
	Ital, Italian
CPsy, Child Psychology	
Chem, Chemistry	Jour, Journalism and Mass Communication
ChEn, Chemical Engineering	Jpn, Japanese
ChPy, Child Psychiatry	
Chin, Chinese	Lat, Latin
Clas, Classics	Lib, Library School
CIPy, Clinical Psychology	Ling, Linguistics
Comm, Communication	LMed, Laboratory Medicine
Comp, Composition	
CICS, Computer, Information, and Control Sciences	Math, Mathematics
CSPP, Counseling and Student Personnel Psychology	MdBc, Biochemistry (Medical)
	ME, Mechanical Engineering
DE, Distributive Education	MeAg, Mechanized Agriculture
Derm, Dermatology	Med, Medicine
	MedT, Medical Technology
Ecol, Ecology and Behavioral Biology	MetE, Metallurgy-Materials Science
Econ, Economics	Mgmt, Management
Educ, Higher Education and Teacher Education	MIS, Management Information Systems
EdAd, Educational Administration	MicB, Microbiology
EE, Electrical Engineering	MinE, Mining Engineering
EG, Engineering Graphics	Mktg, Marketing
Elem, Elementary Education	Mort, Mortuary Science
Engl, English	MthE, Mathematics Education
Ent, Entomology	MuEd, Music Education
EPsy, Educational Psychology	Mus, Music
FamS, Family Studies	Neur, Neurology
Fin, Finnish	NSci, Natural Science
For, Forestry	NuEd, Nursing Education
	Nurs, Nursing

Obst, Obstetrics and Gynecology  
OMgt, Office Management  
Opth, Ophthalmology  
OrSu, Orthopedic Surgery  
Otol, Otolaryngology

PA, Public Affairs  
Path, Pathology  
PE, Physical Education for Men and  
Women  
Ped, Pediatrics  
PetE, Petroleum Engineering  
Phcg, Pharmacognosy  
Phcl, Pharmacology  
Phil, Philosophy  
Phsl, Physiology  
Phys, Physics  
Phm, Pharmaceuticals  
PIPa, Plant Pathology  
PIPh, Plant Physiology  
PMed, Physical Medicine and  
Rehabilitation  
PO, Personal Orientation  
Pol, Political Science  
Port, Portuguese  
Prod, Production  
Psy, Psychology  
PsyF, Psychological Foundations  
PubH, Public Health (including Biometry)

QA, Quantitative Analysis

Rad, Radiology  
Rec, Recreation and Park Administration

Rhet, Rhetoric  
Russ, Russian

Scan, Scandinavian  
SchP, School Psychology  
SeEd, Secondary Education  
Soc, Sociology  
Soil, Soil Science  
Span, Spanish  
Spch, Speech  
SpEd, Special Education  
SSci, Social Science  
SSPA, Speech Science, Pathology, and  
Audiology  
Stat, Statistics  
Surg, Surgery  
SW, Social Work  
Swed, Swedish

Th, Theatre  
Tran, Transportation  
VAAna, Veterinary Anatomy  
VM, Veterinary Medicine  
VMic, Veterinary Microbiology and Public  
Health  
VObs, Veterinary Obstetrics  
VPaP, Veterinary Pathology and  
Parasitology  
VPP, Veterinary Physiology and  
Pharmacology  
VSR, Veterinary Surgery and Radiology

Zool, Zoology

# BUILDING ABBREVIATIONS

## MINNEAPOLIS

### East Bank

A, Armory  
Aero, Aeronautical Engineering  
Annex, Music Annex (321½ 14th Ave. S.E.)  
AH, Appleby Hall  
Arch, Architecture  
  
BFB, Bierman Field Buildings  
Bo, Botany  
BoG, Botany Greenhouse  
Bu, Burton Hall  
  
C, Chemistry  
CD, Child Development  
CenH, Centennial Hall  
CH, Cooke Hall  
ChE, Chemical Engineering  
ChRC, Children's Rehabilitation Center  
CMU, Coffman Memorial Union  
ComH, Comstock Hall  
  
DiehlH, Diehl Hall  
  
E, Main Engineering  
EconRes, Economics Research  
EdH, Eddy Hall  
Elth, Elliott Hall  
EE, Electrical Engineering  
Ex, Experimental Engineering  
  
FieldHse, University Field House  
FolH, Folwell Hall  
ForH, Ford Hall  
FraH, Fraser Hall  
FronH, Frontier Hall  
  
HL, St. Anthony Falls Hydraulic Laboratory  
HolB, Holman Building  
HS, Health Service  
  
J, Jones Hall  
Jach, Jackson Hall  
JOAd, Jackson-Owre Addition  
JohH, Johnston Hall  
  
KlaCt, Klaeber Court  
  
LyonL, Lyon Laboratories  
  
MasonH, Masonic Memorial Hospital  
Mayo, Mayo Memorial Hospital  
MDH, Minnesota Department of Health  
ME, Mechanical Engineering  
MH, Millard Hall  
MinMet, Mines and Metallurgy  
MMA, Mayo Memorial Auditorium  
MNH, Bell Museum of Natural History

MorH, Morrill Hall  
MRRC, Mineral Resources Research Center  
MUHi, Marshall-University High School  
MurH, Murphy Hall  
MusEd, Music Education  
  
NGW, Norris Gymnasium for Women  
NH, Nicholson Hall  
NMA, Northrop Memorial Auditorium  
  
Owre, Owre Hall  
  
P, Pillsbury Hall  
PB, Poucher Building  
PeikG, Peik Hall Gymnasium  
PeikH, Peik Hall  
Ph, Tate Laboratory of Physics  
PiH, Pioneer Hall  
PoH, Powell Hall  
Pt, Pattee Hall  
  
SaH, Sanford Hall  
ScH, Scott Hall  
SciCB, Science Classroom Building  
ShAn, Shops Annex  
SH, Shevlin Hall  
SpSci, Space Science Center  
Stad, Stadium  
  
TerH, Territorial Hall  
TNCE, Temporary, North Court of Engineering  
TNM, Temporary, North of Mines  
TSE, Temporary, South Court of Engineering  
TSF, Temporary, South of Folwell  
  
VCHH, Variety Club Heart Hospital  
VH, Vincent Hall  
  
WaLib, Walter Library  
WeH, Wesbrook Hall  
WmsA, Williams Arena  
WuH, Wulling Hall  
  
Z, Zoology

### West Bank

AndH, Anderson Hall  
ArtB, Art Building  
  
BA, Business Administration Building  
BlegH, Blegen Hall  
  
MdbH, Middlebrook Hall  
  
OMWL, O. Meredith Wilson Library  
SocSci, Social Sciences Building

**ST. PAUL**

**AdmServ, Administrative Services**  
 (2610 University Ave.)  
**AgBot, Agricultural Botany**  
**AgEng, Agricultural Engineering**  
**AgLib, Agriculture Library**  
**Agr, Agronomy**

**BaH, Bailey Hall**  
**BeH, Berry House (1304 Cleveland Ave. N.)**  
**BFH, Botany Field House**  
**BoHH, Botany Headhouse**

**CI, Crop Improvement**  
**CofH, Coffey Hall**

**DinC, Dining Center**

**EntFW, Entomology, Fisheries, and Wildlife**

**FP, Forest Products**  
**FSI, Food Science and Industries**

**GH, Green Hall**  
**GorL, Gortner Laboratory of Biochemistry**  
**Gym, Gymnasium**

**HH, Haecker Hall**  
**Hr, Horticulture**  
**HS, Health Service**

**LsPav, Livestock Pavilion**

**McNH, McNeal Hall**  
**MS, Machinery Shop**  
**MSh, Meat Shop**

**NorH, North Hall**  
**NWGH, Northwest Greenhouses**

**PalmC, Palmer Classroom Building**  
**PetH, Peters Hall**  
**PISci, Plant Sciences**  
**PM, Post-Mortem**  
**PP, Plant Pathology**  
**PPFL, Plant Pathology Field Laboratory**

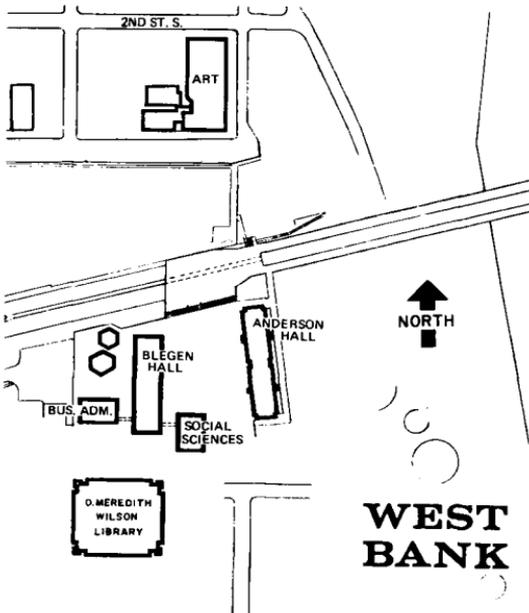
**RustL, Rust Laboratory (USDA)**

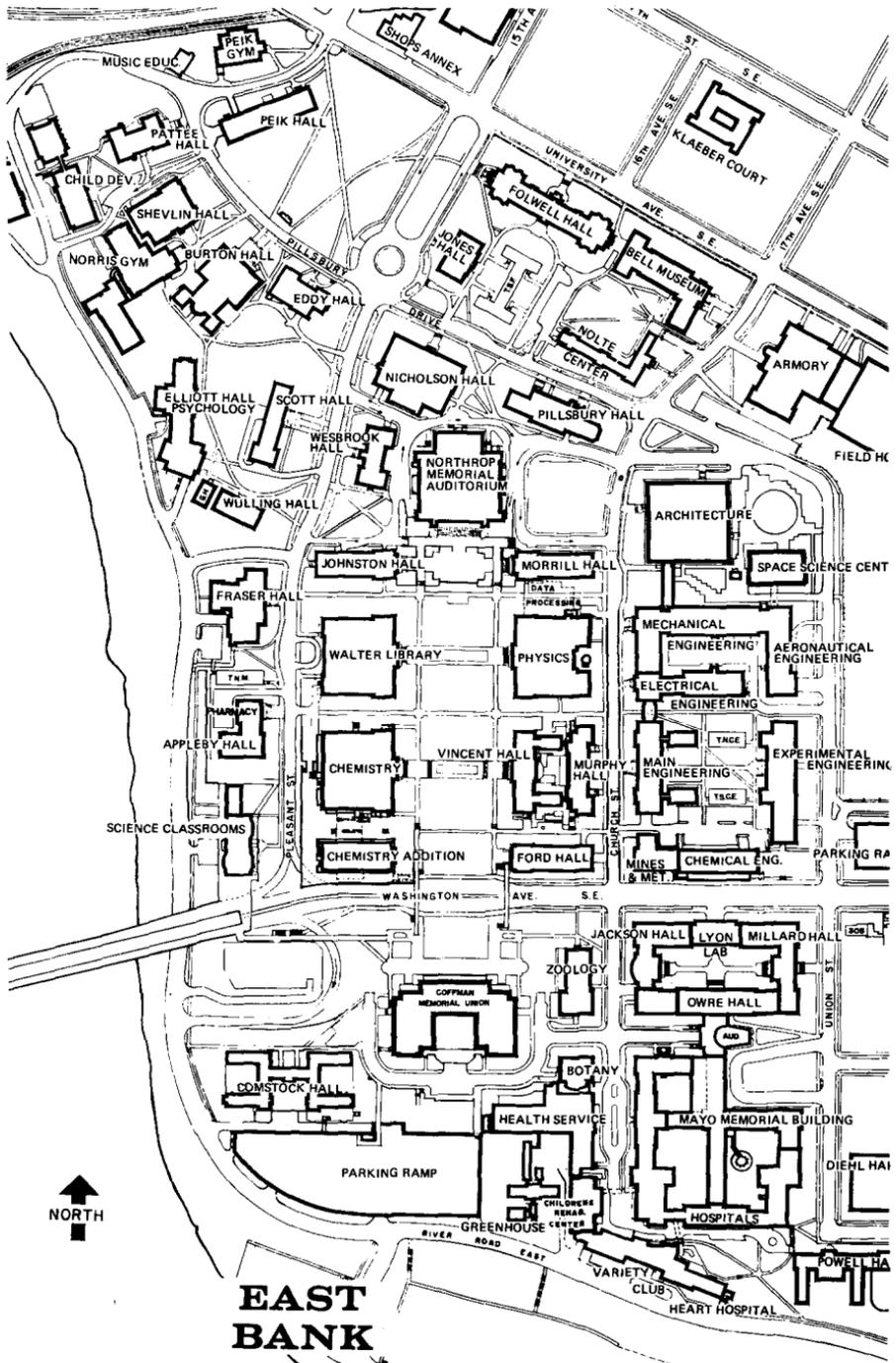
**SnH, Snyder Hall**  
**So, Soils**  
**StCen, Student Center**

**TEH, Temporary, East of Haecker**  
**TH, Thatcher Hall**  
**TSC, Temporary, South of Coffey Hall**

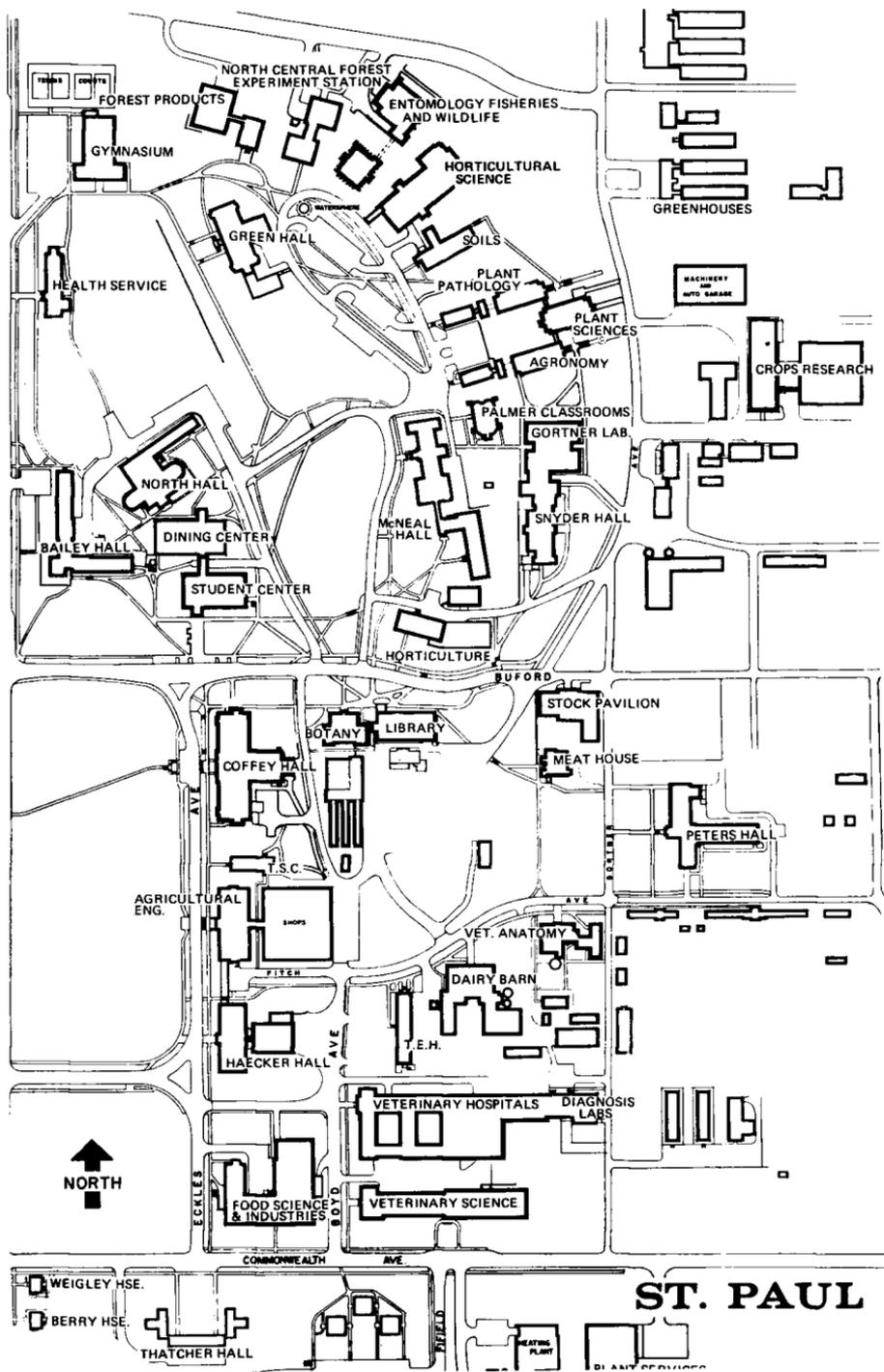
**VetA, Veterinary Anatomy**  
**VetC, Veterinary Clinic**  
**VetDL, Veterinary Diagnostic Laboratories**  
**VetIB, Veterinary Isolation Buildings**  
**Vets, Veterinary Science**

**WeiH, Weigley House**  
**WRL, Weed Research Laboratory**





**EAST  
BANK**



**ST. PAUL**



## Admission

Summer Session courses 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.

### 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 Office of Admissions and Records prior to May 1. All freshman applicants are required to present ACT scores before final admission can be granted. For further information see the *General Information Bulletin* or write to Office of Admissions and Records, University of Minnesota, Minneapolis, Minnesota 55455.

### SUMMER-ONLY 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-only students.

*Persons 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-only students.

All students not regularly enrolled spring quarter 1971 must be prepared to show their United States Social Security numbers.

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

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

## **GRADUATE STUDENTS**

The procedure for admission of graduate students is discussed in the Graduate School section of this bulletin, on page 183.

## **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 (\$15 for Graduate School) credentials examination fee must accompany all applications.

All students should consult the *General Information Bulletin* 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 codes *must* accompany requests 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-only students" in a preceding section 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 1971, 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.



## Registration

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 correct registration period. All students not regularly enrolled during spring quarter 1971 must be prepared to show their United States Social Security numbers.

### FIRST TERM—ADVANCE REGISTRATION

#### Dates • May 24 to June 3

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 24, through Thursday, June 3, 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.

Students who register for the First Term and who plan to attend Second Term should register for both terms at the same time.

Registration will not be open between June 7 and June 11.

## Place

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-only 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, 130 Coffey Hall (St. Paul)  
Biological Sciences, 123 Snyder Hall (St. Paul) or 307 Zoology Building  
Business Administration, 225 Business Administration Building (West Bank)  
Dental Hygiene, 360A Millard Hall  
Dentistry, 136 Owre Hall  
Education, 206 Burton Hall  
Forestry, 130 Coffey Hall (St. Paul)  
General College, 20 Nicholson Hall  
Graduate School, 316 Johnston Hall  
Home Economics, 130 Coffey Hall (St. Paul)  
Institute of Technology, 26 Main Engineering Building  
Liberal Arts  
    Summer-only Students  
        114 Johnston Hall  
    Regularly Admitted Students  
        Lower Division, 216 Johnston Hall  
        Upper Division:  
            Humanities, 206 Folwell Hall  
            Science and Math (and Central), 223 Johnston Hall  
            Social Sciences, 122 Social Sciences Building (West Bank)  
            Honors, 115 Johnston Hall  
    Adult Special Students, 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, 130 Coffey Hall (St. Paul)

## FIRST TERM—FINAL REGISTRATION

**Date • Monday, June 14, 8 a.m. to 3:15 p.m.**

Registration on Tuesday, June 15, incurs late fee.

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

June 16-18 .....	\$ 6.00
June 21-25 .....	10.00
Thereafter .....	20.00

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.*

### Place

#### A. Registration at Coffman Union Ballroom

Education

Graduate School (registration material for students in St. Paul departments should be obtained at 130 Coffey Hall, St. Paul)

Medical School

College of Liberal Arts (summer-only students)

#### B. Registration at College Offices

Agriculture, 130 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

Forestry, 130 Coffey Hall (St. Paul)

General College, 20 Nicholson Hall

Home Economics, 130 Coffey Hall (St. Paul)

Institute of Technology

Architecture, Engineering, and Mathematics, 26 Main Engineering Building

Chemistry, 139 Chemistry Building

Geology and Geophysics, 108 Pillsbury Hall

Physics, 148 Tate Laboratory of Physics

Liberal Arts (regularly admitted students)

Lower Division, 216 Johnston Hall

Upper Division:

Humanities, 206 Folwell Hall

Science and Math (and Central), 223 Johnston Hall

Social Sciences, 122 Social Sciences Building (West Bank)

Honors, 115 Johnston Hall

Adult Special Students, 225 Johnston Hall

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

University College, 106 Nicholson Hall

Veterinary Medicine, 130 Coffey Hall (St. Paul)

## Registration Procedure at Coffman Union

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

- Step 1.** Obtain registration material on 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-only 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, and Medical School—North Star Room. Follow the blue line.)
- Step 5. Class reservations:** CLA courses—Ski-U-Mah Room; Education courses—North Star Room. If any of your courses are listed on pages 29-32 of the bulletin, you must obtain a class reservation 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—the Pop Inn, 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 payment is due June 15. Your fee statement for the Second Term will be mailed to you on June 28, and it will be payable on or before July 20.

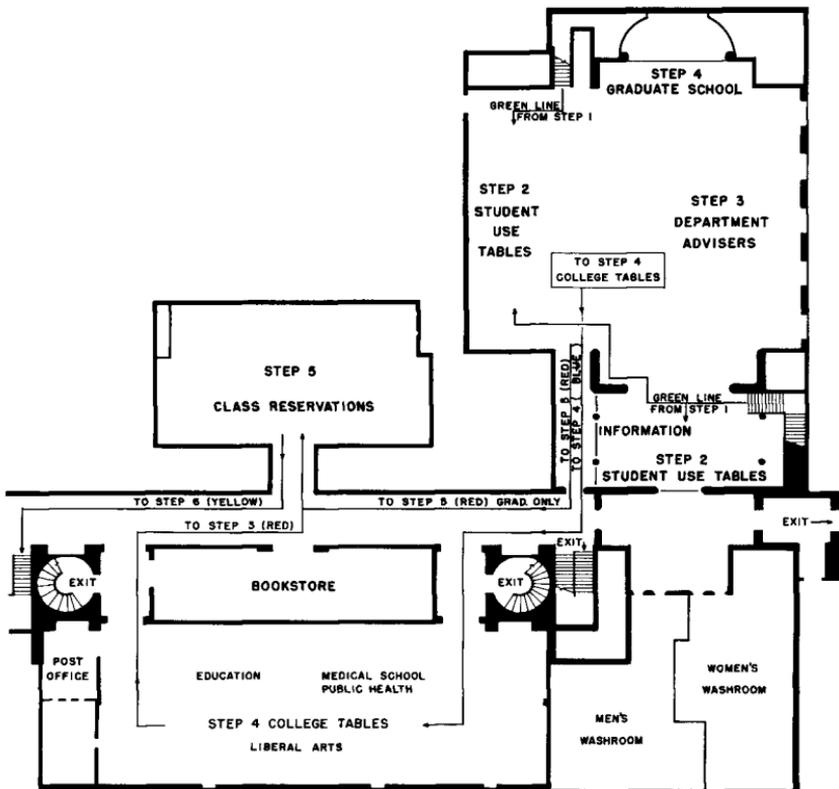
If you are a new student who has been admitted for the summer and the ensuing regular session, this is the place and the time to turn in your Registration Permit—and also your Medical Appointment Card, which you should obtain at the University Health Service.

If you are a student enrolling for 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) the depository 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 postmarked if mailed, not later than Tuesday, June 15.

**Step 8.** Begin classes Tuesday. Minneapolis classes on the East Bank and on the West Bank begin at 8:00 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)

- 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 130 Coffey Hall, St. Paul.

## SECOND TERM—ADVANCE REGISTRATION

### Dates • July 12 to July 16

Students registered for the First Term who have not registered for Second Term should register during the advance registration period for Second Term, July 12-16. Students who are not registered for the First Term may register during the advance registration period for Second Term or on July 19.

### Place

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-only 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 Second Term will take place at the college offices as listed below:

Agriculture, 130 Coffey Hall (St. Paul)  
Biological Sciences, 123 Snyder Hall (St. Paul) or 307 Zoology Building  
Business Administration, 225 Business Administration Building (West Bank)  
Dental Hygiene, 360A Millard Hall  
Dentistry, 136 Owre Hall  
Education, 206 Burton Hall  
Forestry, 130 Coffey Hall (St. Paul)  
General College, 20 Nicholson Hall  
Graduate School, 316 Johnston Hall  
Home Economics, 130 Coffey Hall (St. Paul)  
Institute of Technology, 26 Main Engineering Building  
Liberal Arts  
    Lower Division, 216 Johnston Hall  
    Upper Division:  
        Humanities, 206 Folwell Hall  
        Science and Math (and Central), 223 Johnston Hall  
        Social Sciences, 122 Social Sciences Building (West Bank)  
        Honors, 115 Johnston Hall  
    Adult Special Students, 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, 130 Coffey Hall (St. Paul)

## SECOND TERM—FINAL REGISTRATION

**Date • Monday, July 19, 8 a.m. to 4 p.m.**

Registration on Tuesday, July 20, incurs late fee.

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

July 20-23 .....	\$ 6.00
July 26-30 .....	10.00
Thereafter .....	20.00

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.*

### Place

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

#### B. Registration at College Offices

Agriculture, 130 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  
Forestry, 130 Coffey Hall (St. Paul)  
General College, 20 Nicholson Hall  
Graduate School, 316 Johnston Hall  
Home Economics, 130 Coffey Hall (St. Paul)  
Institute of Technology, 26 Main Engineering Building  
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    Regularly Admitted Students  
        Lower Division, 216 Johnston Hall  
        Upper Division:  
            Humanities, 206 Folwell Hall  
            Science and Math (and Central), 223 Johnston Hall  
            Social Sciences, 122 Social Sciences Building (West Bank)  
            Honors, 115 Johnston Hall  
    Adult Special Students, 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, 130 Coffey Hall (St. Paul)

## Procedure

- 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 130 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 20.

## CHANGES IN REGISTRATION

After a student's registration has been accepted by the University recorder, any change must be approved by the Committee on Student Scholastic Standing or the dean of the college through which the student is 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.*

Friday of the third week of classes is the last day to cancel with "W." Thereafter, cancellation is with "I" if the student is failing and with "no grade" only if he is passing at the time of cancellation. Cancellation during the fifth week generally is not permitted.

**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:

### Tuition Fee (per term)

3 credits or less .....	\$ 42.00
4 credits (\$14.00 per cr) .....	56.00
5 credits .....	70.00
6 credits .....	84.00
7 credits .....	98.00
8 credits .....	112.00
9 credits .....	126.00
10 credits (\$7.00 per cr) .....	133.00
11 credits .....	140.00
12 credits .....	147.00

### Student Services Fee‡‡

Per term; not included in tuition fee ..... \$20.50

**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 student services fee.

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‡‡ The student services fee of \$20.50 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*.

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 \$30 per summer term with student services fee optional to maintain required continuous registration.

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 6 credits, \$75 per term; 6 credits or less or thesis-only, \$37.50 per term plus student services fee.

For additional fee information, refer to the *General Information Bulletin*.

## **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:

### **HEALTH SERVICE** (field trips and foreign study)

Required of students on University field trips such as anthropology, civil engineering, geology, mines, etc.—\$10.50 per summer term

Students in University-sponsored foreign travel groups are required to enroll in the Blue Cross-Blue Shield program or take out other adequate insurance

### **ITASCA BIOLOGICAL STATION**

Laboratory Fee—\$8.50

Research Table Fee—\$5.00 per week††

### **MATHEMATICS**

Math 0-009—\$70.00 plus student services fee

### **MUSIC**

Two Half-hour Individual Lessons per Week—\$50.00

Four Half-hour Individual Lessons per Week—\$100.00

Two (2 cr) Half-hour Individual Lessons per Week—\$50.00

Four (4 cr) Half-hour Individual Lessons per Week—\$100.00

Student paying \$50.00 or more in music fees pays only the special fees indicated for these courses. Such students may take other courses by paying regular summer tuition and student services fee in addition to the applied music fee.

Upper Division music majors should check with Music Department office about course fees.

### **PHYSICAL EDUCATION**

PE 1-205—\$20.00 per term

### **PUBLIC HEALTH**

5-755 (Field Work)—\$100.00 per year

5-068 (Field Work)—\$100.00

5-239 (Hospital Problems)—\$150.00

8-002 (September Field Course)—\$200.00

8-246, 8-247 (Ground Water)—\$251.00

††In lieu of tuition.

## **SPECIAL FEES**

### **MUSIC PRACTICE ROOM**

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

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

Small Organ—25c per hour

Large Organ—50c per hour

### **PHYSICAL EDUCATION††**

#### **Cooke Hall**

Locker and Towel Fee—\$5.00 deposit

Gym Clothing Rental Fee—\$6.00

#### **Norris Gymnasium**

Locker and Towel Fee—\$4.00 plus \$1.00 deposit

#### **St. Paul Gymnasium**

Locker and Towel Fee—\$5.00

### **SPEECH AND HEARING CLINIC—Nonstudents**

Speech Therapy (days)—\$2.00 per term

Speech Therapy (evenings)—\$2.50 per term

Consultation (outpatient)—\$5.00

Evaluation (outpatient)—\$20.00

Summer Session Intensive Therapy—\$125.00

### **SPEECH AND HEARING CLINIC—Students**

Special Clinical Treatment—\$5.00 per term

### **MISCELLANEOUS**

Foreign Student Health Fee—\$2.50 per term (required of all noncitizens)

Foreign Student Aid Fee—\$1.00 per term (required of all noncitizens)

Credentials Examination Fee—\$10.00 (\$15.00 for Graduate School)

Graduation Fee (each degree; includes small diploma)—\$15.00

Large Diploma—\$7.50

Master's Thesis Binding—\$5.00

Ph.D. Thesis Binding—\$25.00

Special Examination—\$20.00

Record Service Fee—\$3.00 (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 is optional. Commencement exercises for Summer Session candidates will be held on Friday, August 20, at 4 p.m.

6. Graduation Fee—each degree, \$15.

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 undergraduate and graduate students must obtain class reservation cards for the courses listed below. Students registering for College of Education and College of Liberal Arts courses on June 14 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.

### ITASCA BIOLOGY SESSION — First Term

<b>Botany</b> 5-801, 5-811—CofH 130	<b>Soil Science</b> 5-532—CofH 130
<b>Ecology and Behavioral Biology</b> 5-026, 5-812, 5-814, 5-815, 5-817—CofH 130	<b>Zoology</b> 5-814, 5-834—CofH 130
<b>Entomology, Fisheries, and Wildlife</b> 5-020—CofH 130	

### ITASCA BIOLOGY SESSION — Second Term

<b>Botany</b> 5-805, 5-815—CofH 130	<b>Plant Pathology</b> 5-102—CofH 130
<b>Ecology and Behavioral Biology</b> 5-018, 5-019, 5-812, 5-813, 5-817—CofH 130	<b>Zoology</b> 5-819, 5-843—CofH 130
<b>Entomology, Fisheries, and Wildlife</b> 5-130—CofH 130	

### TWIN CITIES CAMPUS — First Term

<b>Accounting</b> All courses—BA 225	<b>Botany</b> See Itasca Biology Session 5-105, 5-142—Bo 8
<b>Aerospace Engineering and Mechanics</b> All courses—MainE 136	<b>Business Finance</b> 3-000, 3-300, 3-500, 8-000—BA 225
<b>Agricultural Education</b> 8-001—CofH 130	<b>Business Law</b> 3-058, 8-158—BA 225
<b>American Indian Studies</b> All courses—JohH 12	<b>Chemistry</b> 1-004, 1-006—CofH 130 for AFHE, Main- E 136 for IT, and JohH 12 for other students
<b>American Studies</b> 1-101, 5-102, 8-202—JohH 12	All other courses under 8-000—MainE 136 for IT, and JohH 12 for other students
<b>Anthropology</b> All courses under 5-970—JohH 12	<b>Communications</b> 1-003—JohH 12
<b>Architecture</b> All courses—MainE 136	<b>Computer, Information, and Control Sci- ences</b> All courses—MainE 136
<b>Art Education</b> 1-208, 3-001, 3-010, 3-020—Bu 206	<b>Counseling, Student Personnel Psychol- ogy</b> 8-301, 8-320—Bu 206
<b>Art History</b> 1-001, 1-011, 1-013, 5-433, 5-766, 5-911 —JohH 12	<b>Distributive Education</b> 5-100, 5-125, 5-300—Bu 206
<b>Art Studio</b> All courses under 8-101—JohH 12	<b>Ecology and Behavioral Biology</b> See Itasca Biology Session
<b>Biology</b> 1-001, 3-012, 5-605—CofH 130 for AFHE, and JohH 12 for other stu- dents	

**Economics**

All courses under 5-970 except 3-970,  
5-151, 5-152, 5-161, 5-164—JohH 12

**Educational Administration**

5-128—Bu 206

**Electrical Engineering**

All courses—MainE 136

**Elementary Education**

All courses under 8-916 except 3-604,  
5-109—Bu 206

**Engineering Graphics**

All courses—MainE 136

**English**

1-001, 1-003, 1-821, 1-938, 3-155, 3-156,  
3-722—JohH 12

**Entomology, Fisheries, and Wildlife**

See Itasca Biology Session

**Family Studies**

All courses—JohH 12

**General College**

All courses—NH 20

**Geography**

1-425, 3-511, 5-441—JohH 12

**Geology and Geophysics**

1-001, 5-051—MainE 136 for IT, and  
JohH 12 for other students  
All other courses—MainE 136

**German**

All courses except 3-001, 3-031, 5-001  
—JohH 12

**History and Philosophy of Education**

3-090—Bu 206

**Home Economics**

1-401, 1-521, 1-531, 1-552, 1-533, 3-263,  
3-264, 3-581, 3-582, 5-200, 5-312, 5-  
531, 5-533, 5-558, 5-568, 5-662—CofH  
130

**Home Economics Education**

5-405, 5-410—CofH 130

**Humanities**

All courses except 3-970—JohH 12

**Industrial Education**

5-303, 5-600—PeikH 125

**Industrial Engineering**

All courses—MainE 136

**Industrial Relations**

3-002, 5-022—BA 225

**Journalism**

1-005, 1-011, 1-201, 3-221, 3-241, 3-451,  
5-184—JohH 12

**Library**

All courses under 8-970 except 8-002,  
8-206—JohH 12

**Management**

3-001, 3-004, 8-001—BA 225

**Management Informations Systems**

All courses—BA 225

**Marketing**

3-000, 3-065, 3-085, 8-000, 8-085—BA  
225

**Mathematics**

All IT—MainE 136

All CLA—JohH 12

**Mathematics Education**

All courses except 8-980—Bu 206

**Mechanical Engineering**

All Courses—MainE 136

**Mechanized Agriculture**

1-020—CofH 130

**Metallurgy-Materials Science**

All courses—MainE 136

**Mortuary Science**

All courses—MainE 136

**Music**

1-001—JohH 12

**Music Education**

3-011, 5-322—Bu 206

**Natural Science**

1-001—JohH 12

**Personal Orientation**

1-001—JohH 12

**Philosophy**

1-001, 1-002, 1-003, 1-004, 3-001—JohH  
12

**Physical Education for Men and Women**

All undergrad courses under 3-110—  
JohH 12  
3-170, 3-171, 3-327, 5-620—Bu 206

**Physics**

1-015—CofH 130 for AFHE, MainE 136  
for IT, and JohH 12 for other stu-  
dents

All other courses—MainE 136

**Plant Pathology**

See Itasca Biology Session

**Political Science**

1-051, 3-382, 5-308, 5-317, 5-448, 5-659,  
5-661, 5-737, 5-739, 5-884—JohH 12

**Production**

3-050, 8-150—BA 225

**Psychology**

1-004, 1-005—JohH 12

**Psychological Foundations**

5-110, 5-120, 5-140, 5-141, 5-160, 5-170,  
8-310—Bu 206

**Quantitative Analysis**

3-052—BA 225

**Rhetoric**

All courses—CofH 130

**School Health Education**

All courses—Bu 206

**School Psychology**

5-310, 5-311—Bu 206

**Secondary Education**3-150, 3-155, 3-600, 5-109, 5-110, 5-112  
—Bu 206**Social Science**

All courses—JohH 12

**Social Work**

5-010—JohH 12

**Sociology**

3-801, 3-802—JohH 12

**Soil Science**

See Itasca Biology Session

**Spanish**

All courses under 5-392—JohH 12

**Special Education**

5-101, 5-110, 5-610—Bu 206

**Speech**All courses under 5-615 except 3-190,  
5-101, 5-211—JohH 12**Speech Science, Pathology, and Audiology**

5-514—JohH 12

**Theatre Arts**All courses under 5-813 except 1-501,  
5-171, 5-186, 5-516—JohH 12**Transportation**

3-064—BA 225

**Zoology**

See Itasca Biology Session

**TWIN CITIES CAMPUS — Second Term****Accounting**

All courses—BA 225

**Aerospace Engineering and Mechanics**

All courses—MainE 136

**American Studies**

1-102—JohH 12

**Anthropology**

All courses under 5-970—JohH 12

**Architecture**

All courses—MainE 136

**Art Education**

1-207, 3-001, 3-020, 5-384—Bu 206

**Art History**

All courses—JohH 12

**Art Studio**

All courses—JohH 12

**Biology**1-002—CofH 130 for AFHE, and JohH  
12 for other students**Botany**

See Itasca Biology Session

**Business Finance**

3-000, 3-100, 3-300—BA 225

**Chemistry**1-005, 3-302—JohH 12  
All other courses under 8-000—MainE  
136 for IT, and JohH 12 for other  
students**Computer, Information, and Control Sciences**

All courses except 5-000—MainE 136

**Counseling, Student Personnel**

5-101—Bu 206

**Distributive Education**

5-105, 5-110—Bu 206

**Ecology and Behavioral Biology**

See Itasca Biology Session

**Economics**All courses under 5-970 except 3-970,  
5-131, 5-151, 5-152, 5-162, 5-165  
—JohH 12**Educational Administration**

5-139—Bu 206

**Electrical Engineering**

All courses—MainE 136

**Elementary Education**

All courses under 8-916—Bu 206

**English**

All courses under 3-875—JohH 12

**Entomology, Fisheries, and Wildlife**

See Itasca Biology Session

**Family Studies**

All courses—JohH 12

**General College**

All courses—NH 20

**Geology and Geophysics**1-002, 5-052—MainE 136 for IT, and  
JohH 12 for other students  
All other courses—MainE 136**German**

All courses—JohH 12

**History and Philosophy of Education**

3-090, 5-141, 5-182—Bu 206

**Home Economics**

1-553, 3-581, 3-582, 5-587—CofH 130

**Home Economics Education**

3-300—CofH 130

**Humanities**

All courses under 3-970—JohH 12

- Industrial Engineering**  
All courses—MainE 136
- Industrial Relations**  
3-002, 5-022—BA 225
- Library**  
All courses under 8-970 *except* 5-304,  
8-004—JohH 12
- Management**  
3-001, 3-002—BA 225
- Marketing**  
3-000, 8-000—BA 225
- Mathematics**  
All IT—MainE 136  
All CLA—JohH 12
- Mathematics Education**  
5-321, 5-345—Bu 206
- Mechanical Engineering**  
All courses—MainE 136
- Mortuary Science**  
All courses—MainE 226
- Music**  
1-001—JohH 12
- Music Education**  
3-011—Bu 206
- Natural Science**  
1-002—JohH 12
- Personal Orientation**  
1-001—JohH 12
- Philosophy**  
1-001—JohH 12
- Physical Education for Men and Women**  
All courses under 3-172—JohH 12  
3-172, 3-327—Bu 206
- Physics**  
All courses—MainE 136
- Plant Pathology**  
See Itasca Biology Session
- Political Science**  
1-002, 1-026, 1-041, 5-307—JohH 12
- Psychology**  
1-004, 1-005—JohH 12
- Psychological Foundations**  
5-110, 5-120—Bu 206
- Quantitative Analysis**  
3-053—BA 225
- Rhetoric**  
All courses—CofH 130
- School Health Education**  
3-330, 5-101—Bu 206
- School Psychology**  
5-310, 5-311—Bu 206
- Secondary Education**  
3-155, 5-108—Bu 206
- Social Science**  
3-503, 3-981—JohH 12
- Social Work**  
5-010—JohH 12
- Spanish**  
All courses under 5-232—JohH 12
- Special Education**  
5-101, 5-111, 5-320, 5-611—Bu 206
- Speech**  
All courses under 5-441 *except* 3-190—  
JohH 12
- Theatre Arts**  
All courses under 5-970 *except* 1-501—  
JohH 12
- Transportation**  
3-054—BA 225
- Zoology**  
See Itasca Biology Session



## **General Information**

### **DATES OF SUMMER SESSION**

The Summer Session consists of two terms of 5 weeks each—June 14 through July 16, and July 19 through August 20. 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 14. First Term classes in Minneapolis (East and West Banks) will begin Tuesday, June 15, at 8 a.m. Classes in St. Paul will begin at 8:30 a.m., Tuesday, June 15.

Payment of fees for the Second Term closes at 3:30 p.m. on Monday, July 19. Classes for Second Term will open Tuesday, July 20.

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

### **HUMAN RIGHTS**

The Board of Regents has committed itself and the University of Minnesota to the policy that there shall be no discrimination in the treatment of persons because of race, creed, color, sex, or national origin. This is a guiding policy in the admission of students in all colleges and in their academic pursuits. It is also to be a governing principle in University-owned and University-approved housing, in food services, student unions, extracurricular activities and all other student and staff services. This policy must also be adhered to in the employment of students either by the University or by outsiders through the University and in the employment of faculty and civil service staff.

## **LIBRARY FACILITIES AND SERVICES**

The University library system with approximately 2,950,000 volumes, is one of the 10 largest of its kind in the United States. As such it provides the basic resources for the teaching and research needs of the students and faculty of the University. There are many library units on campus, with the O. Meredith Wilson Library serving as headquarters of the library system. A library handbook will serve to guide the user to the correct location of the materials needed.

### **O. Meredith Wilson Library**

This new library building was occupied in September 1968. It contains the humanities and social sciences collections of the University Library. Located on the West Bank with other new buildings of the expanded campus, it houses the administrative offices, the central processing and resources staffs, as well as the major service units.

Among the many specialized collections within the Wilson Library, particularly noteworthy are the Ames Library of South Asia, the James Ford Bell Library which contains rare volumes dealing with exploration and trade from the 16th through 18th centuries, the East Asian Library, the Middle East Library, and the Special Collections Department which has responsibility for the custody of rare books and unique collections.

Other specialized resources in the Wilson Library are the Newspaper Division, the Map Division, the Documents Division, the Business Reference Service, and a collection of recordings of the spoken word.

Among the services provided in the Wilson Library are a Reserve Room, a Circulation Service, a Reference and a Bibliography Service, and an Interlibrary Loan Service.

### **Walter Library**

Until 1968, this large building served as the University's central library. It now contains the Education Library, which serves education, psychology, and library science; the Chemistry Library, which provides service also for the science and technology needs; a Reserve Book Room serving East Bank classes; and the Music Library, which includes listening facilities.

Specialized services in the Walter Library include the Technical Information Service and the University Archives.

### **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 the East Bank are the Art, Architec-

ture, Mathematics, Physics, Chemistry, Music, Mines and Metallurgy, Journalism, Geology, and Pharmacy Libraries. Also on the East Bank are the more extensive collections of the Bio-Medical Library, the Engineering Library, and the Law Library. On the West Bank there is a Public Administration Library.

### **St. Paul Campus Libraries**

The St. Paul Campus is served by a central library which houses publications relating to agriculture and home economics. Outlying specialized collections are in departmental libraries for Forestry, Biochemistry, Plant Pathology, Entomology, and Veterinary Medicine.

### **Library Hours**

During the Summer Session, hours of service for libraries are posted in the individual libraries concerned and are also published in the Official Daily Bulletin. In general, except for holidays and the vacation period following Second Term, the major libraries are open from 8 a.m. to 11 p.m. on weekdays; from 8 a.m. to 5 p.m. on Saturdays; and from 2 p.m. to 11 p.m. on Sundays.

### **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 charges to all students who have paid the student services 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 SERVICE**

If you are a student on the Minneapolis or St. Paul Campus and need a job to help meet school expenses, the Student Employment Service, 30 Wulling Hall, Minneapolis Campus, 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.

Dormitory counseling opportunities are also available for men and women in the Residence Halls Counseling Program. Write to the Student Employment Service for further information.

## **STUDENT COUNSELING BUREAU**

The Student Counseling Bureau, 101 Eddy Hall, offers counseling on a year-round basis to all students. This is a University-wide service for students in all of the University's colleges and schools. Counseling is available not only for those in all fields of study, but also for those at any stage of academic progress, from the beginning freshman to students at graduate and professional levels. The range of concerns brought to the Student Counseling Bureau is likewise wide, including vocational choice, educational planning, reading and study improvement, family relationships, peer relationships, and sex-related problems. Tests and inventories are often used to assist the counseling process in the various problem areas. Referrals are sometimes made to appropriate University and community resources. There is no fee, and counseling and testing information is confidential.

If you are interested in using this counseling service, come to 101 Eddy Hall and tell the receptionist you would like to see a counselor. Counselors are available from 8 a.m. to 4:30 p.m., Monday through Friday, to see you on a walk-in basis.

## **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 between campuses can purchase tickets at the Bursar's Office in Minneapolis or the Cashier's Office in St. Paul.

## **UNIVERSITY POST OFFICE**

The University post office contract stations are located on the ground floor of Coffman Memorial Union (Minneapolis) and in Coffey Hall (St. Paul). Most 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: Parking Services, 2030 University Avenue S.E., University of Minnesota, Minneapolis, Minnesota 55455.

Parking is also available on a daily basis in the University's outdoor parking lots which are located on and adjacent to the 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-eight student religious organizations, representing 29 faiths and denominations, function on the Twin Cities Campus. There are 15 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, 306 Walter Library (telephone 373-4076).

## **HOUSING AND FOOD SERVICE**

### **Minneapolis Residence Halls**

Comstock Hall, a residence for women on the East Bank, and Middlebrook Hall, an air-conditioned coeducational residence on the West Bank, have been reserved for Summer Session students. Each hall will offer comfortable living in large single and double rooms and a 7-day (19-meal) food service program under the direction of trained food managers. In both terms, the meal service will begin the first day of regularly scheduled classes.

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

### **St. Paul Residence Hall**

Bailey Hall is an attractive coeducational residence hall offering comfortable accommodations in large double rooms. Thirty spaces are available for men and women summer students. The remaining 270 spaces are reserved for conference participants. A room and 7-day (19-meal) board contract will be offered. Meals will be served beginning on 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 or the Director of Housing, University of Minnesota, Minneapolis, Minnesota 55455.

## **Off-Campus Housing—Private Residences**

Rooms in private homes, rooming houses, fraternities, and sororities are available. Vacancy listings for all types of off-campus housing (including sublets in housekeeping units such as apartments and houses) are available beginning in May.

The Housing Office provides counseling service in the residence halls during the Summer Session. Resident advisers are available to assist with individual and group activities and problems.

Information about housing facilities and assistance in locating residence accommodations may be secured from the Housing Office off-campus centers in 209 Eddy Hall in Minneapolis (East Bank), 190 Coffey Hall in St. Paul, and 2001 Riverside Avenue in Minneapolis (West Bank).

## **Food Service**

Cafeterias, lunchrooms, vending service, 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. Cafeterias are also located in Blegen Hall on the West Bank, and in Shevlin Hall (basement level) on the East Bank.

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 intra-campus bus.

## **THE MINNESOTA UNION**

All Twin Cities Campus students, by virtue of student services fee payment, become members of the Minnesota Union, an association of students, faculty, staff, and alumni. The Minnesota Union is organized through a coordinating board of three constituent governing bodies to provide the services, conveniences, and amenities needed by the University community members in their daily lives together. The union aims to conduct programs geared to the intellectual, cultural, social, and recreational needs of the community, and to provide opportunities for significant student participation and leadership.

Two major building facilities (St. Paul Campus Student Center and Coffman Memorial Union) currently exist to further the goals of the Minnesota Union and a third building for the West Bank is being planned.

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

The St. Paul Campus 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 and at the Information Desk on the first floor.

Facilities include lounges, art galleries, ballroom, work shop, television, magazines, conference rooms, and a games area with bowling lanes, table tennis, and billiard tables. Outings equipment is available.

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

Meeting rooms are available for groups. Building hours are 7 a.m. to 10 p.m. week days.

## **Coffman Memorial Union**

*Coffman Memorial Union* provides a diversified program for the summer student which includes instruction in crafts and sailing, art exhibits, music programs, and dances. Consult *Socially Speaking* and the *Minnesota Daily* for specific program events.

Students are encouraged to serve on planning committees and provide leadership for events. Visit the program office in Room 205 for committee opportunities and information on programs.

Facilities include billiards and table tennis . . . bowling lanes . . . an art craft studio for general hobby/craft activities (woodworking, leather work, ceramics, jewelry, photography) . . . a newly remodeled cafeteria and fountain grill for dining . . . a commuter's lunchroom with vending machines . . . coeducational lounges for resting and studying . . . an outdoor terrace for lounging or dining . . . a spacious ballroom for informal dancing, parties, lectures, and special activities . . . the University Post Office and Union Bookstore . . . and barber and beauty shops. The building is joined to the parking ramp by an enclosed walkway.

Coffman Union is open from 7 a.m. to 10 p.m. each week day. Rooms can be reserved for group meetings and luncheons.

## **West Bank Union**

West Bank Union (WBU) plans programs to make summer living on "the Bank" more enjoyable and stimulating.

110 Anderson Hall is the WBU office. It is the "center" on the West Bank for program information, lost and found, locker rentals, and general assistance or information.

## **CONCERTS AND LECTURES**

Through the Department of Concerts and Lectures, the Summer Session provides varying experiences in music and the dance, including symphonies, solo recitals, chamber music, opera, and dance presentations. In addition, lecturers offer their expert observations on the arts, science, national, and international affairs.

## **BELL MUSEUM OF NATURAL HISTORY**

The James Ford Bell Museum of Natural History, 17th and University Avenues S.E., Minneapolis, features fine exhibitions of the wildlife of Minnesota, a natural history library, and extensive study collections of birds, mammals, reptiles, and fish.

The museum is free and is open from 9 a.m. to 5 p.m., Monday through Saturday, and from 2 to 5 p.m. on Sundays. Guide services are available to groups of 15 or more upon advance request. There is a bookstore in the lobby which also sells prints, stationery, and bird call recordings. Call 373-2423 for further information.

## **SUMMER FILM PROGRAM**

Each year the Summer Session sponsors a film program which centers around a theme of current interest or current study. Check the campus bulletin boards and the announcements in *Socially Speaking* for the titles and the exact time and location of these showings.



Course Descriptions

*First Term*

# Institute of Agriculture

## COLLEGE OF AGRICULTURE

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

### Agricultural and Applied Economics (AgEc)

#### 5-140 AGRICULTURAL PRODUCTION

The application of economic analysis to the planning and evaluation of the operation of agricultural businesses, with emphasis on the farm; economic principles, budgeting, linear programming, practice. (3 cr; not available to students majoring in agricultural economics; prereq 5-110 [111] or #; I-II MTWThF [meets June 15-July 2 only]; HH 210) Engene

#### 8-200 (200) 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)

#### 1-020 (4) AGRICULTURAL SHOP—METALWORK

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 Chem 1-004 [GeCh 4] or #; 2 lect and 6 lab hrs per wk; I-III MTWTh, I-IV F; AgEn 20 and 35) Bear, Clarke

#### 5-020 (130) PROGRAM PLANNING AND INSTRUCTIONAL METHODS IN AGRICULTURAL MECHANICS

Planning and designing high school vocational agriculture facilities, organizing equipment, tools, supplies and storage as demanded by the instructional program. Administering the agricultural mechanics program. Developing teaching techniques and program planning as related to the student-supervised study programs in mechanized agriculture. (3 cr; prereq 10 cr in mechanized agriculture, AgEd 3-031 [91] or ¶AgEd 3-031 [91]; hrs and rm ar) Bear

#### 5-400 (115) DRAINAGE AND IRRIGATION

Soil moisture excesses and deficiencies. Theory and design of tile drainage, surface drainage, and sprinkler irrigation systems. Development of irrigation water supplies. Selection of pumps and power units for drainage and irrigation. Economic feasibility. Legal problems and procedures. (3 cr; prereq Phys 1-010 [1], Math 1-111 [10], Soil 18 or 1-122 [19]; 10 lect hrs per wk; II-III MTW, III-IV, VI-VII Th; AgEn 16B) Allred

### Agronomy and Plant Genetics (Agro)

#### Agronomy

#### 8-010\* (201) RESEARCH IN AGRONOMY

Problems in physiology and production of crop plants. (Cr ar; prereq #) Staff

#### Plant Breeding

#### 8-310\* (244) LABORATORY METHODS IN PLANT BREEDING

Field study of plant breeding programs and techniques. (1 cr; prereq 5-020 [132] or #) Lambert

#### 8-330\* (241) RESEARCH IN PLANT GENETICS

(Cr ar) Staff

## Animal Science (AnSc)

### 5-603 (165) BEEF CATTLE PRODUCTION

Status and characteristics of the beef cattle industry; application of the principles of animal breeding, nutrition, physiology, and economics to management of beef cattle breeding herds. Ration formulation, management and marketing of feedlot cattle. (3 cr; prereq 1-400 [44] or 3-403 [54] or #...3-200 [56] recommended; III-IV MTWThF, June 14-July 2 [concentrated course]; PetH 110) Meiske

### 5-710 (180) SPECIAL PROBLEMS

Research in an area of animal science under the supervision of a staff member. A written report of the research is required. (Cr ar; open to students who have completed pertinent prereq; prereq #) Staff

### 8-810\* (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 and hrs ar; prereq #) Staff

### 8-820\* (211) RESEARCH IN ANIMAL GENETICS

Research in quantitative genetics, cytogenetics, and other areas related to animal breeding. (Cr and hrs ar; prereq #) Staff

### 8-830\* (231) RESEARCH IN ANIMAL PHYSIOLOGY

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 and hrs ar; prereq #) Staff

### 8-840\* (212) RESEARCH IN ANIMAL NUTRITION

Research in selected areas of animal nutrition. Research topics and animal species determined by consultation. (Cr and hrs ar; prereq #) Staff

### 8-850\* (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 and hrs ar; prereq #) Staff

## Entomology, Fisheries, and Wildlife‡‡

*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.*

## Entomology (Ent)

### 3-100 (55) ENTOMOLOGICAL TECHNIQUES

Practical laboratory instruction in mounting, preservation of insect larvae; preparation of microscopic mounts of minute insects; labeling, classifying, and cataloging specimens of insects for scientific study. (1-3 cr; prereq 3-175 [74] or equiv, #) Cook

### 8-503\* (243) RESEARCH IN ENTOMOLOGY

(Cr ar) Hodson, Chiang, Cook, Cutkomp, Harein, Peterson, Price, Richards, Brooks, Furgala, Kulman, Radcliffe

## Fisheries and Wildlife (FW)

### 8-367\* (267) RESEARCH IN FISHERY BIOLOGY

(Cr ar) Smith, Underhill, Waters

### 8-380\* (280) RESEARCH IN WILDLIFE BIOLOGY

(Cr ar) Frenzel, Marshall, Tester, Beer, Peek

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

## Plant Pathology (PIPa)

### 8-090\* (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, Calpouzos, MacDonald, Mirocha, Moore, Kennedy, Rowell, Bantari

### 8-110\* (207) PROBLEMS IN MYCOLOGY

Research along lines such as taxonomy of natural groups, fungus flora of particular regions, localities, or habitats; investigations of fungi involved in industrial or natural processes; morphology and physiology of special forms. (Cr ar; prereq 5-106 [106], 5-107 [107]) Christensen, French

### 8-301\* (209) RESEARCH IN PLANT VIROLOGY

Identification, transmission, purification, serological or histological studies involving viruses, their host plants and vectors. (Cr ar; prereq 5-300 [117] or §) Bantari

### 8-401\* (205) RESEARCH IN PHYTOBACTERIOLOGY

Special assignments on problems of current interest; investigations related to ecology and interaction among bacterial plant pathogens and their hosts. (Cr ar; prereq 5-400 [118] or §) Kennedy

### 8-501\* (201) RESEARCH IN NEMATOLOGY

Taxonomy or ecology of plant parasitic nematodes. (Cr ar; prereq PIpa 5-500 [101] or §) MacDonald

## Plant Physiology (PIPh)

### Bot 5-141 (141) SURVEY OF PLANT PHYSIOLOGY

A critical study of the physiological processes which occur in living plants; emphasis on higher plants. Growth and development, energy relations, mineral nutrition, water relations, respiration, photosynthesis, and nitrogen metabolism. (3 cr, §Bot 5-141; prereq Biol 1-002 [2] or 3-012 [51], course in organic chemistry, physics; III MTWThF; HSW 30) Soulen

### Bot 5-142 (141A) PLANT PHYSIOLOGY LABORATORY

A laboratory course to accompany PIPh 5-141. (2 cr, §Bot 5-142; limited to 15 students; prereq 5-141 [141] or ¶5-141; V-VII TTh; Bo 3) Soulen

## Rhetoric (Rhet)

### 1-222 (22) PUBLIC SPEAKING

A practical course in the fundamentals of speechmaking. Particular emphasis upon organizing the speech and projecting it to the audience. (3 cr; each section limited to 20 students; prereq satisfaction of freshman communication requirements) Holloway, McBride

Sec 1, II MTWThF, AgEng 307

Sec 2, IV MTWThF, AgEng 307

### 1-147 (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; each section limited to 30 students) Wright, Marchand

Sec 1, I MTWThF, ForH 115

Sec 2, II MTWThF, ForH 115

Sec 3, III MTWThF, ForH 115

Sec 4, IV MTWThF, ForH 115

**3-551 (51) EXPOSITION**

Essays and articles, technical writing, application letters, review of English usage. (3 cr; each section limited to 25 students; prereq jr) Holloway, McBride

Sec 1, II MTWThF, AgEng 105

Sec 2, IV MTWThF, AgEng 105

## **Soil Science (Soil)**

**5-114\* (130) SPECIAL PROBLEMS IN SOILS**

Research, readings, instruction. (1-5 cr per term [10 cr max]; prereq 1-122 [19] or equiv) Martin, Blake, Arneman, Rust, Farnham, Grava, Caldwell, MacGregor, Schmidt, Adams, Baker, Ham

**5-532\* (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 in Itasca Biology Session) Grigal

**8-124\* (202) RESEARCH PROBLEMS IN SOILS**

Individual laboratory or field work in 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, Blake, Arneman, Rust, Farnham, Grava, Caldwell, MacGregor, Schmidt, Adams, Baker, Ham

## **COLLEGE OF FORESTRY**

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

## **Forestry (For)**

**Offered on the St. Paul Campus**

**8-100\* (200) RESEARCH PROBLEMS IN SILVICULTURE**

(Cr ar) Bakuzis, B Brown, Hansen, Scholten, Tappeiner

**8-101\* (215) RESEARCH PROBLEMS IN FOREST-TREE PHYSIOLOGY**

(Cr ar) Sucoff

**8-102\* (220) RESEARCH PROBLEMS IN FOREST-TREE GENETICS**

(Cr ar) Mohn

**8-103\* (221) RESEARCH PROBLEMS IN FOREST HYDROLOGY**

(Cr ar) Mace

**8-200\* (203) RESEARCH PROBLEMS IN FOREST MANAGEMENT**

(Cr ar) B Brown, Hughes, Irving, Hallgren, Winsness

**8-201\* (205) RESEARCH PROBLEMS IN FOREST ECONOMICS**

(Cr ar) Gregersen, Hughes, Skok

**8-202\* (218) RESEARCH PROBLEMS IN FOREST MEASUREMENTS**

(Cr ar) Meyer, Gerrard, John

**8-203\* (219) RESEARCH PROBLEMS IN FOREST RECREATION**

(Cr ar) Hansen, Hughes, Merriam

**8-204\* (222) RESEARCH PROBLEMS IN FOREST POLICY**

(Cr ar) Hughes, Irving, Merriam, Skok, Winsness, Gregersen

**8-205\* (217) RESEARCH PROBLEMS IN REMOTE SENSING AND PHOTOGRAMMETRY**

(Cr ar) Meyer, Gerrard, John

**8-300\* (207) RESEARCH PROBLEMS IN FOREST PRODUCTS ENGINEERING**

(Cr ar) Haygreen, Hossfeld, Kaufert, Erickson, Gertjeansen

**8-301\* (213) RESEARCH PROBLEMS IN FOREST UTILIZATION**

(Cr ar) Haygreen, Hossfeld, Kaufert, Erickson, Gertjeansen, Thompson

# COLLEGE OF HOME ECONOMICS

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

## Home Economics (HE)

### 1-401 (49) HOUSEHOLD EQUIPMENT

The principles that should guide in the selection, operation, care, and convenient arrangement of equipment in the home. (3 cr; limited to 23 students; prereq soph, GC 1-163 [7A] or NSci 1-004 [4] or Phys 1-010 [1] or #: VI-VII MTWThF; McNH 128) Koon

### 1-521 (21) COLOR

Study of color theory and its application to environment. Experiences with pigments and color in light and color illusion. (3 cr; limited to 24 students; II-III MTWThF; McNH 342) Shank

### 1-531 (25) TEXTILE DESIGN I (Workshop)

Orientation to sources and resources of textile media. Individual designing in textile construction techniques and/or applied media. Studio problems. (3 cr; limited to 12 students; June 30-July 16; II-VIII MTWThF; LsPav 203) Abell

### 1-533 (26) CRAFTS DESIGN I (JEWELRY) (Workshop)

Orientation to craft materials and techniques in nontextile crafts. Metals, wood, plastic, others. Studio problems. (3 cr; limited to 12 students; June 15-30; II-III MTWThF; LsPav 205) Ordos

### 1-552 (24A) THE HOME: SELECTION 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, §GC 1-733 [3D]; limited to 75 students; prereq soph; I MTWThF; McNH 227) Nagle

### 3-263 (86) HOME MANAGEMENT LABORATORY

Residence for one term in one of the two home management houses, with direct experience in managing and sharing activities and responsibilities. (4 cr; limited to 6 students; prereq 3-260 [85] or ¶3-260...1-311 [41] recommended; \$10 deposit required; I and ar; Weigley House) Steier

### 3-264 (86A) HOME MANAGEMENT LABORATORY

(4 cr; limited to 10 students; prereq #: VI-VII TTh; 222 McNH) Jeary

### 3-381 (76) CURRENT PROBLEMS IN NUTRITION

A study of the major nutritional problems facing the world today. Included are considerations of protein-calorie malnutrition, obesity, and nutritional status of adolescents and special nutritional problems of infants and the aged. (3 cr, §5-361 [170], §5-362 [171]; prereq 1-381 [31], physiology or human biology; IV MTWThF; Ent 495) Balek

### 3-581 (58A) FIELD EXPERIENCES: RELATED ART

Supervised work-study program with professional firm, agency, or institution such as interior design studio, art museum, or housing authority. (3 cr; limited to 15 students; prereq completion of at least one half of professional sequence and #; Psy 1-002 [2]; hrs and rm ar) Ar

### 3-582 (58B) FIELD EXPERIENCES: RELATED ART

Supervised work-study program in display design and/or crafts. (3 cr; limited to 11 students; prereq completion of at least one half of the professional sequence and #; hrs and rm ar) Ar

### 5-200 (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; limited to 45 students; prereq Psy 1-002 [2], Soc 1-001 [1]; III MTWThF; Ent 495) Bisztray

- 5-201 (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 5-200 [87] or equiv; II MTWThF; Ent 495) Bennett
- 5-260 (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 for the family. (3 cr; prereq 1-301 [40], 1-311 [41]; IV MTWThF; McNH 227) Jeary
- 5-312 (138) FOOD PURCHASING**  
Cost factors, quality standards, informative labels, food laws, economy of new trends in food processing. (3 cr; limited to 50 students; prereq 15 cr in Food and Nutrition, Principles of Economics; I MTWThF; Ent 495) Trammell
- 5-392 (179) READINGS IN NUTRITION**  
Survey of literature in the field. Oral and written reports. (3 cr; prereq 5-361 [170], 5-362 [171]; hrs and rm ar) Sirny and others
- 5-396 SELECTED ASPECTS OF NUTRITION (COMMUNITY NUTRITION) (Workshop)**  
In any one offering, special attention to a single preselected aspect of nutrition. Teaching procedure and approach to be determined by nature of topic and clientele needs, but such that both in-breadth and in-depth treatment of the subject is obtained. Specific aspect to be announced in advance of course offering. (2-4 cr [12 cr max]; prereq sr, 1-301 [40], 1-381 [31], or #; hrs and rm ar) Doyle
- 5-531 (121) TEXTILE DESIGN II (Workshop)**  
Designing in one selected textile technique. Studio problems. Readings. (3 cr; limited to 12 students; prereq 1-531 [25] or equiv; June 30-July 16; LsPav 203) Abell
- 5-533 (126) CRAFT DESIGN II (JEWELRY) (Workshop)**  
Studio problems in nontextile materials and techniques. Readings. (3 cr; limited to 12 students; prereq 1-533 [26] or equiv; June 15-30; II-VIII MTWThF; LsPav 204) Ordos
- 5-558 (127) PURCHASING HOME FURNISHINGS**  
Study of home furnishings in terms of use, cost, and appearance. Includes furniture, dinnerware, floor and wall coverings, fabrics, and accessories. Actual materials, slides, and references used. Field trips. (3 cr; limited to 40 students; prereq 1-552 [24A] or equiv, 3-621 [50]; VI-VIII TTh, VI-VII MW; McNH 359) Betsinger
- 5-568 (181) HOUSING PROBLEMS OF THE FAMILY**  
Plans for urban and rural homes with evaluation of the economic, art, and social aspects. Discussions, field trips, and classroom analyses of student problems. (3 cr; limited to 24 students; prereq 1-552 [24A] or 3-563 [29] or equiv or 12 cr in social science; III-IV MTWThF; McNH 360) Nagle
- 5-641 (198) TOPICS IN MERCHANDISING (Workshop) (Taught concurrently with DE 5-311)**  
Assigned readings, reports, and discussions. Independent study available to high scholarship students. (3 cr; prereq I DE 5-311 required...15 cr in textiles and clothing and sociology or economics, #; June 15-30; VI-VIII MTWThF; McNH 303) Grindereing
- 5-662 (116) FAMILY CLOTHING PROBLEMS**  
Clothing problems and issues resulting from family characteristics, value of orientation and social mores. Interpersonal influences in clothing behavior. (3 cr; limited to 40 students; prereq 3-621 [50], AgEc 1-030 [3] or Econ 1-002 [2], Soc 1-001 [1] or Psy 1-002 [2], or #; II MTWThF; McNH 303) Williams
- 5-663 (198) TOPICS IN CLOTHING**  
Assigned readings, reports, and discussions. Independent study available to high scholarship students. (3 cr; prereq 15 cr in textiles and clothing and sociology or economics, #; III MTWThF; McNH 303) Williams

- 8-251 (295) PROBLEMS: FAMILY SOCIAL SCIENCE**  
Independent study and written reports. (1-5 cr per term; prereq #; hrs and  
rm ar) Ar
- 8-392 (295) PROBLEMS: FOOD**  
Independent study and written reports. (1-5 cr per term; prereq #; hrs and  
rm ar) Gordon
- 8-396 (295) PROBLEMS: NUTRITION**  
Independent study and written reports. (1-5 cr per term; prereq #; hrs and  
rm ar) Sirny
- 8-585 (295) PROBLEMS: RELATED ART**  
Independent study and written reports. (1-5 cr per term; prereq #; hrs and  
rm ar) Esteros
- 8-663 (295) PROBLEMS: TEXTILES AND CLOTHING**  
Independent study and written reports. (1-5 cr per term; prereq #; hrs and  
rm ar) Grindereing

# College of Biological Sciences

## Biochemistry (BioC)

### 3-990 (99) UNDERGRADUATE RESEARCH

Research problems for B.S. thesis (optional). (1-3 cr; prereq sr biochemistry major) Staff

### 8-990 (299) GRADUATE RESEARCH

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

## Biology (Biol)

### 1-001 (1) GENERAL BIOLOGY

See section on 10-week courses, page 157.

### 3-012 (51) PLANT BIOLOGY

Comparative study of growth, development, and function in plants; emphasizes adaptations which have evolved in various groups of plants providing suitable means of support, transport of materials, nutrition, and reproduction; evolution and diversity of plant life. (5 cr; limited to 20 students each lab; prereq Biol 1-002 [2] or  $\Delta$ , Chem 1-005 [5]; lect IV MTWThF, HSW 30) Pratt

Lab 1, I-III MWF, Bo 3

Lab 2, V-VII MWF, Bo 3

### 5-601 (131) GENERAL CYTOLOGY

Introductory analysis of structure, growth, and function of cells and organelles. (3 cr, §GCB 3-012 [51], §GCB 5-051 [120]; prereq 10 cr in biology, botany or zoology, elementary genetics or ‡; II MTWThF; Z 211) Ar

### 5-605 (132) GENERAL CYTOLOGY LABORATORY

Experimental approaches to cell structure and function including specialized forms of light microscopy, autoradiography, cell fractionation and an introduction to electron microscopy. (2 cr; limited to 10 students; prereq 5-601 or ¶5-601 or ‡; III MTWThF and ar; Z 202) Ar

## Botany (Bot)††

### 5-105 (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 5-101 [104] or ‡; lect and lab ar; Bo 5) Abbe

### 5-141 (141) SURVEY OF PLANT PHYSIOLOGY

A critical study of the physiological processes which occur in living plants, with emphasis on higher plants. Growth and development, energy relations, mineral nutrition, water relations, respiration, photosynthesis, and nitrogen metabolism. (3 cr; prereq Biol 1-002 [2] or 3-012 [51], course in organic chemistry, physics; III MTWThF; HSW 30) Soulen

### 5-142 (141A) PLANT PHYSIOLOGY LABORATORY

A laboratory course to accompany Bot 5-141. (2 cr; limited to 15 students; prereq 5-141 or ¶5-141; V-VII TTh; Bo 3) Soulen

### 8-990 (299) RESEARCH PROBLEMS

(Cr ar; prereq ‡) Staff

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

## Genetics and Cell Biology (GCB)

### 3-022 (66) GENETICS

The mechanisms of heredity, their implications for biological populations and applications to practical problems. (4 cr; primarily designed for students other than CBS majors and CLA biology majors; prereq Biol 1-002 [2] or equiv; II MTWThF; PalmC 12)

### 3-970 (97) INDEPENDENT STUDY

Individual study on selected topics or problems with emphasis on selected readings and use of scientific literature. (Cr ar; prereq #) Staff

### 3-990 (99) LABORATORY RESEARCH

Individual projects on selected topics and problems. (Cr ar; prereq #) Staff

### 5-023 (161) GENETICS AND THE BIOLOGY OF POPULATIONS

Primarily designed for secondary school teachers. Emphasis is on elementary development of basic concepts in population genetics and population biology. Topics include population expansion and deterioration of the environment, analysis of gene frequency changes under natural and relaxed selection, genetic loads and reproductive excess, population genetics of quantitative characters, inbreeding, and the genetics of population isolates. Examples are to be drawn largely from human populations. (3 cr; prereq 3-022 [66] or equiv, or #; III MTWThF; PalmC 12) Hartl

### 5-022 (166) GENETICS

Same as GCB 3-022. (2 cr [offered for grad students for reduced cr]; not open to grad students in genetics; II MTWThF; PalmC 23)

### 8-990 (299) RESEARCH

(Cr ar) Staff

## Zoology (Zool)††

### 3-990 (99) INDIVIDUAL WORK IN SOME SPECIAL DISCIPLINE

(Cr ar; prereq Biol 1-002 [2] or 3-011 [50] and #) Staff

### 8-990 (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)

**5-801 (116) SUMMER FLORA OF MINNESOTA**

(5 cr; limited to 20 students; prereq course in taxonomy; TF) Ownbey

**5-811 (155) FRESHWATER ALGAE**

(5 cr; limited to 20 students; prereq 10 cr in botany, biology or zoology; MTh) Meyer

**8-990 (299) RESEARCH PROBLEMS**

(Cr ar; prereq #) Staff

## Ecology and Behavioral Biology (Ecol)

**5-026 (126) ENVIRONMENTAL MEASUREMENT AND ANALYSIS III**

(5 cr; limited to 15 students; prereq 1 yr physics, course in meteorology and #; WS) Maxwell

**5-812 (119) AQUATIC ECOLOGY**

(5 cr; limited to 20 students; prereq 15 cr in biology; WS) Underhill

**5-814 (135) COMMUNITY STRUCTURE AND FUNCTIONING**

(5 cr; limited to 20 students; prereq course in ecology; MTh) Buell

**5-815 (136) FIELD ETHOLOGY**

(5 cr; limited to 15 students; prereq Zool 5-834 [135] or equiv; TF) Oring

**5-817 (162) VERTEBRATE ECOLOGY**

(5 cr; limited to 15 students; prereq course in ecology; MTh) Schmid

**5-890 (195) PROBLEMS**

(Cr ar; prereq #) Staff

## Entomology (Ent)

**5-020 (159) FIELD ENTOMOLOGY**

(5 cr; limited to 15 students; prereq 10 cr in biology; TF) Beer

**5-904 (196) SPECIAL PROBLEMS IN ENTOMOLOGY, FISHERIES, AND WILDLIFE**

(Cr ar; prereq #) Staff

## Soil Science (Soil)

**5-114 (130) SPECIAL PROBLEMS IN SOILS**

(Cr ar; prereq #) Grigal

**5-532 (137) SOILS AND THE ECOSYSTEM**

(5 cr; limited to 20 students; may be taken in place of Ecol 5-819 [127]; prereq course in ecology; MTh) Grigal

# School of Business Administration

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

## Accounting (Acct)

### 1-024 (24) PRINCIPLES OF ACCOUNTING

Recording, reporting, and interpreting business events. Use of accounting as a tool of business management. (3 cr, §3-050 [55A]; each section limited to 37 students; prereq 3rd qtr fr)

Sec 1, I MTWThF, BlegH 340

Sec 2, I-II MWF, BlegH 335, Allen

Sec 3, II MTWThF, BlegH 340

Sec 4, III-IV MWF, BlegH 335

### 1-025 (25) PRINCIPLES OF ACCOUNTING

Continuation of Acct 1-024. (3 cr, §3-051 [55B]; each section limited to 40 students; prereq 1-024 [24])

Sec 1, I-II MWF, BlegH 255, Barrett

Sec 2, II MTWThF, BlegH 120, Ar

Sec 3, III MTWThF, BlegH 340, Ar

### 1-026 (26) PRINCIPLES OF ACCOUNTING

Third quarter of Acct 1-024/1-025/1-026 (see Acct 1-024). (3 cr, §3-051 [55B]; each section limited to 35 students; prereq 1-024 [24])

Sec 1, I-II MWF, BlegH 330

Sec 2, III-IV MWF, BlegH 330

### 3-160 (55D) ANALYSIS OF FINANCIAL STATEMENTS

Interpretation and analysis of financial statements for credit, investment, and managerial purposes. (3 cr, §3-201 [103]; limited to 30 students; prereq 1-026 [26] or equiv; II-III MWF; BlegH 404) Simmons

### 3-101 (101) ACCOUNTING THEORY AND PRACTICE I

Search for principles and postulates of accounting, concepts of income, measurement and valuation methodology. (4 cr; limited to 40 students; prereq 1-025 [25], 1-026 [26]; III-IV MTWF; BlegH 415) Barrett

### 3-201 (103) ACCOUNTING THEORY AND PRACTICE III

Accounting for liabilities and other equities, long-range planning, fiduciary accounts, nonprofit organization accounts. (4 cr; limited to 40 students; prereq 3-102 [102]; III-IV MTWF; BlegH 230) Allen

### 5-135 (135) INCOME TAX ACCOUNTING I

Taxation of business income. Emphasis is placed on the effect of income taxation on business planning. (3 cr; prereq 1-025 [25]; limited to 40 students; V MTWThF; BlegH 145) White

### 5-340 (145A) READINGS IN ACCOUNTING LITERATURE

Discussion and reports on selected topics in practice and theory as found in current accounting literature. (3 cr; limited to 30 students; prereq 12 cr in Upper Division accounting; 7:30-9:00 MWF; BlegH 404) Simmons

## Business Law (BLaw)

### 3-058 (58) BUSINESS LAW: INTRODUCTION TO LAW AND THE LAW OF CONTRACTS

The origin of law, its place in and effect upon society; the history of the development of law; the systems of courts; and legal procedure. An extensive study of the law of contracts as the basic law effecting the business transaction. (3 cr, §8-158 [158]; prereq Econ 1-002 [2] or equiv) Wright

Sec 1, I MTWThF, BlegH 235

Sec 2, II MTWThF, BlegH 415

**8-158 (158) BUSINESS LAW: CONTRACTS**

See BLaw 3-058. (3 cr, §3-058 [58]; prereq Econ 1-002 [2] or equiv)  
Wright

Sec 1, I MTWThF, BlegH 235  
Sec 2, II MTWThF, BlegH 415

## Finance (BFin)

**3-000 (56) FINANCE FUNDAMENTALS**

A comprehensive introduction to the main concepts in finance and some of their applications in forecasting; money and capital markets; cost of capital, leverage, and financial policy; risk and return on investments; portfolio choice and performance measurement; cost benefit analysis. (3 cr, §8-000 [156]; limited to 100 students; prereq Acct 1-026 [26]; 10:00-11:25 TWTh; BlegH 5) Upson

**3-300 (66) INVESTMENT FUNDAMENTALS**

An introduction to the management of investment funds. In addition to considering the instruments and institutional structure of the securities markets, this course focuses on analytical techniques of security selection and portfolio management. (3 cr; limited to 36 students; prereq 3-000 [56]; IV MTWThF; BlegH 115) Rosko

**3-500 (86) REAL ESTATE FUNDAMENTALS**

Introduction to problems of urban real estate and financing. Analysis of real estate investments including consideration of depreciation and other income tax laws relating to income property ownership. (3 cr; limited to 35 students; prereq Econ 1-002 [2] or equiv; VI MTWThF; BlegH 330) Rosko

**8-000 (156) FINANCE FUNDAMENTALS**

Comprehensive introduction to the main concepts in finance and some of their applications in forecasting; money and capital markets; cost of capital, leverage, and financial policy; risk and return on investments; portfolio choice and performance measurement; cost benefit analysis. (3 cr, §3-000 [56]; limited to 30 students; prereq Acct 1-026 [26] or 8-051 [155B]; 8:00-9:25 TWTh; BlegH 245) Upson

**8-990 (296A) READINGS IN BUSINESS FINANCE**

Readings useful to student's individual program and objectives but not available in regular course offerings. (Cr ar; prereq consent of adviser and # in field covered) Ar

## Industrial Relations (IR)

**3-002 (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, §5-022 [152]; prereq Econ 1-002 [2] or equiv)

Sec 1, limited to 50 students, I MTWThF, BlegH 110, Zaidi  
Sec 2, limited to 40 students, III MTWThF, BlegH 145, Zaidi

**3-012 (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, §5-032 [172]; prereq Econ 1-002 [2] or #; II MTWThF; BlegH 215) Pinto

**5-022 (152) SYSTEMS OF INDUSTRIAL RELATIONS: LABOR MARKETING**

See IR 3-002. (3 cr, §3-002 [52]; limited to 10 students; prereq Econ 1-002 [2] or equiv or #; III MTWThF; BlegH 145) Zaidi

**5-032 (172) SYSTEMS OF INDUSTRIAL RELATIONS: MANPOWER MANAGEMENT**  
See IR 3-012. (3 cr, §3-012 [72]; prereq Econ 1-002 [2] or §; II MTWThF; BlegH 215) Pinto

**8-006 (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 3-002 [52] or 5-022 [152] or §; IV MTWThF; BlegH 430) Milkovich

**8-015 (262) COMPENSATION AND REWARD ADMINISTRATION**  
Analysis of concepts and procedures for administration of compensation and rewards within an organization. Examination of approaches to determination of compensation levels, forms of compensation and rewards, compensation structures and differentials, and determination of individual compensation. (3 cr; prereq 5-022 [152], 5-032 [172], or §; I MTWThF; BlegH 430) Milkovich

**8-033 (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 3-012 [72] or 5-032 [172] or §; II-III MWF; BlegH 430) Mahoney

## Insurance (Ins)

**3-100 (53) RISK MANAGEMENT AND INSURANCE**  
The nature and economic significance of risk. The recognition, measurement, and treatment of risk with particular emphasis on 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, §8-100 [153]; prereq Econ 1-002 [2] or equiv; III MTWThF; BlegH 245) Whitman

**3-200 (73) LIFE AND HEALTH INSURANCE**  
Nature and relative importance of insurable personnel risks; analysis of life and health insurance contracts; programming; estate planning; business insurance; pricing, underwriting, and marketing methods. (3 cr, §8-200 [203]; prereq 3-100 [53] or equiv; I MTWThF; BlegH 350) Whitman

**8-200 (203) LIFE AND HEALTH INSURANCE**  
See Ins 3-200. (3 cr, §3-200 [73]; prereq 3-100 [53] or 8-100 [153]; I MTWThF; BlegH 350) Whitman

**8-990 (293A) READINGS IN RISK MANAGEMENT AND INSURANCE**  
Readings useful to student's individual program and objectives but not available in regular course offerings. (3 cr; prereq consent of adviser and § in field covered) Ar

## Management (Mgmt)

**3-001 (70) FUNDAMENTALS OF MANAGEMENT**  
Study of concepts, theory, research, and operational problems. Includes the principal functional areas of management. Examines provisions of necessary factors and relationships to achieve organizational objectives: establishment of goals, policies, procedures; organizational structure and behavior; leadership; control systems. (3 cr, §8-001 [150]; limited to 40 students; I MTWThF; BlegH 420) Wonder

- 3-004 (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, §8-010 [260]; each section limited to 30 students; prereq sr and completion of business core or II final core course)  
 Sec 1, 7:30-8:40 MTWThF, BlegH 425, Ar  
 Sec 2, 8:50-10:00 MTWThF, BlegH 425, Ar

- 8-001 (150) FUNDAMENTALS OF MANAGEMENT**  
 A first course in management at the graduate level. Study of concepts, theory, research, and operational problems of management. Examines provisions of necessary factors and relationships to achieve organizational objectives: goals, policies, procedures; organizational structure and behavior; leadership; control systems. Case studies to develop analytic skills and to provide insights into management problems. (3 cr, §3-001 [70]; limited to 30 students; II MTWThF; BlegH 420) Wonder

## Management Information Systems (MIS)

- 3-099 PROGRAMMING COMPUTERS USING FORTRAN**  
 See section on 10-week courses, page 157.
- 3-100 (QA 62) BASIC COMPUTER SYSTEMS**  
 See section on 10-week courses, page 157.
- 5-109 (109) INTRODUCTION TO COMPUTER-ASSISTED MANAGEMENT**  
 See section on 10-week courses, page 157.
- 8-208 (209A) INTRODUCTION TO HARDWARE AND SOFTWARE SYSTEMS**  
 See section on 10-week courses, page 157.

## Marketing (Mktg)

- 3-000 (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, §8-000 [157]; each section limited to 50 students; prereq Econ 1-002 [2] or equiv) Ar  
 Sec 1, III MTWThF, BlegH 110  
 Sec 2, IV MTWThF, BlegH 240
- 3-065 (65) RETAIL MANAGEMENT**  
 Retailing principles and methods; relations of retailing to other parts of the economy; problems associated with operation of stores of various types. (3 cr; limited to 30 students; prereq 3-000 [57]; II MTWThF; BlegH 110) Ar
- 3-085 (85) 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, nonprice competition, government intervention, pricing objectives, organization for pricing, price leadership, and others. (3 cr; limited to 20 students; prereq 3-000 [57]; IV MTWThF; BlegH 404) Ar
- 3-095 (95) MARKET ANALYSIS AND RESEARCH**  
 Techniques used in marketing research. Emphasis on marketing informa-

tion which can aid in the solution of marketing problems and on survey research techniques. (3 cr; prereq 3-000 [57], QA 3-053 [53] or equiv; I MTWThF; BlegH 115) Ar

#### **8-000 (157) PRINCIPLES OF 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, \$3-000 [57]; limited to 15 students; prereq Econ 1-002 [2] or equiv; III MTWThF; BlegH 110) Ar

#### **8-085 (285) PRICE POLICY**

See Mktg 3-085. (3 cr; limited to 10 students; prereq 3-000 [57]; IV MTWThF; BlegH 404) Ar

#### **8-095 (295) MARKET ANALYSIS AND RESEARCH**

See Mktg 3-095. (3 cr; prereq 3-000 [57], QA 3-053 [53] or equiv; I MTWThF; BlegH 115) Ar

## **Production (Prod)**

#### **3-050 (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, \$8-150 [150]; limited to 40 students; prereq QA 3-054 [54] or ¶QA 3-054; lect III MTWThF, BlegH 130 [CCTV]; discussion IV TTh, BlegH 125) Hoffmann

#### **8-150 (150) 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, \$3-050 [50]; limited to 40 students; prereq QA 8-151 [151] or equiv; lect II MTWThF, BlegH 130 [CCTV]; discussion III TTh, BlegH 125) Hoffmann

## **Quantitative Analysis (QA)**

#### **3-052 (52) QUANTITATIVE METHODS FOR ADMINISTRATION I**

Introduction to quantitative models; measurement and statistical description; probability and probability distributions; sampling and sampling distributions. (3 cr; limited to 150 students; prereq Math 1-142 [40A], or Math 1-443 [43], or §; lect IV TTh; AndH 210) Willis and ar

Lab 1, limited to 40 students, IV-V MWF, BlegH 125

Lab 2, limited to 37 students, IV-V MWF, BlegH 205

Lab 3, limited to 37 students, IV-V MWF, BlegH 225

Lab 4, limited to 37 students, IV-V MWF, BlegH 255

#### **8-151 (151) ELEMENTS OF STATISTICS**

Statistical description, frequency distributions, probability, sampling, introduction to statistical estimation, and decision making. (3 cr, \$3-054 [54]; prereq 8-150 [150] or ¶8-150 or Math 1-142 [40A] or ¶Math 1-142; lect IV TTh, AndH 210; lab IV-V MWF, BlegH 120)

## **Transportation (Tran)**

#### **3-064 (164A) BUSINESS LOGISTICS I**

Organization and control of transportation services for the firm. Topics covered include transportation alternatives, documentation, cost levels and rate negotiation, warehousing, and introduction to the logistics concept. (3 cr; limited to 50 students; prereq 3-054 [54] or 8-154 [154]; I MTWThF; BlegH 215) Ar

# College of Education

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

## Art Education (ArEd)

### 1-208 (18C) EXPERIENCES WITH DESIGN AND MATERIALS

Projects in invention, arrangement, and decoration; color, lettering, posters, bulletin board displays. (3 cr; limited to 30 students; I-II MTWThF; WuH 240) Hiniker

### 3-001 (10C) SURVEY OF ART ACTIVITIES

Introduction to pictorial expression, design, and the function of art in the social environment. (3 cr; limited to 30 students; III-IV MTWThF; WuH 220) Hiniker

### 3-010 (53C) INTRODUCTION TO WEAVING

Equipment, design, setting up and operation of table and floor looms. (3 cr; each section limited to 25 students; students are required to register for Sec 2 of 3-020 when taking Sec 1 of 3-010 and register for Sec 2 of 3-010 when taking Sec 1 of 3-020) Smits

Sec 1, II-V MTWThF, June 15-30, WuH 340

Sec 2, II-V MTWThF, July 1-16, WuH 340

### 3-020 (80C) CONTEMPORARY CRAFTS

Materials, equipment, design criteria, and techniques for textile, wood, metal, and ceramics. (3 cr; each section limited to 25 students; students are required to register for Sec 2 of 3-020 when taking Sec 1 of 3-010 and register for Sec 2 of 3-010 when taking Sec 1 of 3-020) Kain

Sec 1, II-V MTWThF, June 15-30, WuH 210

Sec 2, II-V MTWThF, July 1-16, WuH 210

### 5-303 (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) Slettehaugh

### 5-316 (156) INTERCULTURAL EDUCATION THROUGH ART

Approaches to international understanding through recognition of aesthetic contributions of diverse peoples to American life. (3 cr; II MTWThF; WuH 110) Gayne

### 5-389 (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) Slettehaugh

### 5-900 (195) PROFESSIONAL PROBLEMS

Independent study for MEd candidates integrating learning from art education, art, and education. (3 cr; prereq MEd students; hrs ar) Gayne, Slettehaugh

### 8-300 (284) RESEARCH IN ART EDUCATION

(3 cr; IV MTWThF; WuH 110) Gayne

### 8-306 (296) SEMINAR: ART EDUCATION

(1 cr; VI T; WuH 130) Slettehaugh

### 8-900 (295) PROBLEMS: ART EDUCATION

Independent projects under staff guidance may include advanced studio practice or technique problems requiring experimental or library research. (Cr ar; prereq #) Gayne, Slettehaugh

## Child Psychology (CPsy)

- 3-301 (80) CHILD PSYCHOLOGY**  
Introduction to science of child behavior; emphasis upon critical review of theories and research. (3 cr; prereq Psy 1-002 [2]; I MTWThF; SciCB 325) Warren
- 5-303 (81) ADOLESCENT PSYCHOLOGY**  
Physical, cognitive, and social development during adolescence. (3 cr; prereq Psy 1-002 [2]; II MTWThF; SciCB 325) Ar
- 5-311 (140) BEHAVIOR PROBLEMS**  
Types, origin, development, and treatment of behavior difficulties in normal children. (3 cr; prereq 3-301 [80] or equiv; III MTWThF; SciCB 325) Ar
- 5-315 (143) PROBLEMS OF MENTAL DEFICIENCY**  
Diagnosis, care, training; social and vocational problems. (3 cr; prereq 3-301 [80] or equiv; I MTWThF; Ph 145) Libby
- 5-319 (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 child psychology, psychology, educational psychology, or sociology; VI MTWThF; SciCB 325) Weinberg
- 5-323 (126) CASE STUDY OF CHILDREN**  
Supervised intensive study of intellectual, personality, and social development and functioning of individual normal children. (3 cr; prereq 3-301 and #; III MTWThF; CD 218) Ar
- 5-325 (127) SOCIAL BEHAVIOR OF CHILDREN**  
Behavior of children in groups; supervised observation and experience in the nursery school. (3 cr; prereq 3-301 [80] and #; II MTWThF; J 1) Marvin
- 5-331 (100) PROCESSES OF SOCIALIZATION OF CHILDREN**  
Processes of social learning of children; identification, imitation, reward and punishment, internalization, and object choice. (3 cr; prereq 3-301 [80] or grad; III MTWThF; Arch 5) Masters
- 5-333 (180) PERSONALITY DEVELOPMENT**  
Psychoanalytic and behavior theory formulations and related research literature. (3 cr; prereq 5-331 [100]; III MTWThF; AH 350) Woloshin
- 5-339 (189) PARENT-CHILD RELATIONS**  
Discussion of parent-child relations and evaluation of relevant research literature. (3 cr; prereq 5-331 [100]; IV MTWThF; J 2) Marvin
- 5-343 (186) COGNITIVE DEVELOPMENT**  
Development of cognitive processes; theories of intelligence and intellectual functioning; related research literature. (3 cr; prereq 3-301 [80]; VI MTWThF; CD 216) P Yonas
- 5-345 (183) LANGUAGE DEVELOPMENT**  
Development of structure and function of language, methodological problems, speech and language development; language scales; theories. (3 cr; prereq 3-301 [80]; IV MTWThF; ForH 155) Templin
- 5-970 (190) DIRECTED READINGS IN CHILD PSYCHOLOGY**  
Independent readings. (Cr ar; prereq #) Masters
- 5-990 (190) RESEARCH IN CHILD PSYCHOLOGY**  
Independent research. (Cr ar; prereq #) Masters

## Education

### Higher Education and Teacher Education (Educ)

- 5-184 (EdCI 184) SUPERVISION OF STUDENT TEACHING**  
For persons planning to supervise or administer student teaching and other professional laboratory experiences in elementary and secondary education. (3 cr; prereq 15 cr in education; II MTWThF; Ph 145) Mork
- 8-228\* (EdCI 228) PROBLEMS: HIGHER EDUCATION AND TEACHER EDUCATION**  
(Cr and hrs ar; prereq #) Keller, Mork, Williams
- 8-250 (EdCI 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; prereq yr of grad study in any field or 18 cr in education; II MTWThF; Ph 236A) Keller
- 8-252 (EdCI 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; III-IV TTh and hrs ar; Arch 140) Williams
- 8-285 (EdCI 285) PROFESSIONAL EDUCATION OF TEACHERS**  
For present and prospective instructors, administrators, and personnel workers in teacher education institutions. Current issues and problems, selection and retention, curriculum, certification, experimental programs, and research. (3 cr; prereq 15 cr in education incl 5-184 [184] and 8-250 [250] or HED 5-182 [182] or CSPP 8-140 [EPsy 250] or #; I MTWThF; CD 218) Mork

### Educational Administration (EdAd)

- 5-101 (101) PUBLIC SCHOOL ADMINISTRATION**  
Organization, administration, and general support of public schools in state and local school districts. (3 cr; not open to educational administration majors; prereq 9 cr in education; III MTWThF; CD 216) Popper
- 5-103 (103) SUPERVISION AND ADMINISTRATION OF SPECIAL EDUCATION**  
Procedures in establishing and improving educational programs for exceptional children. (3 cr; prereq #; III MTWThF; NH 209A) Weatherman
- 5-128†† (128) WORKSHOP: EDUCATIONAL ADMINISTRATION**  
**Section 1: Part I**  
See section on 10-week courses, page 157.  
**Section 2: Educational Planning (July 1-16)**  
Multidisciplinary experiences including historical survey of planning and its interrelationship with social objectives with emphasis on role of the educational planner in multifunctional planning. Each participant will develop an understanding of basic principles and concepts, terminology, aims, and objectives intrinsic to five planning areas: physical environment, area analysis, governmental administration, regional economics, and education. (1-6 cr; limited to 35 students; prereq practicing educational administrator or #; VI-VIII MTWThF; HrSci 310) Sederberg
- 5-139†† (139) LABORATORY IN DECISION MAKING (Part I)**  
See section on 10-week courses, page 157.
- 5-167 (167) JUNIOR HIGH SCHOOL**  
Sources of the movement; purposes, functions, and limitations; funda-

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

mental problems, types, and curricular implications of reorganization. (3 cr; prereq 9 cr in education; IV MTWThF; NH 209A) Popper

**8-201 (201) FOUNDATIONS OF EDUCATIONAL ADMINISTRATION**

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; EntFW 495) Hendrix

**8-202 (202) FOUNDATIONS OF EDUCATIONAL ADMINISTRATION**

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; I MTWThF; EntFW 495) Mazzoni

**8-210 (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; III MTWThF; HrSci 416) Mueller

**8-215 (215) THE ELEMENTARY SCHOOL PRINCIPALSHIP**

Problems in elementary school administration and the principal's role of leadership. (3 cr; prereq 8-201 [201] and 8-202 [202], or #; I MTWThF; EntFW 490) Cross

**8-220 (220) ANALYSIS OF ADMINISTRATIVE PROBLEMS**

Quantitative techniques for analysis of problem and decision situations in the administration of educational organizations. (3 cr, 8-220, 8-221† [220-221†]; prereq educational administration major or Δ; V MTWThF; HrSci 310) Hendrix

**8-226 (226) SCHOOL PLANT PLANNING: EDUCATIONAL FACILITIES PLANNING**

Planning educational facilities for public and private school systems and institutions of higher education. (3 cr; I MTWThF; HrSci 416) Alkire

**8-227 (227) PUBLIC SCHOOL PERSONNEL PROGRAMS**

Selection, assignment, evaluation, and development of school personnel; salary and conditions of service; policies of administrative, instructional, and noninstructional personnel. (3 cr; IV MTWThF; HrSci 416) Stark

**8-253 (253) ADMINISTRATION IN HIGHER EDUCATION**

Control, faculty and employee personnel administration, budget making and administration, financial accounting and reporting, protection of college funds, public relations. (3 cr; prereq Educ 8-250 [EdCI 250]; I MTWThF; NH 122) Keller

**8-264 (264) THE SECONDARY SCHOOL PRINCIPALSHIP (270A)**

The role of the principal, his qualifications, duties, and problems, including current issues, and factors of staff and student relationships. (3 cr; II MTWThF; HrSci 416) Nickerson

**8-270\* (270A) PROBLEMS: ELEMENTARY SCHOOL ADMINISTRATION**

(Cr and hrs ar; prereq #) Lambert, Cross, Alkire

**8-271\* (270B) PROBLEMS: SECONDARY SCHOOL ADMINISTRATION**

(Cr and hrs ar; prereq #) Hooker, Hendrix, Popper, Mueller, Nickerson, Sederberg, Weatherman, Mazzoni, Stark

**8-272\* (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) Hooker, Hendrix, Keller, Lambert, Popper, Cross, Mueller, Nickerson, Sederberg, Weatherman, Alkire, Mazzoni, Stark

**8-273 (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) Hooker, Keller, Lambert, Popper, Cross, Mueller, Nickerson, Sederberg, Weatherman, Alkire, Mazzoni, Stark

## Educational Psychology

### *Counseling and Student Personnel Psychology (CSPP)*

#### **5-130 (EPsy 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 230) Tennyson

#### **8-301 (EPsy 228) WORKSHOP: COUNSELING PSYCHOLOGY**

For experienced counselors who want to design and test applications of counseling concepts to specific problems of practice in the field. (3-6 cr per term [max 12 cr]; sections 1 and 3 limited to 20 students, section 2 limited to 40 students; prereq \$)

Sec 1, II-IV MTWThF, Bu 125, Blocher, Benson

Sec 2, II-VIII MTWThF, FolH 110, Tennyson, Hansen

Sec 3, I-VII MTWThF, FolH 102, Briskin

#### **8-320 (EPsy 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; limited to 30 students; prereq 5-130 [EPsy 133] or 8-140 [EPsy 250] and PsyF 5-170 [EPsy 125] or 8-310 [EPsy 216A]; VI-VII MWF; Bu 125) A Anderson

#### **8-620 (EPsy 237) PRACTICUM IN GROUP COUNSELING (Part I)**

See section on 10-week courses, page 157.

#### **8-900\* (EPsy 233) PROBLEMS: GUIDANCE AND PERSONNEL WORK**

Independent study. (1-9 cr; hrs and rm ar) Blocher, Tennyson, A Anderson, Hummel, Shaffer

## *Psychological Foundations (PsyF)*

#### **5-110 (EPsy 116) INTRODUCTORY STATISTICAL METHODS**

Basic statistical techniques; comprehension of literature using elementary concepts and methods. This course is not equivalent to 8-110 (EPsy 216), 8-310 (EPsy 216A). (3 cr; each section limited to 60 students) Collier

Sec 1, I MTWThF, WuH 230

Sec 2, III MTWThF, WuH 230

#### **5-120 (EPsy 110) EDUCATIONAL MEASUREMENT IN THE CLASSROOM**

Principles and methods for construction, evaluation, and improvement of test materials and procedures for use in classroom instruction. (3 cr; each section limited to 35 students) Terwilliger

Sec 1, IV MTWThF, WuH 130

Sec 2, V MTWThF, Bu 123

#### **5-140 (EPsy 192) INTRODUCTION TO LEARNING AND COGNITION (Part I)**

See section on 10-week courses, page 157.

#### **5-141 (EPsy 193) PSYCHOLOGY OF SCHOOL LEARNING**

A survey course devoted to an examination of psychological conceptions of the learner, the school process and the implications of these conceptions for education. (3 cr; each section limited to 60 students) Samuels

Sec 1, II MTWThF, FraH 120

Sec 2, III MTWThF, FraH 120

#### **5-160 (EPsy 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 45 students) Rest

Sec 1, I MTWThF, Arch 15

Sec 2, III MTWThF, Arch 15

**5-170 (EPsy 125) SOCIAL PSYCHOLOGY OF EDUCATION**

Concepts and theories in areas of 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 30 students) Ar

Sec 1, V MTWThF, CD 216

Sec 2, VI MTWThF, Bu 123

**5-330 (EPsy 141) COMPUTER PROGRAMMING**

Computer as a tool for research in the behavioral sciences; computer systems, language, and development of specific programs that demonstrate computer characteristics; laboratory experience. (3 cr; prereq sr; II MTWThF; Bu 123) D Anderson

**8-110 (EPsy 216) STATISTICAL METHODS**

Foundations of statistical theory; practice in applying theories to solution of educational and psychological problems. (3 cr; prereq 5-110 [EPsy 116] or Psy 3-801 [90] or equiv; I MTWThF; Arch 35) MacEachern

**8-112 (EPsy 217) STATISTICAL METHODS (Part I)**

See section on 10-week courses, page 157.

**8-310 (EPsy 216A) STATISTICAL METHODS LABORATORY**

For students who wish more experience in solution of problems and use of machines than is obtained in 8-110. (2 cr per qtr; limited to 22 students; prereq ¶8-110 [EPsy 216]; II-III TWTh; WuH 330) Ar

**8-312 (EPsy 218A) STATISTICAL METHODS LABORATORY (Part I)**

See section on 10-week courses, page 157.

**8-900\* (EPsy 253) RESEARCH PROBLEMS**

(Cr ar; prereq ‡) Collier, D Anderson, MacEachern, Samuels, Terwilliger, Rest

## *School Psychology (SchP)*

**5-310 WORKSHOP: CONTEMPORARY PRACTICES IN PSYCHOEDUCATIONAL ASSESSMENT (June 28 to August 6)**

(See section on Schools, Colleges, and Special Programs, page 167) Methods other than traditional individual intelligence testing; didactic and practicum experiences in assessing the school as a social system, measuring patterns of classroom interaction, behavioral analysis, screening for early identification of psychoeducational problems, and techniques of assessing social and personality maladjustment. (5 cr; limited to 18 students; prereq ‡; II-IV MTWThF; CD 105) Hall, Scarr, Shrago, Weinberg

**5-311 WORKSHOP: CONTEMPORARY PRACTICES IN PSYCHOEDUCATIONAL INTERVENTION (June 28 to August 6)**

(See section on Schools, Colleges, and Special Programs, page 167) Intervention methods specific to school settings; systems intervention, instructional intervention, behavior modification, program evaluation, early childhood intervention, group and family therapies. (5 cr, §§5-513 [EPsy 213], §§5-514 [EPsy 214]; limited to 18 students; prereq 5-310 or ¶5-310 and ‡; VI-VII MTWThF; CD 105) Hall, Scarr, Shrago, Weinberg

**8-520 (EPsy 249A) SEMINAR: RESEARCH IN SCHOOL PSYCHOLOGY**

Seminar for doctoral candidates planning dissertation research in school psychology. (1 cr per qtr [total 3]; prereq ‡; hrs and rm ar) Scarr

**8-610 (EPsy 287) PRACTICUM: SCHOOL PSYCHOLOGICAL SERVICES**

Field experience under supervision; typical functions of school psychologists; assessment procedures, case studies, consultation with parents, school personnel, and community agencies; participation in seminar. (1-3 cr; prereq #; hrs and rm ar) Shrago

**8-900\* (EPsy 253) RESEARCH PROBLEMS**

(Cr ar; prereq #) Scarr

## *Special Education (SpEd)*

**3-601 (EdT 53A) TEACHING HANDICAPPED CHILDREN**

Observing work with special classes; teaching under direction; conducted in cooperation with the public schools of the Twin Cities. (3 cr; prereq #; hrs ar) Kennedy

**5-100 (EPsy 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; I MTWThF; ForH 177) Kennedy

**5-101 (EPsy 182) EDUCATION OF EXCEPTIONAL CHILDREN**

Introduction to field of special education for classroom teachers and other school personnel. (3 cr; limited to 50 students; IV MTWThF; Pt 215) Munro

**5-110 (EPsy 160) DIAGNOSIS AND REMEDIATION OF LEARNING DISABILITY I**

Survey, demonstration, and evaluation 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 24 students; prereq 5-310 [EPsy 148] and ¶5-610 [EPsy 160A], Elem 5-334 [EdCI 145], and #; I, V MTWThF; CD 105) Ar

**5-112 (EPsy 165) EDUCATION OF LEARNING-DISABLED CHILDREN**

Analysis of considerations in design and conduct of services for learning-disabled children; approaches to education of such children. (3 cr; VI MTWThF; Pt 111) Crump

**5-120 (EPsy 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 5-101 [EPsy 182]; II MTWThF; Pt 111) Grismer

**5-121 (EdCI 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 5-120 [EPsy 184]; III MTWThF; Pt 111) Gedo

**5-130 (EPsy 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 5-101 [EPsy 182] or #; I MTWThF; J 5) Force

**5-143 (EdCI 127A) METHODS OF DEVELOPING LANGUAGE FOR THE HEARING IMPAIRED**

A review of current methodological practices; practical application of linguistic theory to teaching language. Students will be selected in advance. (3 cr; prereq 5-100 [EPsy 177], SSPA 5-708 [183] or #; II MTWThF; J 9) Kennedy

**5-150 (EPsy 186) EDUCATION OF EMOTIONALLY DISTURBED AND SOCIALLY MALADJUSTED CHILDREN**

Discussion and evaluation of curricula, 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 214) Munro

**5-180 (EPsy 188) EDUCATION OF THE DISADVANTAGED**

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; NH 122) Sullivan

**5-190 (EPsy 183) OUTSTANDING ABILITIES AND THE EDUCATIONAL PROCESS**

Critical analysis of the origin and development of terms such as giftedness, creativity, genius, talent, and intelligence; implications for educational practice; current issues and trends. (3 cr; III MTWThF; J 4) Crump

**5-610 (EPsy 160A) PRACTICUM: DIAGNOSIS AND REMEDIATION OF LEARNING DISABILITY I**

Clinical practice in prescriptive teaching using a selected range of techniques presented in SpEd 5-110 (EPsy 160). (3 cr; limited to 24 students; prereq ¶5-110 [EPsy 160] and §; I MTWThF, Pt 111; II-IV MTWThF, ar; June 15 to August 6) Gallistel

**8-150 (EPsy 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 §; VII-VIII TTh; Pt 111) Wood

**8-500 (EPsy 289) SURVEY OF SPECIAL EDUCATION PROBLEMS**

For persons working in special education or in allied fields. (3 cr; prereq 5-101 [EPsy 182] or experience, and §; II MTWThF; J 5) Weatherman

**8-580 (EPsy 268) SEMINAR: THE DISADVANTAGED**

Psychological theory and research with implications for educational planning and procedures. (3 cr; prereq §; VII-IX MW; Pt 111) Wood

**8-601 (EPsy 288) ADVANCED PRACTICUM**

Experience planned with supervising professor in college teaching, supervision of student teachers or other forms of advanced professional practice; usually taken by advanced graduate students. (Cr ar; prereq §; VII-IX TTh; rm ar) Kennedy, Gedo

**8-900\* (EPsy 253) RESEARCH PROBLEMS**

(Cr and hrs ar; prereq §) Reynolds, Force, Moores, Weatherman, Wood, Crump, Gallistel, Munro, Sullivan

## Elementary Education (Elem)

**3-316 (EdCI 64) TEACHING ENGLISH IN THE ELEMENTARY SCHOOL**

(3 cr; limited to 25 students; prereq 3-100 [Ed 75A], Engl 3-601 [60]; II MTWThF; Pt 102) Dykstra

**3-331 (EdCI 60) TEACHING READING IN THE ELEMENTARY SCHOOL**

(3 cr; limited to 25 students; prereq 3-100 [Ed 75A]; III MTWThF; Bu 123) Ar

**3-346 (EdCI 65) TEACHING SCIENCE IN THE ELEMENTARY SCHOOL**

(3 cr; limited to 25 students; prereq 3-100 [Ed 75A], 10 cr in natural science; I MTWThF; Pt 102) Goossen

**3-361 (EdCI 61) TEACHING SOCIAL STUDIES IN THE ELEMENTARY SCHOOL**

(3 cr; limited to 25 students; prereq 3-100 [Ed 75A]; IV MTWThF; Pt 214) Ellis

**3-376 (EdCI 56) NURSERY SCHOOL-KINDERGARTEN CURRICULUM I**

(3 cr; limited to 25 students; prereq 3-100 [Ed 75A]; II MTWThF; CD 216) Hansen

**3-604†† (EdT 77) STUDENT TEACHING IN THE NURSERY SCHOOL**

(3 cr; prereq approval of major advisers; hrs ar) Ar

†† Student teaching is open only to students in the College of Education regular degree programs. Application must be made prior to May 10. Forms and instructions are available in the Student Teaching Office, 227 Burton Hall.

- 5-100 (EdCI 119) ELEMENTARY SCHOOL CURRICULUM**  
(3 cr; limited to 40 students; prereq 3-101 [Ed 75B]; I MTWThF; CD 216) Ryan
- 5-108 (EdCI 150) SUPERVISION AND IMPROVEMENT OF INSTRUCTION**  
(3 cr; limited to 25 students; prereq 9 cr in education; III MTWThF; NH 107) Ar
- 5-109 (EdCI 186) LABORATORY IN ELEMENTARY INSTRUCTIONAL PRACTICES**  
Daily observation of elementary classes with discussion of techniques; emphasis on activity units, visual aids, materials, and individual differences. (2 cr; prereq experienced tchrs only; students enrolling in this class must carry at least one other course in College of Education; observation 4 hrs per wk ar MTWThF, Tuttle School; lect VI TTh, Bu 125) Benson
- 5-300 (EdCI 121) LITERATURE FOR THE ELEMENTARY SCHOOL**  
(3 cr; limited to 50 students; II MTWThF; Pt 215) Odland
- 5-316 (EdCI 153) TEACHING AND SUPERVISION OF ENGLISH IN THE ELEMENTARY SCHOOL**  
(3 cr; limited to 30 students; prereq 3-316 [EdCI 64] or elem school tchg exper; III MTWThF; Bu 120) Chase
- 5-331 (EdCI 143A) TEACHING AND SUPERVISION OF READING IN ELEMENTARY SCHOOL**  
For graduate students and summer students who already hold a Bachelor's degree in elementary education. Undergraduate students should register for 3-331 in First Term. (3 cr; each section limited to 50 students; prereq 9 cr in education)  
Sec 1, I MTWThF, Bu 120, D Pearson  
Sec 2, II MTWThF, Bu 120, Ar  
Sec 3, IV MTWThF, Bu 120, D Pearson
- 5-334 (EdCI 145) READING DIFFICULTIES**  
(3 cr; each section limited to 40 students; prereq 5-331 [EdCI 143A] or SeEd 5-344 [EdCI 144])  
Sec 1, I MTWThF, Bu 125  
Sec 2, III MTWThF, J 1
- 5-335 (EPsy 148) CLINICAL DIAGNOSIS OF READING DIFFICULTIES**  
Relationship to psychological factors and clinical remedial correction. (3 cr; each section limited to 20 students; prereq 5-334 [EdCI 145]) Schreiner  
Sec 1, III MTWThF, Pt 215  
Sec 2, IV MTWThF, Bu 123
- 5-336 (EPsy 150) CLINICAL PRACTICE IN REMEDIAL TEACHING**  
Remedial tutoring of individual children who have difficulty in school learning. (3 cr; each section limited to 23 students; prereq 5-334 [EdCI 145] or 5-107 [EdCI 151] and #) Ar  
Sec 1, I-II MTWThF, rm ar  
Sec 2, I-II MTWThF, rm ar
- 5-346 (EdCI 103A) TEACHING SCIENCE IN THE ELEMENTARY SCHOOL**  
Materials, resources, and methods of teaching science at the elementary level. For graduate students and summer students who already hold a Bachelor's degree in elementary education. Undergraduate students should register for 3-346 (EdCI 65). (3 cr; limited to 30 students; prereq elem tchg exper or #; III MTWThF; Pt 102) Goossen
- 5-347 (EdCI 120A) WORKSHOP: CURRICULUM IMPLEMENTATION IN ELEMENTARY SCHOOL SCIENCE (June 15-30)**  
Focuses on a single science program to be determined through early registrants. Conducted mornings in an elementary school where program elements will be prepared, demonstrated, and taught. Afternoon sessions will be held on campus, will focus on teaching specific lessons, in-service programs. (3-6 cr; limited to 25 students; prereq elem tchg exper; VI-VIII MTWThF; Pt 102) R Johnson

- 5-348 (EdCI 120B) WORKSHOP: OUTDOOR SCIENCE EDUCATION (July 1-16)**  
Classroom and field work activities dealing with models, materials, and methods in the outdoor setting; held mornings in Elm Creek Park Reserve and on campus in the afternoon. (3 cr; limited to 25 students; prereq elem tchg exper; VI-VIII MTWThF; Pt 102) R Johnson
- 5-361 (EdCI 102) TEACHING AND SUPERVISION OF SOCIAL STUDIES IN ELEMENTARY SCHOOL**  
For graduate students and for summer students who already hold a Bachelor's degree in elementary education. Undergraduate students should register for 3-361 in First Term. (3 cr; limited to 40 students; prereq 3-101 [Ed 75B] or equiv; III MTWThF; Pt 214) Ryan
- 5-362 (EdCI 155A) MATERIALS LABORATORY FOR ELEMENTARY SOCIAL STUDIES TEACHERS**  
Printed, audio-visual, and other materials. Investigation and evaluation of teaching materials and devices. (3 cr; limited to 25 students; prereq 3-361 [EdCI 61] or 5-361 [EdCI 102] or #; II MTWThF; Pt 214) Cogan
- 5-363 WORKSHOP: CURRICULUM IMPLEMENTATION IN ELEMENTARY SCHOOL SOCIAL STUDIES**  
(Cr ar [maximum 9 cr]; prereq elementary tchg exper and #)
- Sec 1, Project Social Studies (June 15-30)**  
Project Social Studies as a focal point to develop inquiry process, inductive-deductive teaching strategies, use of original data sources, instructional sequences, procurement of materials. (Limited to 25 students; VI-VII MTWThF; Pt 214) Ellis
- Sec 2, Instructional Leadership in Elementary School Social Studies (July 1-16)**  
For elementary school principals, supervisors, and curriculum directors. Opportunity to analyze new instructional materials, investigate recent curriculum developments, consider models for curriculum change in elementary school social studies. (Limited to 20 students; VI-VII MTWThF; Pt 214) Cogan
- 5-376 (EdCI 166) CURRENT TRENDS IN KINDERGARTEN EDUCATION**  
Continuing needs of children in our changing culture; current practices and recent research. Not intended for kindergarten certification requirements. (3 cr; limited to 40 students; prereq tchg exper in kindergarten or primary school or #; IV MTWThF; PeikH 355) Hansen
- 8-317 (EdCI 258) RESEARCH IN SKILL DEVELOPMENT IN SPELLING, HANDWRITING, AND LISTENING**  
Review of findings with implications for the classroom teacher; evaluation criteria and needed research. (3 cr; limited to 15 students; prereq 5-316 [EdCI 153]; IV MTWThF; J 5) Dykstra
- 8-916\* (EdCI 296) PROBLEMS: TEACHING ENGLISH**  
(Cr ar) Chase, Dykstra
- 8-931\* (EdCI 273) PROBLEMS: READING**  
Recent issues, studies, and findings; for those with previous training in reading who have a special problem, or who wish to survey the most recent literature. (Cr ar; prereq 5-331 [EdCI 143A] or SeEd 5-334 or #) Chase, Dykstra, Odland, Schreiner, D Pearson
- 8-961\* (EdCI 201) PROBLEMS: TEACHING SOCIAL STUDIES**  
(Cr ar; prereq 5-361 [EdCI 102] or SeEd 5-155 [EdCI 155], 5-168 [EdCI 168], 8-104 [EdCI 204] or #) Ryan, Cogan, Ellis
- 8-991\* (EdCI 261) PROBLEMS: IMPROVEMENT OF INSTRUCTION**  
(Cr ar; prereq #) Lambert, Chase, Dykstra, Goossen, Odland, Hansen, Post, Ryan, Schreiner, Cogan, Ellis, R Johnson, D Pearson

## History and Philosophy of Education (HEd)

### 3-090 (90) THE SCHOOL AND SOCIETY

Readings in social science and philosophy give the student opportunity to integrate points of view in thinking about the role of the school in present-day society. (3 cr; each section limited to 65 students; prereq sr)

- Sec 1, I MTWThF, Arch 130, Weidman
- Sec 2, II MTWThF, Arch 60, Weidman
- Sec 3, III MTWThF, Arch 130, Harkins
- Sec 4, III MTWThF, AH 150, Landsverk
- Sec 5, IV MTWThF, AH 150, Landsverk

### 5-132 (132) EDUCATION IN THE THIRD WORLD

Introduction to comparative and international education focusing on the role of education in ameliorating the social, economic, and political problems of nations in Asia, Africa, and Latin America. (3 cr; II MTWThF; WuH 130) Graham

### 8-231 SEMINAR: COMPARATIVE AND INTERNATIONAL EDUCATION

Research reports on cross-national and cross-cultural developments in education and methods of investigating these developments. (3 cr; IV MTWThF; Pt 102) Graham

### 8-241\* (241) PROBLEMS: HISTORY AND PHILOSOPHY OF EDUCATION

For graduate students interested in research and original work in these areas. (Cr ar; prereq #) Harkins

## Mathematics Education (MthE)

### 5-101 (100) WORKSHOP: ELEMENTARY SCHOOL MATHEMATICS

Modern trends, methods, and materials used to convey mathematical ideas. (3 cr; limited to 48 students; prereq #; not open to mathematics education majors; IV MTWThF; Pt 111) Post

### 5-312 (112) TEACHING AND SUPERVISION OF MATHEMATICS IN THE SECONDARY SCHOOL

Methods, materials, and curriculum development; principles of learning; review of research; preparation and evaluation of tests, units, and materials of instruction. (3 cr; limited to 25 students; prereq mathematics tchg exper or #; II MTWThF; PeikH 315) David C Johnson

### 5-322 (122) MATERIALS LABORATORY FOR SECONDARY SCHOOL MATHEMATICS INSTRUCTION

Sources and types of materials, laboratory projects and techniques of using mathematics devices and instruments, visual aids, and community resources. (3 cr; limited to 25 students; prereq 5-312 [112] or #; IV-V MTTh; PeikH 315) David C Johnson

### 5-355 (155) 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; limited to 48 students; prereq 5-311 [111] or Elem 3-391 [EdCl 62] or #; I MTWThF; Pt 111) Post

### 8-980\* (280) PROBLEMS: MATHEMATICS EDUCATION

(Cr and hrs ar; prereq 8-500 [200] or 8-570 [270]) David C Johnson, Post

## Music Education (MuEd)

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

### 3-011 (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 1-001 [4] or exemption) Byrne

Sec 1, II MTWThF, ScH 4

Sec 2, III MTWThF, ScH 4

**3-557 (65) INSTRUMENTATION**

Theoretical study of orchestral and band instruments, in combination; revision of materials suitable for school use; capacity and capability of school performance on the various instruments. (3 cr; prereq Mus 1-506 [6T]; IV MTWThF; NMA 4) Schultz

**5-112 (170) RECENT RESEARCH AND LITERATURE**

Current research; evaluation of teaching materials; appraisal of techniques. (3 cr; prereq sr, #; VI MTWThF; ScH 103) Turrentine

**5-214 (103) PSYCHOLOGICAL FOUNDATIONS**

Analysis and interpretation of psychologies of music and education as applied to the teaching of music. (3 cr; prereq #; I MTWThF; ScH 103) Caswell

**5-231 (151) SUPERVISION AND ADMINISTRATION OF ELEMENTARY MUSIC**

Analysis and evaluation of instructional techniques; supervisory and administrative techniques; readings; new trends. (3 cr; prereq major or minor in music or music education; II MTWThF; ScH 2) Borg

**5-311 (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 pupils. (3 cr; prereq 3-011 [56] or #; I MTWThF; ScH 103) Borg

**5-322 INSTRUMENTAL MUSIC IN THE GENERAL MUSIC CLASSROOM**

Beginning and intermediate class and small group recorder instruction. Methods and materials for teaching all sizes of recorder, capped and uncapped Renaissance reed instruments, and the Studio 49 (Orff Schulwerk) melodic and percussion instruments. Factors in combining these instruments with voices and keyboard instruments. (3 cr; limited to 25 students; prereq Mus 1-001 [4] or equiv or music or music education major; V MTWThF; ScH 4) Caswell

**5-534 PERCUSSION TECHNIQUES**

Contemporary approaches to teaching percussion in the elementary, junior high, and high school. Emphasis on performing techniques. Playing of teaching materials; solo and ensemble repertoire. (3 cr; III MTWThF; NMA 4) Schultz

**5-583 (125) SELECTION OF INSTRUMENTAL MATERIALS III**

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, #; V MTWThF; ScH 2) Turrentine

**8-990\* (224) RESEARCH PROBLEMS**

Individual projects. (3-9 cr; prereq knowledge of elementary statistics; hrs ar; ScH 104) Caswell, Turrentine, Borg

## Physical Education, Recreation, and School Health

### *Physical Education for Men and Women (PE)*

(For Special Fees, see page 26.)

**Nonprofessional Physical Education**—Students interested in meeting a college requirement in physical education or in taking activity courses for elective credit may register for PE 1-007 (5A), 1-014 (11A), 1-022 (14A),

1-024 (16A), 1-038 (36A), 1-050 (29A), 1-058 (27A), 1-059 (37A), 1-107 (5B), 1-138 (36B), 1-150 (29B), 1-205 (3A), 1-306 (4A), and 1-410 (7A).

**Professional Physical Education**—Courses are offered for men and women at the advanced and graduate level and in the undergraduate major and minor in physical education. Many of these courses apply toward meeting the certification requirements for teaching physical education in the State of Minnesota. For men, courses are offered 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:

1. An Advanced Degree in Physical Education for Men and Women—  
PE 5-120 (115), 5-122 (171), 5-150 (100), 5-151 (102), 5-152 (106), 5-160 (135), 5-255 (147), 5-620 (160), 5-980 (136), 5-981 (118E), 5-982 (128E), 5-983 (137), 8-110 (260), 8-980 (224A), 8-981 (224B).
2. Undergraduate Major in Physical Education for Women—  
PE 1-007 (5A), 1-024 (16A), 1-050 (29A), 1-306 (4A), 1-410 (7A), 5-151 (102), Hlth 1-500 (25).
3. Undergraduate Major in Physical Education for Men—  
PE 1-410 (7A), 3-110 (50), 3-170 (80), 3-171 (81), 3-172 (82), 3-900 (99), 5-151 (102), Hlth 1-500 (25).
4. Undergraduate Minor in Physical Education for Women—  
PE 1-007 (5A), 1-024 (16A), 1-050 (29A), 1-306 (4A), 1-410 (7A), 5-151 (102), Hlth 1-500 (25).
5. Undergraduate Minor in Physical Education for Men—  
PE 1-410 (7A), 3-110 (50), 3-115 (71), 3-170 (80), 3-171 (81), 3-172 (82), 3-900 (99), Hlth 1-500 (25).
6. State of Minnesota Coaching Credential—  
PE 3-110 (50), 3-115 (71), 3-170 (80), 3-171 (81), 3-172 (82), 3-900 (99), 5-620 (160).

**Elementary School Majors**—Hlth 3-330 and PE 3-327 are offered to accommodate elementary school education majors and classroom teachers.

#### **ACTIVITY CLASSES—NONPROFESSIONAL (PE)**

*(Open to all students)*

Health Service approval is needed for activity classes. Courses are designated as (co-ed); (women only); (men only).

#### **1-007 (5A) SWIMMING**

For nonswimmers. Course includes aquatic breathing, floating, bobbing, treading, finning, human stroke, elementary backstroke, sidestroke, front crawl. (1 cr; each section limited to 24 students)

Sec 1 (co-ed), II MTWTh, CH Pool, Roethlisberger

Sec 2 (women only), III MTWTh, NGW 58, Stoner

Sec 3 (co-ed), V MTWTh, NGW 58, Ost

- 1-014 (11A) CONDITIONING** (men only)  
Participation in and development of an understanding of various methods of physical conditioning. (1 cr; limited to 24 students; IV MTWTh; CH 206) Tsai
- 1-038 (36A) TENNIS**  
Fundamental strokes such as service, forehand and backhand, drives and volley; court positions and strategy for singles and doubles; rules, terminology, and etiquette. Women students should have a free hour following class. (1 cr, §PE 1-541 [PEWP 22C]; each section limited to 24 students)  
Sec 1 (women only), II MTWTh, NGW 151, Cato  
Sec 2 (women only), III MTWTh, NGW 151, Cato  
Sec 3 (co-ed), I MTWTh, CH 420, Tsai  
Sec 4 (co-ed), IV MTWTh, CH 420, McKechney
- 1-050 (29A) GOLF**  
Emphasizes fundamentals of grip, stance, and swing in addition to etiquette and rules. Instruction is on an individual basis; therefore, the student need not take the course in sequence. (1 cr, §PE 1-530 [PEWP 22B]; each section limited to 24 students)  
Sec 1 (women only), II MTWTh, NGW 60, Ost  
Sec 2 (women only), III MTWTh, NGW 60, Ost  
Sec 3 (men only), 12:30-1:45 MW, Golf Course, Bolstad  
Sec 4 (men only), 12:30-1:45 TTh, Golf Course, Bolstad
- 1-058 (27A) PHYSICAL EDUCATION FOR FAMILY LIVING** (co-ed)  
Taught with the purpose of instructing and interesting students in physical activities appropriate for the family in the home setting and community. Covers exercise programs, recreational games, individual and dual sports. (1 cr; limited to 24 students; III MTWTh; CH 214) Kundla
- 1-059 (37A) TRACK AND FIELD** (co-ed)  
Survey of basic rules of fundamental running, hurdling, jumping, and throwing skills and of modern training techniques. (1 cr; limited to 24 students; III MTWTh; CH 420) Griak
- 1-107 (5B) SWIMMING** (co-ed)  
Stresses the improvement of strokes, kicking, and breathing. In addition, turns, elementary diving, fundamental lifesaving techniques, and deep water skills are taught. (1 cr; limited to 24 students; III MTWTh; CH Pool) Roethlisberger
- 1-138 (36B) TENNIS** (co-ed)  
Students should have developed good ball control in basic strokes. The volley, lob, and advanced strategy for singles and doubles will be stressed. (1 cr; limited to 24 students; prereq 1-038 [36A]; V MTWTh; CH 420) McKechney
- 1-205 (3A) SCUBA AND SKIN DIVING** (co-ed)  
Skills, techniques, and safety precautions of scuba and skin diving. (1 cr; limited to 16 students; prereq women 1-207 [PEW 5C], men 1-107 [5B]; see Special Fees list; 1:30-3:00 MTWThF; CH Pool) Mowerson
- 1-306 (4A) AMERICAN RED CROSS SENIOR LIFE SAVING** (co-ed)  
For students interested in obtaining the Red Cross Life Saving Certificate. (1 cr; limited to 24 students; prereq ability to swim 440 yds; IV MTWTh; NGW 58) Stoner
- 1-410 (7A) WATER SAFETY INSTRUCTOR** (co-ed)  
For those interested in obtaining the Red Cross Swimming Instructor's Certificate. (2 cr; limited to 24 students; prereq current American Red Cross Senior Lifesaving Certificate; 3:00-4:00 MTWThF; CH Pool) Mowerson

## PROFESSIONAL COURSES (PE)

- 3-110 (50) HUMAN ANATOMY**  
Emphasizes bones, nerves, and muscles and their significance in physical education. (3 cr; V MTWThF; CH 206) Serfass

- 3-115 (71) PHYSIOLOGICAL APPLICATIONS TO SPORTS**  
 Consideration of muscular contraction with applications for strength development programs; contributions of training programs 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 3-385 [91] or 3-386 [92]; I MTWThF; CH 206) Serfass
- 3-170 (80) BASEBALL COACHING (men only)**  
 Techniques of playing each position, batting, coaching runners, and team play; study of rules; officiating methods and practice; organization of practices. (2 cr; limited to 20 students; prereq 1-553 [PEMP 9] or §; III MTWThF; CH 215) Kindall
- 3-171 (81) BASKETBALL COACHING (men only)**  
 Techniques, styles of offense and defense, conditioning, and handling of players. (2 cr; limited to 20 students; prereq 1-652 [PEMP 10] or §; II MTWThF; CH 215) Hanson
- 3-327 TEACHING PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL**  
 An overview of the elementary school physical education program. Representative experiences include: skill analysis, observations, microteaching, group discussions, and laboratory work. (3 cr, §1-560 [PEWP 45], §3-325 [PEWP 70], or Hlth 3-325 [70]; limited to 35 students; prereq elementary education major; V MTWThF; NGW 153, 201) Cato
- 3-900 (99) INDEPENDENT STUDY (men only)**  
 Self-directed study preceded by classroom study and possession of basic competence. (1-9 cr; prereq Δ; hrs ar) Serfass
- 5-120 (115) ADVANCED KINESIOLOGY**  
 Principles of mechanics applied to human movement, analysis of motor skills, applications to individual projects. (3 cr; prereq undergrad kinesiology or §; III MTWThF; NGW 3) Wilson
- 5-150 (100) TEACHING ELEMENTARY SCHOOL PHYSICAL EDUCATION**  
 Principles, techniques, and procedures in developing basic motor skills, physical fitness and sports skills. (3 cr; prereq tchg certificate or §; II MTWThF; CH 214) Torpey
- 5-152 (106) CURRICULUM DEVELOPMENT**  
 Trends, issues, and problems at selected levels of interest; elementary, secondary, junior college. For experienced teachers. (3 cr; prereq 5-151 [102] or equiv; IV MTWThF; CH 214) Torpey
- 5-160 (135) TESTS AND MEASUREMENT IN PHYSICAL EDUCATION**  
 Place and limitations of measurement; construction and interpretation of evaluative procedures. (3 cr; prereq grad or MEd, §; II MTWThF; NGW 3) Stoner
- 5-255 (147) INTRAMURALS-EXTRAMURALS**  
 Analysis and interpretation of philosophies of men's and women's programs; principles, objectives, and techniques of program development. (3 cr; I MTWThF; CH 214) B Anderson, Mueller
- 5-620 (160) PRACTICUM: PREVENTION AND CARE OF ATHLETIC INJURIES (June 21 to July 2)**  
 An overview of problems (recognition, principles, and responsibilities) related to athletic injuries in secondary and college programs; demonstration and practice in training techniques and familiarity with the use of instruments for athletic rehabilitation. (3 cr; limited to 50 students; prereq §; 1:30-5:00 MTWThF; CH 215) Bird, Stein, Marshall
- 5-980 (136) INTRODUCTION TO RESEARCH**  
 Method and design for research in health, physical education, and recreation. (3 cr; prereq §; I MTWThF; NGW 3) Wilson
- 5-981 (118E) PROBLEMS**  
 Focus on teaching of physical education. (Cr and hrs ar; prereq MEd candidate, §) Bird, Cato, Jaeger, Olson, Stoner, Torpey, Wilson

**5-982 (128E) INTEGRATING PAPER**

Independent paper integrating learnings from a course or courses in education with learnings in physical education. (3 cr, §H1th 5-982 [128E]; prereq MEd only; hrs ar) Bird, Cato, Jaeger, Olson, Stoner, Torpey, Wilson

**5-983 (137) READINGS: PHYSICAL EDUCATION**

Independent study under tutorial guidance. (1-3 cr; prereq sr honors, grad, §; hrs ar) Bird, Jaeger, Olson, Stoner, Torpey, Wilson

**8-110 (260) ADMINISTRATION: GENERAL PRINCIPLES AND PROCEDURES**

Operation and management of physical education and athletic programs in schools, colleges and universities. (3 cr; IV MTWThF; NGW 4) Jaeger

**8-981\* (224B) RESEARCH PROBLEMS**

Individual problems. (Cr and hrs ar; prereq 8-980 [224A] or §) Jaeger, Olson, Stoner, Wilson

## *Recreation and Park Administration (Rec)*

**1-520 (20) INTRODUCTION TO RECREATION AND PARKS**

Examination of the history and development of park and recreation movement; professional and service organizations; orientation to the professional field. (2 cr; I MTWTh; CH 215) Cheatham

**1-700 (40) RECREATION FIELD WORK WITH SPECIAL GROUPS**

(1-4 cr; prereq recreation students for special groups program only; hrs ar) Chapman

**3-700 (90) FIELD EXPERIENCE**

(1-9 cr; prereq sr, recreation major or minor; II T and ar; CH 420) Giles

**5-120 (101) RECREATION IN COMMUNITY ORGANIZATIONS**

Agencies and their interrelationships. (3 cr; prereq 1-520 [20] or §; III MTWThF; CH 206) Chapman

**5-140 (112) RECREATION PROGRAM PLANNING**

Principles of program planning for an organized offering of recreation opportunities. (3 cr; prereq 1-520 [20] or §; II MTWThF; CH 206) Cheatham

**5-230 (144) RECREATION FOR THE MENTALLY RETARDED**

Characteristics and special needs in relation to recreation program; consideration of skills and techniques for work with retarded persons in institutions and in the community. (3 cr; prereq 5-210 [141], 5-220 [143] or §; IV MTWThF; CH 215) Chapman

**5-981 (118E) PROBLEMS**

Focus on conduct of recreation programs. (Cr ar; prereq MEd candidate, §; hrs ar) Giles

**5-983 (137) READINGS: RECREATION**

Independent study under tutorial guidance. (1-3 cr; prereq sr honors, grad, MEd or §; hrs ar) Cheatham

**8-620 (250) PRACTICUM: COLLEGE UNIONS**

Supervised experiences in program operation; administrative and supervisory duties. (3-9 cr; prereq 12 grad cr in recreation; hrs ar) Giles

**8-630 (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

**8-640 (252) PRACTICUM: PUBLIC RECREATION AND PARKS**

Supervised experiences in program operation; administrative and supervisory duties. (3-9 cr; prereq 12 grad cr in recreation; hrs ar) Giles

**8-981\* (224B) RESEARCH PROBLEMS**

Individual problems. (Cr ar; prereq 8-980 [224A] or §; 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 undergraduate major in school and community health education are Hlth 1-500 (25) and 5-400.
2. Courses offered this summer which apply to advanced and graduate degrees in school health education are Hlth 5-130 (119), 5-300 (117B), 5-400, 5-981 (118E), 5-982 (128E), 5-983 (137), 8-981 (224B).
3. Courses offered this summer which apply to state driver education certification are Hlth 5-100 (EdCl 101A), 5-101 (EdCl 101B) and 5-130 (119).

### 1-500 (25) AMERICAN RED CROSS FIRST AID: STANDARD, ADVANCED

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; IV MTWThF; NGW 201) Loia

### 3-330 TEACHING HEALTH IN THE ELEMENTARY SCHOOL

Content and methods of instruction. (3 cr; limited to 35 students; prereq elementary education major; II MTWThF; NGW 201) Eburne

### 5-100 (EdCl 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's license required. (4 cr; limited to 32 students; prereq  $\Delta$ ; 1:00-2:20 MTWThF; NGW 3) Thissen

### 5-130 (119) SAFETY EDUCATION

Scope and nature of accident prevention in our society; study of curricular areas leading to accident prevention. (4 cr; limited to 32 students; prereq sr; 10:15-11:45 MTWThF; NGW 201) Guthmann

### 5-400 TOPICS: EDUCATIONAL ASPECTS OF DRUG USE AND ABUSE (June 21 to July 9)

Basic background information on alcohol and other drugs and chemicals with emphasis on curriculum concepts, teaching methodology, materials, and referral procedures appropriate for elementary, junior, and senior high school. (3 cr, §PubH 5-032; limited to 80 students; prereq education sr, certified tchrs, school nurses; 1:30-3:30 MTWThF; NGW 201) Eburne

## Secondary Education (SeEd)

### 3-100 (EdCl 52) OFFICE OCCUPATIONAL EXPERIENCE

Observation and practice in business offices; weekly seminars on application to teaching and guidance of high school and post-high school students. (3-9 cr; prereq jr, business education major, and  $\$$ ; hrs ar) Price

### 3-150 (Ed 55A) INTRODUCTION TO SECONDARY SCHOOL TEACHING

Open only to those students accepted for regular degree program in College of Education; those not previously registered as regular students should apply for admission to the College of Education not later than May 10 in order to allow time for tests, interviews, and approval by the major department; designed principally for those who have finished jr

yr with sufficient work in the tchg major to permit entrance in fall qtr. (5 cr; each section limited to 30 students; prereq Psy 1-002 [2]) Williams

Sec 1, I-IV MTWThF, PeikH 165 (prereq ¶3-155, sec 1)

Sec 2, I-IV MTWThF, PeikH 175 (prereq ¶3-155, sec 2)

Sec 3, I-II MTWThF, PeikH 325

Sec 4, I-II MTWThF, PeikH 385

Sec 5, III-IV MTWThF, PeikH 325

Sec 6, III-IV MTWThF, PeikH 375

**3-155 (Ed 55B) INTRODUCTION TO SECONDARY SCHOOL TEACHING**

Open only to students accepted for a regular degree program in College of Education. (5 cr; each section limited to 30 students; prereq Psy 1-002 [2]) Rhettts

Sec 1, I-IV MTWThF, PeikH 165 (prereq ¶3-150, sec 1)

Sec 2, I-IV MTWThF, PeikH 175 (prereq ¶3-150, sec 2)

Sec 3, I-II MTWThF, Aero 317, CCTV

Sec 4, III-IV MTWThF, Aero 319, CCTV

**3-600†† (EdT 52) STUDENT TEACHING**

Open only to students who need a limited number of cr in student tchg to graduate at end of 1st term. (Cr and hrs ar; limited to 20 students; prereq Δ) E Anderson

**5-105 (EdCI 105) AUDIO-VISUAL MATERIALS IN EDUCATION**

(3 cr; prereq sr; I MTWThF and 2 hrs lab ar; WeH 202) Pearson

**5-107 (EdCI 107) RADIO AND TELEVISION IN EDUCATION**

(3 cr; prereq 9 cr in education; III MTWThF; WeH 202) Pearson

**5-109 (EdCI 109) PROJECTED AUDIO-VISUAL MATERIALS AND EQUIPMENT LABORATORY**

(3 cr; each section limited to 15 students; prereq 5-105 [EdCI 105] or ¶5-105; lect IV MTWThF; WeH 202) Newren

Sec 1, VI MW, WeH 206

Sec 2, VI TTh, WeH 206

**5-110 (EdCI 105A) APPLIED INSTRUCTIONAL MEDIA EVALUATION AND SELECTION**

Analysis of traditional and newer types of audio-visual materials; emphasis on selection applied to content, learning situations, and technical quality; opportunity for students to follow subject area and grade-level interests. (3 cr; limited to 30 students; prereq 5-105 [EdCI 105]; II MTWThF; WeH 202) Newren

**5-112 (EdCI 112) FAMILY LIFE EDUCATION**

Sources and types of materials available; techniques of family life education; preparation and evaluation of instructional materials. (3 cr; limited to 35 students; II MTWThF; PeikH 215) Hey

**5-113 (EdCI 113) PRINCIPLES OF SECONDARY SCHOOL CURRICULUM**

Concepts and basic principles; forces influencing curricular objectives, organization, and construction; evaluation and trends. (3 cr; prereq 3-155 [Ed 55B] or equiv; I MTWThF; PeikH 215) Birkmaier

**5-120 SECONDARY EDUCATION FOR THE CULTURALLY DIFFERENT**

Characteristics and problems of culturally different and economically deprived secondary students using a multidisciplinary approach; traditional school and teacher responses; alternate solutions. (3 cr, §BsEd 5-120; prereq sr; II MTWThF; PeikH 235) Sullivan

**5-150 INTRODUCTION TO SOCIAL STUDIES EDUCATION**

Advanced methods for social studies teachers; prerequisite to other graduate level courses in social studies education. (3 cr; II MTWThF; PeikH 255) Mackey

†† Student teaching is open only to students in the College of Education regular degree programs. Application must be made prior to May 10. Forms and instructions are available in the Student Teaching Office, 227 Burton Hall.

- 5-160 SOCIAL STUDIES EDUCATION FOR THE CULTURALLY DIFFERENT**  
 Evaluation of and recommendations for improvement in programs, curricula, methodologies, and instructional materials for culturally different secondary students in social studies education. (2 cr; prereq SeEd 5-120 or BsEd 5-120 or ¶ or equiv; I MTWThF; PeikH 235) Mackey
- 5-172 (EdCI 172) SUPERVISION OF SECONDARY INSTRUCTION**  
 Achievement of appropriate teaching expectations focusing on problems of personnel responsible for their improvement. (3 cr; prereq 5-113 [EdCI 113]; I MTWThF; PeikH 225) Hill
- 5-177 (EdCI 177) DIRECTING SECONDARY SCHOOL SPEECH ACTIVITIES**  
 Philosophy, organization, and administration of extemporaneous speaking, oratory, interpretive reading, and debate. (3 cr; prereq Spch 1-101 [5] or 1-102 [2] and 1-106 [6]; III MTWThF; FoIH 306) Brock
- 5-190 FOREIGN LANGUAGE EDUCATION FOR THE CULTURALLY DIFFERENT**  
 Evaluation of and recommendations for improvement in programs, curricula, methodologies, and instructional materials for culturally different secondary students in foreign language education. (2 cr; prereq SeEd 5-120 or BsEd 5-120 or ¶ or equiv; I MTWThF; PeikH 315) Ar
- 5-198 ENGLISH EDUCATION FOR THE CULTURALLY DIFFERENT**  
 Evaluation of and recommendations for improvement in programs, curricula, methodologies, and instructional materials for culturally different secondary students in English education. (2 cr; prereq SeEd 5-120 or BsEd 5-120 or ¶ or equiv; I MTWThF; PeikH 355) Ar
- 5-321 (EdCI 122A) TEACHING LITERATURE IN SECONDARY SCHOOLS**  
 (3 cr; prereq 3-155 [Ed 55B] or jr-sr high school tchg exper; IV MTWThF; PeikH 225) Brunetti
- 5-323 (EdCI 122C) TOPICS IN LANGUAGE AND THE TEACHING OF ENGLISH**  
 Psychological, linguistic, philosophical, sociological perspectives on language; cognitive and affective implications of language in discourse and in art; minority dialects, developmental aspects of language use, comparative grammatical systems and implications for English curriculum development. (3 cr; III MTWThF; PeikH 215) Shroyer
- 5-344 (EdCI 144) TEACHING READING IN SECONDARY SCHOOLS**  
 (3 cr; prereq 9 cr in education; I MTWThF; Bu 123) Chase
- 5-382 TESTING AND EVALUATION IN FOREIGN LANGUAGE TEACHING AND LEARNING**  
 Standardized achievement, proficiency, aptitude, and attitude tests in foreign languages; building test items for cognitive, affective, and psychomotor domains; techniques for evaluating curricula and teaching practices. (3 cr; prereq PsyF 5-120 [EPsy 110]; V MTWThF; PeikH 225) Lange
- 5-385 (EdCI 185) ADVANCED COURSE IN THE TEACHING OF MODERN LANGUAGES**  
 New curricula, classroom procedure; use of language laboratory and other media and evaluation techniques; open to teachers of modern languages and registrants in language institutes. (3 cr; III MTWThF; PeikH 225) Lange
- 5-393 (EdCI 193C) METHODS AND MATERIALS FOR TEACHING EARTH SCIENCES**  
 Individualized instruction in laboratory techniques and equipment with applications to classroom use. (3 cr; prereq 3-356 [EdT 68A], 3-357 [EdT 68B], 3-358 [EdT 68C], or 3-351 [EdT 68M] or equiv; III TTh and lab hrs ar; PeikH 365) Boeck
- 5-674, 5-675, 5-676 (EdCI 174, 175, 176) CLINICAL METHODS AND PRACTICES IN SPEECH PATHOLOGY**  
 (See course listings under Communication Disorders, page 114) Case history and analysis; testing and diagnosis of speech defects; techniques and work programs; practical clinical work. (Cr and hrs ar; prereq SSPA 5-502 [141], 5-503 [142], 5-504 [143], and ¶) McDermott

- 8-194 (EdCI 294) STRATEGIES AND PROBLEMS OF INSTRUCTION IN ENGLISH**  
Analysis of instructional problems in English and speech programs designed for secondary schools. (3 cr; prereq 3-326 [EdT 76A] or equiv; II MTWThF; PeikH 225) Brunetti
- 8-801\* (EdCI 201) PROBLEMS: TEACHING SOCIAL STUDIES**  
Individual research. (3-9 cr; prereq 5-150, 5-152, 5-156, 8-104 [EdCI 204] or §; hrs ar) Gardner
- 8-805\* (EdCI 205) PROBLEMS: AUDIO-VISUAL EDUCATION**  
(Cr and hrs ar; prereq §) Pearson
- 8-807\* (EdCI 207) PROBLEMS: RADIO-TELEVISION EDUCATION**  
For students whose work in SeEd 5-107 has indicated an aptitude or interest in the field. (1-3 cr per qtr; prereq 5-107 [EdCI 107]; hrs ar) Pearson
- 8-825\* (EdCI 225) PROBLEMS: SECONDARY SCHOOL SUPERVISION**  
An individual problems course on improvement of instruction. (Cr and hrs ar; prereq §) Hill
- 8-871\* (EdCI 271) PROBLEMS: CURRICULUM CONSTRUCTION**  
Individual research. (Cr and hrs ar; prereq §) Birkmaier, Boeck, Hill, Lange
- 8-887\* (EdCI 287) RESEARCH IN FOUNDATIONS OF SECONDARY SCHOOL SCIENCE TEACHING**  
Implications for improvement of instruction in junior and senior high schools. (3 cr; IV MTWThF; PeikH 375) Boeck
- 8-892 (EdCI 292) INTRODUCTION TO RESEARCH IN ENGLISH AND SPEECH EDUCATION**  
Review and analysis of representative, current research and research procedures related to the teaching of English and speech. (3 cr; prereq 15 hrs of grad study incl 5-321 [EdCI 122A] or 5-322 [EdCI 122B], 5-194 [EdCI 195A], or §; IV MTWThF; PeikH 215) Shroyer
- 8-895 (EdCI 295) READINGS IN ENGLISH AND MODERN LANGUAGE EDUCATION**  
Readings in high school English or modern language instruction. (1-3 cr; hrs ar) Birkmaier, Lange, Piché
- 8-896\* (EdCI 296) PROBLEMS: TEACHING ENGLISH**  
For those qualified to undertake individual research. (Cr and hrs ar) Piché

### *Business Education (BsEd)*

- 5-102 (132) TEACHING THE BASIC BUSINESS SUBJECTS**  
Recent trends and developments in teaching general business, economic geography, marketing, business law, and consumer education. (3 cr; III MTWThF; PeikH 255) Price
- 5-107 (158) MATERIALS AND METHODS IN OFFICE AND STENOGRAPHIC PROCEDURES**  
Recent research and developments in teaching office practice, clerical practice, and office machines. (3 cr; IV MTWThF; PeikH 255) McLean
- 5-109 BUSINESS EDUCATION FOR THE CULTURALLY DIFFERENT**  
Evaluation of and recommendations for improvement in programs, curricula, methodologies, and instructional materials for culturally different students in business education. (2 cr; prereq SeEd 5-120 or BsEd 5-120 or equiv; I MTWThF; PeikH 255) McLean
- 8-300 (237) SEMINAR: RESEARCH IN BUSINESS, DISTRIBUTIVE, AND ECONOMIC EDUCATION**  
Primarily for Master's degree candidates. Planning and evaluation of research and of individual projects. (No cr; prereq §; hrs ar) Price
- 8-600 (240) INTERNSHIP: BUSINESS EDUCATION**  
In-service experience in a business education specialist role, supervised experience in communication, planning, decision making, materials, cur-

riculum development, and supervising and working with people. (3-12 cr; hrs ar) Price, McLean

**8-900\* (239) PROBLEMS: BUSINESS EDUCATION**

Investigations in field of student's interest. (Cr and hrs ar; prereq #) Price, McLean

## Vocational Education

### *Agricultural Education (AgEd)*

**5-052 (173) ADVANCED FARM BUSINESS MANAGEMENT EDUCATION**

Administration, organization, and operation of farm business management education programs for adults in the secondary schools; development and utilization of curriculum materials based on farm business record data. (3 cr; prereq 5-050 [103] or #; June 14-July 2; VI-VII MTWThF; Hr 102) Persons

**5-065 (172) EVALUATION OF LOCAL VOCATIONAL EDUCATION PROGRAMS**

Procedures and instruments for assessing the effectiveness of programs for employment-bound youth and adults. (3 cr; June 14-July 2; I-II MTWThF; Hr 301) Marvin, Copa

**5-072 (146) PRACTICUM: AGRICULTURAL BUSINESS AND INDUSTRY**

Observation, study, and experience in agricultural business and industry; application to education problems in agriculture. (1-3 cr [max 9 cr]; June 14-July 2; hrs and rm ar) McMillion

**5-084 CURRICULA FOR CAREER EXPLORATION IN AGRICULTURAL OCCUPATIONS**

Analysis and evaluation of material; criteria for selection of material; content, organization, resource activities, and teaching techniques. (3 cr; June 14-July 2; VI-VII MTWThF; Hr 301) Kitts

**5-090 (170) INDEPENDENT STUDY**

Topics may be chosen to permit study of areas within education or to supplement areas of inquiry not provided in the regular course structure. (1-3 cr; prereq sr; hrs and rm ar) Marvin, Bear, Kitts, Peterson, Swanson, McMillion, Persons

**5-095 (195E) INDEPENDENT STUDY**

Preparation of a paper dealing with learnings in agricultural education applied to professional responsibilities. (3 cr; prereq MEd student in agricultural education; hrs ar) Marvin, Bear, Kitts, Peterson, Swanson, McMillion, Persons

**8-001\* (232) RESEARCH IN AGRICULTURAL EDUCATION**

Selecting problems, preparing bibliographies, analyzing and interpreting data, and preparing manuscripts. (Cr ar; prereq 15 cr in education)

Sec 1, limited to 25 students, June 14-July 2, VIII-IX MTWThF, Hr 301, Swanson

Sec 2, limited to 30 students, hrs and rm ar, Marvin, Bear, Kitts, Peterson, Swanson, McMillion, Persons, Copa

**8-091 (221) FIELD PROBLEMS**

Making investigations, gathering data, and formulating plans regarding agricultural education. (3 cr; hrs ar) Marvin, Bear, Kitts, Peterson, Swanson, McMillion, Persons

### *Distributive Education (DE)*

**3-100 (51) DISTRIBUTIVE OCCUPATIONAL EXPERIENCE**

Observation and practice 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, distributive education majors only, #; hrs ar) Klaurens

- 5-100 (136) ORGANIZATION AND ADMINISTRATION OF DISTRIBUTIVE EDUCATION**  
Principles, practices, and legislation followed in developing cooperative part-time and adult programs under federal vocational acts; basic course for teacher coordinators and vocational administrators. (3 cr; limited to 30 students; II MTWThF; PeikH 275) Meyer
- 5-116 MATERIALS LABORATORY: POST-SECONDARY DISTRIBUTIVE EDUCATION**  
(July 1-17)  
New methods of instruction and the development of materials for distributive education programs in junior colleges and area vocational-technical schools. (3 cr; limited to 20 students; prereq #: 1:00-4:00 MTWThF; PeikH 275) Ashmun
- 5-125 (146) ISSUES AND TRENDS IN DISTRIBUTIVE EDUCATION**  
Identification, analysis, and discussion of recent issues and trends; review and synthesis of research. (3 cr; limited to 15 students; prereq sr or grad and #: IV MTWThF; PeikH 275) Meyer
- 5-300 (137A) MATERIALS AND METHODS IN COOPERATIVE VOCATIONAL EDUCATION CLASSES**  
For cooperative part-time distributive, office, miscellaneous trades, and diversified occupations classes. (3 cr; limited to 25 students; III MTWThF; PeikH 275) Klaurens
- 5-311 MATERIALS LABORATORY: FASHION MERCHANDISING** (June 15-30)  
Development of specific related materials for fashion merchandising in distributive education classes. (3 cr; prereq 3-303 or 5-300 or #...THE 5-641; 1:00-4:00 MTWThF; McNH 303) Ar
- 8-300 (237) SEMINAR: RESEARCH IN BUSINESS, DISTRIBUTIVE, AND ECONOMIC EDUCATION**  
Primarily for Master's degree candidates; planning and evaluation of research and of individual projects. (No cr; prereq #: hrs and rm ar) Meyer, Price, Ashmun, Klaurens
- 8-600 (239) INTERNSHIP: DISTRIBUTIVE EDUCATION**  
Practical participation in supervisory or teaching positions; in-service experience in leadership role; includes a seminar-related project; required for Specialist in Distributive Education Certificate. (3-9 cr; prereq grad and #: hrs ar) Meyer, Ashmun
- 8-900\* (238) PROBLEMS: DISTRIBUTIVE EDUCATION**  
Individual research. (Cr ar; prereq #) Meyer, Ashmun, Klaurens

## *Home Economics Education (HEEd)*

- 1-500 (49) INTRODUCTION TO HOME ECONOMICS EDUCATION**  
Nature of the home economics teacher's work; means for developing necessary competencies. (2 cr; prereq soph, Psy 1-002 [2]; II MTWThF; McNH 103) Burklund
- 5-310 (161) METHOD IN TEACHING HOME ECONOMICS: THEORY AND TECHNOLOGY**  
Derivation of theory for educational method from relevant research; application to educational objectives; analysis of technology related to teaching method. (3 cr; prereq 3-305 [61], 3-600 [63] or #: IV-V MTWThF; McNH 103) Brown
- 5-320 (164) ADULT EDUCATION IN HOME ECONOMICS** (June 14-30)  
Planning a community program; teaching procedures; special problems. Planned for teachers and supervisors of adult education. (3 cr; prereq 3-315 [64] or #: II-III and ar MTWThF; McNH 144) Ford
- 5-405†† (196B) WORKSHOP: CHILD DEVELOPMENT AND HUMAN RELATIONS** (June 30-July 16)  
Recent emphasis on growth and guidance of individuals; materials and techniques for high school and adult levels to attain better understanding.

†† 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.

(4 cr; limited to 25 students; prereq grad; 8:30-11:30 am MTWThF, afternoons ar; McNH 102) Newkirk

**5-410†† (196C) WORKSHOP: FOODS AND NUTRITION (June 14-30)**

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 am MTWThF, afternoons ar; McNH 102) Mullan, Whiteford

**5-900 (190) READINGS IN HOME ECONOMICS EDUCATION**

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

**8-900\* (201) PROBLEMS: HOME ECONOMICS EDUCATION**

Independent study of current educational problems. (1-9 cr; prereq 8-300 [200A], #; hrs ar) Brown, Ford, Whiteford

## *Industrial Education (Ind)*

**5-301 (101) TESTS IN INDUSTRIAL SUBJECTS**

Application of principles of evaluation to shop and drawing subjects. (3 cr; prereq SeEd 3-155 [Ed 55B]; II MTWThF; PeikH 355) Pucel

**5-303 (103) INSTRUCTIONAL AIDS**

Planning, construction, use. (3 cr; limited to 20 students; prereq 3-360 [55], 5-360 [100] or equiv; VI MTWThF; PeikH 65) Kavanaugh

**5-305 (155) CRITICAL ISSUES IN INDUSTRIAL EDUCATION**

Identification, analysis, and discussion of major current problems in the field. (3 cr; II MTWThF; PeikH 65) Lockette

**5-325 (125) PHILOSOPHY AND PRACTICE OF INDUSTRIAL EDUCATION**

History, objectives, development, and current practices of the field. (3 cr, §3-330 [35]; III MTWThF; PeikH 335) Lockette

**5-330 (135) INDUSTRIAL COURSE CONSTRUCTION**

Principles and techniques; experiences in planning, organizing, and building of a teaching guide. (3 cr, §3-340 [40]; I MTWThF; PeikH 155) Kavanaugh

**5-360 (100) INDUSTRIAL INSTRUCTION**

Concepts and techniques of instruction in industrial arts, trade and industrial schools and classes, and training-within-industry programs. (3 cr; prereq 3-340 [40], SeEd 3-155 [Ed 55B] and #; V MTWThF; PeikH 65) Randleman

**5-600 (136) INSTRUCTIONAL MATERIALS LABORATORY**

(3-6-9 cr; prereq major, tchg exper, or #)

**Sec 1: Management of Work Training Programs**

Management of school and industry related programs; work stations; coordination of work and public school programs. (3 cr; limited to 20 students; II MTWThF; PeikH 65) Miletich

**Sec 2: Foundations and Curriculum Development for Health Occupations**

Foundational and development techniques for constructing teaching guides for health occupations instructors. (6 cr; limited to 20 students; I-IV TTh; PeikH 65) Rosdahl, Miletich

**8-310 (251) RESEARCH**

Critical analysis of existing research; selection of problems; organization and presentation of projects. (3 cr; prereq #; III MTWThF; PeikH 335) Moss

**8-900\* (200) RESEARCH PROBLEMS**

Individual conferences. (3-6-9 cr per qtr; prereq approval of candidacy; hrs ar) Kavanaugh, Moss, Nelson, Randleman, Pucel, Smith

†† 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.

# General College (GC)

## 1-131 (10A) BIOLOGICAL SCIENCE: PRINCIPLES

A study of the variety and relationships of living organisms illustrates the general principles of biology as they apply to man, animals, and plants. These principles are drawn from fields such as study of cells, relationships of organisms in nature, heredity, chemical and physical properties of living organisms, evolution, and reproduction. The student spends about 4 hours per week in laboratory sessions working directly with laboratory materials and problems which supplement the lectures. (5 cr; limited to 60 students; 4 lab hrs per wk; III-IV MTWThF; SciCB 125) Dearden

## 1-171 (7D) PHYSICAL SCIENCE: GEOLOGY

Emphasis is placed on the description of common land features—valleys, mountains, hills, and lakes—and on the processes responsible for their origin and change. A knowledge of the types of surface materials, such as rocks and glacial deposits, helps the student to understand how landforms develop and change. (5 cr; limited to 60 students; 2 lab hrs per wk; I-II MTWThF; SciCB 175) M Harris

## 1-211 (41A) MAN IN SOCIETY: HIS PERSONAL ROLE

An interdisciplinary approach is used to study social problems. American values are examined in an attempt to make the student aware of how he orients himself to social problems in terms of his own personal values. The specific social problem of minority-group relations, such as those of blacks to whites in the United States, is then studied in detail. (5 cr; limited to 45 students; I-II MTWThF; NH 216) F Johnson

## 1-233 (46A) UNITED STATES: PROBLEMS OF GOVERNMENT

The general principles, procedures, and problems of government are studied. Among the problems considered are federal-state relations, conduct of foreign relations; executive and legislative conflicts; the relations of government to agriculture, labor, and business; taxation; and the relationship of the individual citizen to his government. (3 cr; limited to 45 students; III MTWThF; NH 216) Hathaway

## 1-282 (2B) SOCIAL SCIENCE: FIELDS OF APPLIED PSYCHOLOGY

A survey of the use of psychological principles in the study of human affairs. The course examines the contributions that psychological research has made in fields such as teaching and learning, vocational guidance, mental health, personnel selection and training in industry, the measurement and improvement of worker efficiency and morale, law and crime, and consumer research and advertising. (3 cr; limited to 45 students; II MTWThF; NH 213) Shapiro

## 1-283 (2C) SOCIAL SCIENCE: PSYCHOLOGY OF HUMAN DEVELOPMENT

Growth and development of the individual from conception through adolescence. Aspects of development emphasized include physical, motor, social, emotional, and psychological growth. An integration of facets of development is made in order to understand the human being as a complex organism functioning in a complex environment. (3 cr; limited to 45 students; III MTWThF; NH 213) Latts

## 1-295 (42A) SOCIAL SCIENCE: ECONOMIC PERSPECTIVES

A broad study of the economy considers fundamental economic principles and their application. Topics include scarcity; elementary economic structure and process; goals such as social welfare, full employment, price stability, and economic growth; tools and methods of the economist; descriptive terms, such as "socialism" and "free enterprise," and evaluation of the American economy with respect to such characteristics. (3 cr; limited to 45 students; IV MTWThF; NH 213) Cline

## 1-312 (22A) ART TODAY I

The student examines the role and importance of contemporary art and design in several related fields such as architecture, painting, sculpture, photography, and industrial art. He is challenged to develop powers of

observation, sensitivity, and judgment, and to communicate these in a thoughtful and intelligent manner. Course activity consists of discussion, illustrated lectures, explorative exercises, and gallery trips. (3 cr; limited to 40 students; P-N only; IV MTWThF; NH 111) Safer

**1-331 (24A) MUSIC IN SOCIETY**

Attention focuses on the functional role of music in society: music in drama, the church, the dance, and the concert hall. (3 cr; students with or without previous training in music may register for this course; limited to 40 students; II MTWThF; NH 111) Byrne

**1-361 (29A) LITERATURE: WORLD LITERATURE—MAN'S PERSONAL RELATIONSHIPS**

This course seeks to integrate life and literature and to relate the student's experiences to certain universal themes concerning the personal relationships and spiritual values of mankind. Readings include ancient and modern Oriental and Western literature in a variety of forms—poems, plays, short stories, novels, and essays. The reading emphasizes man's personal relationships. (3 cr; limited to 60 students; I MTWThF; NH 213) Sheldon

**1-421 (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; each section limited to 30 students)

Sec 1, I-II MTWThF, NH 209, Reisman

Sec 2, I-II MTWThF, NH 209A, O'Neill (for DA students only)

Sec 3, III-IV MTWThF, NH 209, Rathburn

**1-423 (31C) WRITING LABORATORY: COMMUNICATING IN SOCIETY**

The student investigates the role played by language in his own life, in the mass media of communication, and elsewhere in the society in which he lives. Through reading and listening he becomes aware of the various devices of propaganda and the methods of persuasion. In addition, he writes analyses of arguments of others and composes persuasive arguments of his own. (3 cr; limited to 30 students; prereq 1-421 [31A], 1-422 [31B]; III-IV MTWThF; NH 122) Stockdale

**1-451 (8A) MATHEMATICS AND MEASUREMENTS I**

In science and technology, mathematics is used with measurements. This course deals with the concept of quantity and its evaluation through measurements, the approximate nature of measured data and its reliability, calculations and the reliability of results, use of the slide rule, units of measure, and the fundamentals of algebra. Mathematical skills are developed against a background of practical application with problems that provide a broad acquaintance with the language and symbols of science. (5 cr; limited to 35 students; III-IV MTWThF; NH 207) Polioff

**1-533 (19A) FINANCIAL MATHEMATICS: PROCEDURES AND APPLICATIONS**

Using only basic mathematic skills, the student studies the methods used to solve problems connected with percentages, simple interest and discount, compound interest, the most common annuities, and investment securities. Through the study of practical business problems, the student develops the calculations and the understanding which will assist him in dealing with a wide variety of financial matters. (3 cr; limited to 40 students; I MTWThF; NH 207) Roger Larson

**1-535 (14D) INTRODUCTION TO DATA PROCESSING**

Designed to provide an introduction to data processing for students wishing to acquaint themselves with basic aspects of this important and rapidly evolving technology. Useful as well to those considering the possibility of entering a course of training for work in the world of tabulation equipment, programming, computers, and related areas. The course defines data processing and explores its history, summarizes some of its basic applications, and assesses its social and economic effects. Students study terminology; basic steps in the processing of data; and kinds of machines used to accomplish these steps, such as keypunches, sorters, interpreters,

reproducers, collators, accounting machines, calculators, and computers, with an elementary introduction about their operation. (3 cr; limited to 40 students; IV MTWThF; NH 216) Folz

**1-731 (17A) HOME LIFE: CONSUMER PROBLEMS**

The objective is to develop an understanding of our economic system from the viewpoint of the consumer. Emphasis is on fundamentals of financial planning and personal economic decision making, and the application of these concepts to such specific problems as buying insurance protection, saving and investing, using credit facilities, and obtaining and evaluating consumer information. (3 cr; limited to 40 students; II MTWThF; NH 207) Kroll

# Health Sciences

## MEDICAL SCHOOL

### Anatomy (Anat)

#### ELECTIVE COURSES

- 8-156 (156) ADVANCED ANATOMY**  
Individual problems in gross anatomy, embryology, histology, or neuroanatomy. (Cr and hrs ar; prereq #) Staff
- 8-204 (204) RESEARCH IN ANATOMY**  
Gross anatomy, cytochemistry, histology, endocrinology, embryology, hematology, or neuroanatomy. (Cr and hrs ar; prereq #) Staff

### Anesthesiology (Anes)

All anesthesiology courses are listed in the section on 10-week courses, page 157.

### Biochemistry (MdBc)

#### ELECTIVE COURSES

- 5-053 (153) PROBLEMS IN BIOCHEMISTRY**  
Special work arranged with qualified students. (Cr and hrs ar; may be taken one or both terms; prereq 5-743 [143] or 5-101 [101]) Staff
- 8-215 (215) TOPICS IN LIPID METABOLISM**  
(3 cr; minimum of 8 students; prereq 5-743 [143] or 5-101 [101] or #) Frantz
- 8-300 (205) RESEARCH IN BIOCHEMISTRY**  
(Cr and hrs ar) Staff

### Laboratory Medicine

#### Laboratory Medicine (LMed)

- 5-181 (181) LABORATORY AND CLINICAL HEMATOLOGY**  
(Cr and hrs ar; prereq #) Sundberg
- 5-182 (181) MEDICAL GENETICS**  
(Cr and hrs ar; prereq #) J Yunis
- 5-183 (181) CLINICAL AND LABORATORY IMMUNOLOGY**  
(Cr and hrs ar; prereq #) E Yunis
- 5-184 (184) IMMUNOHEMATOLOGY IN BLOOD BANKING**  
(Cr and hrs ar; prereq #) McCullough
- 5-185 (181G) LABORATORY PROBLEMS IN BLOOD COAGULATION**  
(Cr and hrs ar; prereq #) Edson
- 5-186 (186) CLINICAL PATHOLOGY EXTERNSHIP (Hennepin County General Hospital)**  
(Cr and hrs ar; prereq #) Strom
- 5-187 (187) CLINICAL PATHOLOGY EXTERNSHIP (Mt. Sinai Hospital)**  
(Cr and hrs ar; prereq #) Ward

- 5-189 (189) CLINICAL BLOOD BANK IMMUNOLOGY (Minneapolis War Memorial Blood Bank)**  
(Cr and hrs ar; prereq #) Polesky
- 5-190 COMPUTER APPLICATIONS IN LABORATORY MEDICINE**  
(Cr and hrs ar; prereq #) Rosenberg, Blume
- 5-191 GENERAL CLINICAL MICROBIOLOGY**  
(Cr and hrs ar; prereq #) Matsen
- 5-192 (192) ANTIBIOTIC TEACHING UNIT**  
(Cr and hrs ar; prereq #) Matsen
- 5-193 (181) CLINICAL PATHOLOGY EXTERNSHIP (Hibbing General Hospital)**  
(Cr and hrs ar; prereq #) Alexander
- 5-194 COMPUTER APPLICATIONS IN MEDICINE**  
(Cr and hrs ar; prereq #) Ackerman
- 5-195 COMPUTER APPLICATIONS IN MEDICAL RESEARCH**  
(Cr and hrs ar; prereq #) Ackerman, Rosevear
- 5-196 COMPUTER AND BIOCHEMICAL PATIENT MONITORING**  
(Cr and hrs ar; prereq #) Rosevear
- 5-197 CLINICAL PATHOLOGY BIOCHEMISTRY (St. Paul-Ramsey Hospital)**  
(Cr and hrs ar; prereq #) Lakatua, Haus
- 5-199 CLINICAL GENETICS**  
(Cr and hrs ar; prereq #) J Yunis
- 5-261 (182) TOPICS IN HEMATOLOGY**  
(Cr ar; prereq 5-166 [166]) Brunning
- 5-262 (183) TOPICS IN IMMUNOLOGY**  
(Cr ar; prereq 5-172 [172]) Bridges, E Yunis
- 5-268 TOPICS IN CLINICAL MICROBIOLOGY**  
(1 cr; prereq #) Matsen
- 5-269 SEMINAR: IMMUNOHEMATOLOGY**  
(1 cr; prereq #) Azar and staff
- 8-235 (235) ADVANCED CLINICAL LABORATORY MEDICINE**  
(Cr ar) Benson and staff
- 8-236 (236) RESEARCH ON CLINICAL LABORATORY PROBLEMS**  
(Cr ar) Benson and staff
- 8-251 (251) RESEARCH IN HUMAN GENETICS**  
(Cr ar) J Yunis

### *Medical Technology (MedT)*

- 5-082 (82) APPLIED CLINICAL CHEMISTRY**  
Application of basic methods and techniques in chemistry in the clinical laboratory. (4 cr; prereq  $\Delta$ ; hrs ar) Freier and staff
- 5-086 (86) APPLIED CLINICAL HEMATOLOGY AND IMMUNOHEMATOLOGY**  
Application and use of laboratory methods in hematology. Morphology of blood cells. Application of technical methods in procurement of blood and blood grouping and cross matching for transfusions. (4 cr; prereq  $\Delta$ ; hrs ar) Bordewich, Carter
- 5-088 (88) APPLIED DIAGNOSTIC MICROBIOLOGY**  
Identification of bacteria by microbiologic techniques. Correlation with clinical cases. Identification of parasites and fungi. (4 cr; prereq  $\Delta$ ; hrs ar) Blazevic, Ederer

**5-090 (90) SPECIAL LABORATORY METHODS**

Special assignment on an individual basis in one of a wide variety of special areas of experience within the clinical laboratory; field experience. (4 cr; prereq  $\Delta$ ; hrs ar) Staff

**5-092 (92) HONORS PROGRAM IN LABORATORY METHODS**

Individual assignment on special projects or research with more intensive treatment in theory in one of the clinical areas of chemistry, hematology, immunohematology, or microbiology. (9 cr; prereq  $\Delta$ ; hrs ar) Staff

**5-110 (110) ADVANCED CLINICAL LABORATORY TECHNIQUES**

Assignment on individual basis for observation, study, and practice in special problems; techniques and methodology in the units of the clinical laboratories (bacteriology, chemistry, hematology, or immunology). (5 cr; prereq  $\Delta$ ; hrs ar) Staff

## Medicine (Med)

### REQUIRED COURSES

**5-104 (104) INTRODUCTION TO INTERNAL MEDICINE**

Combined with pediatrics and laboratory medicine. (2 cr per qtr for 4 qtrs; prereq 5-101 [101], LMed 5-102 [102]; 4:15-5:00 W; Hosp Todd Amph) Ebert and staff

**5-112 (112) CLERKSHIP: INTERNAL MEDICINE**

(16 cr; prereq regis med; 8:00-5:00 MTWThFS) Murray and staff

### ELECTIVE COURSES††

**5-501 (180) MEDICAL ONCOLOGY EXTERNSHIP IN MEDICINE (University Hospitals)**

Provides training in internal medicine with emphasis on the total care of patients with cancer by assuming direct patient responsibilities as an intern. (9 cr per period; offered all periods; hrs ar) Kennedy, Fortuny, Theologides

**5-502 (180) MEDICAL EXTERNSHIP (Veterans Administration Hospital)**

The practical problems of patient care at a high level with primary assignment to a medical ward under the direction and supervision of a medical resident. (9 cr per period; offered all periods; hrs ar) Brown

**5-503 (180) MEDICAL EXTERNSHIP (St. Paul-Ramsey Hospital)**

The student functions as an acting intern on one of the in-patient services. Meals, uniforms, and on-call quarters furnished. (9 cr per period; offered all periods; hrs ar) Frost and staff

**5-504 (180) MEDICAL EXTERNSHIP (Northwestern Hospital)**

The student functions as an acting intern on one of the in-patient services. Uniforms, on-call quarters, and some meals furnished. Night duty every fifth night. (9 cr per period; offered all periods; hrs ar) Watson and staff

**5-505 (180) MEDICAL EXTERNSHIP (Mt. Sinai Hospital)**

The student functions as an acting intern on either the private or ward teaching service under supervision of residents and attending physicians. (9 cr per period; offered all periods; hrs ar) Lewis and staff

**5-511 (181) RESEARCH IN GASTROENTEROLOGY (University Hospitals)**

Arrangements with Dr. Dodd Wilson and Dr. Michael Levitt. (Cr and hrs ar; offered all periods)

**5-512 (181) RESEARCH TOPICS IN HEMATOLOGY (University Hospitals)**

Students specifically interested in research are acquainted with a problem or problems under investigation in hematology. (18 cr; offered all periods; hrs ar) Jacob, McArthur

†† Prior arrangements must be made with departmental office.

- 5-521 (184) PROBLEMS IN CLINICAL MEDICINE (University Hospitals)**  
Cases with interesting, classical, or problematic aspects for observation, examination, and discussion. (9 cr per period; offered all periods; Hosp Eustis Amph; hrs ar) Murray
- 5-522 (184) GASTROENTEROLOGY (University Hospitals)**  
Ward rounds, Gastroenterology Clinic, Endoscopy Clinic, teaching rounds, and consultations throughout University Hospitals with the medical fellow and staff assigned to gastroenterology. (9 cr per period; offered all periods; hrs ar) Wilson, Levitt
- 5-523 (184) METABOLISM AND CLINICAL PHARMACOLOGY (University Hospitals)**  
Centers largely on the Metabolism and Diabetes Clinics with special emphasis on pharmacological problems in the area of metabolic disease. (9 cr per period; offered all periods; hrs ar) Goetz, Hunninghake, and staff
- 5-524 (184) IMMUNOLOGY, ALLERGY, AND INFECTIOUS DISEASES (University Hospitals)**  
Outpatient experience relates primarily to allergy. Experience with infectious disease includes clinical rounds, consultation, and conferences. (9 cr per period; offered all periods; hrs ar) Spink
- 5-525 (184) CARDIOVASCULAR DISEASE (University Hospitals)**  
Emphasis will be on outpatient clinic material including new and return patients. (9 cr per period; offered all periods; hrs ar) Winchell
- 5-526 (184) ELECTROCARDIOGRAPHY (University Hospitals)**  
Full-time instruction in clinical electrocardiography. (4½ cr per 3-wk period; offered periods 1, 3, 5, and 7; hrs ar) Tuna
- 5-527 (184) RENAL (University Hospitals)**  
Medical management of renal failure; experiences with dialysis, kidney transplant, acute renal shutdown, etc. (4½ cr; offered first 3 wks of periods 2 and 5; hrs ar) Tobian, Kjellstrand
- 5-528 (184) CLINICAL HEMATOLOGY (University Hospitals)**  
Clinical and research aspects of hematology. Student given responsibility for diagnosis and treatment of basic hematologic diseases. (9 cr per period; offered all periods; hrs ar) Jacob, McArthur
- 5-529 (184) CLINICAL HEMATOLOGY (CONDENSED) (University Hospitals)**  
Same as Med 5-528. (4½ cr per 3-wk period; offered all periods; prereq LMed 5-185 [181G]; hrs ar) Jacob, McArthur
- 5-530 (184) SEMINAR IN ONCOLOGY (University Hospitals)**  
The broad aspects of neoplastic diseases designated to orient the student to cancer problems. (9 cr per period; prereq 5-528; offered period 3; 11:00-12:00 MWF; MasonH 407) Fortuny
- 5-531 (184) CLINICAL RHEUMATOLOGY (University Hospitals)**  
Clinical aspects of diseases of rheumatic and immunologic nature including the broad areas of collagen disease, autoimmune disease, and all types of arthritic and musculoskeletal disease. (9 cr per period; offered all periods; hrs ar) Caperton
- 5-532 (184) PULMONARY DISEASE (University Hospitals)**  
Emphasizes clinical chest disease. Exposure to clinical problems will be obtained by participating with the consultation service, outpatient chest department, and the intensive care unit. (9 cr per period; offered all periods; hrs ar) Ebert, Drage, Kronenberg
- 5-533 (184) CLINICAL ALLERGY (University Hospitals)**  
Up-to-date survey of clinical allergy, including all immunologic diseases. (9 cr per period; offered all periods; hrs ar) Blumenthal
- 5-542 (184) HEMATOLOGY (St. Paul-Ramsey Hospital)**  
Student given responsibility for initial evaluation and follow-up of patients with hematological diseases in Department of Medicine. (9 cr per period; offered all periods; hrs ar) Taddeini and staff

- 5-543 (184) CARDIOLOGY (St. Paul-Ramsey Hospital)**  
 Student given opportunity to see cardiac consultations. Under close supervision, student will assist in right heart catheterizations including calculation of data and presentation of data at weekly cardiac catheterization conferences. (9 cr per period; offered all periods; hrs ar) Lee
- 5-544 (184) PULMONARY DISEASE (St. Paul-Ramsey Hospital)**  
 The Medical Chest Service at St. Paul-Ramsey Hospital is a consultative service embracing the disciplines of chest disease, pulmonary physiology, and inhalation therapy. (9 cr per period; offered all periods; hrs ar) Greene
- 5-545 (184) CLINICAL ENDOCRINOLOGY (St. Paul-Ramsey Hospital)**  
 Clinical experience with the broad range of endocrine problems including diabetes. (9 cr per period; offered all periods; hrs ar) Gold
- 5-546 (184) INFECTIOUS DISEASE AND IMMUNOLOGY (St. Paul-Ramsey Hospital)**  
 Experience and responsibility essentially inpatient. (9 cr per period; offered all periods; hrs ar) Gruninger and Roth
- 5-547 (184) RESEARCH IN CLINICAL INFECTIOUS DISEASE AND IMMUNOLOGY (St. Paul-Ramsey Hospital)**  
 Working with immunology staff on infectious disease problems. (9 cr per period; offered all periods; hrs ar) Gruninger, Woolfrey
- 5-551 (184) CARDIOLOGY (EKG) (Veterans Administration Hospital)**  
 Weekly lectures on introduction to ECG and VCG given by staff members. (9 cr per period; offered spring, winter, fall qtrs; hrs ar) Alexander, Richman and staff
- 5-552 (184) CLINICAL HEMATOLOGY (Veterans Administration Hospital)**  
 Arranged to meet the individual needs of student through inpatient and outpatient (Hematology Clinic) experience. Each student assigned an individual tutor. (9 cr per period; offered all periods; hrs ar) Swaim, Windschitl, Doscherholmen
- 5-553 (184) PULMONARY DISEASE (Veterans Administration Hospital)**  
 Equivalent to an internship on one of the services of the Pulmonary Disease Service which has 84 beds. (9 cr per period; offered all periods; hrs ar) MacDonald, Jenne, R Johnson
- 5-554 (184) LABORATORY MEDICINE (Veterans Administration Hospital)**  
 Inpatient case studies, seminars, outpatient clinic experience, and individual tutorials provide basis for the study of the prevention, recognition, and therapy of acid-base and electrolyte abnormalities. (9 cr per period; offered all periods; hrs ar) Mulhausen, Brown, Doe
- 5-555 (184) ELECTROCARDIOGRAPHY (Veterans Administration Hospital)**  
 Given in conjunction with radiology. (9 cr per period; offered spring, winter, fall qtrs; hrs ar) Alexander and staff
- 5-561 (184) CARDIOLOGY SERVICE (Hennepin County General Hospital)**  
 Student participates in management of patients in Coronary Care Service. (9 cr per period; offered all periods; hrs ar) Richards
- 5-562 (184) RENALOGY SERVICE (Hennepin County General Hospital)**  
 Student responsible for patients on 8-bed Renal Service. Participates in management of patients on Chronic Dialysis Service and in weekly Renal and Hypertension Clinics. (9 cr per period; offered all periods; hrs ar) Shapiro, Smith
- 5-563 (184) PULMONARY DISEASE (Hennepin County General Hospital)**  
 Student responsible for patients on 20-bed Chest-Isolation Service. Participates in activities of Pulmonary Function Laboratory. (9 cr per period; offered all periods; hrs ar) Mulrooney
- 5-564 (184) INFECTIOUS DISEASE (Hennepin County General Hospital)**  
 Student participates in management of patients with a wide variety of infectious diseases on the Infectious Service and participates in consultations on patients with infectious disease problems. (9 cr per period; offered all periods; hrs ar) Payson

**5-565 (184) GASTROENTEROLOGY (Hennepin County General Hospital)**

Emphasizes clinical evaluation of patients with a wide variety of G.I. problems. Student acts as consultant on selected cases under direct supervision of several of permanent staff. (9 cr per period; offered all periods; hrs ar) Onstad, Kitzmiller

**5-571 (185) MEDICAL EMERGENCY ROOM (St. Paul-Ramsey Hospital)**

Similarity to a physician's office is shown. Student sees medical emergencies requiring both inpatient care and scheduled followup visits to the Emergency Room. (9 cr per period; offered all periods; hrs ar) Frost and staff

**5-572 (185) AMBULATORY MEDICINE (St. Paul-Ramsey Hospital)**

Individualized programs can be arranged utilizing the ambulatory care facilities of the Department of Medicine with experience in General Medical Clinic and selected specialty clinics in hematology, cardiology, and pulmonary disease. (9 cr per period; offered all periods; hrs ar) Frost and staff

**5-573 (185) MEDICAL OUTPATIENT CLINICS (Hennepin County General Hospital)**

Student assigned to Medical Specialty Clinics each morning (MTWThF) and to New Patient Medicine Clinic each afternoon (MTWThF). (9 cr per period; offered all periods; hrs ar MTWThF) Schultz

**5-581 INTERNAL MEDICINE (St. Mary's Hospital)**

Training in clinical practices and special problems in medicine. (9 cr per period; offered all periods; hrs ar) LaBree

## Microbiology (MicB)

**5-970 (152) SPECIAL PROBLEMS**

(Cr ar; prereq #)

**8-121 ADVANCED MICROBIOLOGY LABORATORY I**

Experimentation in physiology, genetics, and virology. (3 cr; prereq 8-111 or #) Rogers

**8-122 ADVANCED MICROBIOLOGY**

Experimentation in immunology and medical microbiology. (3 cr; prereq 8-112) Kim

**8-990 (201) RESEARCH IN MICROBIOLOGY**

Graduate students with the requisite preliminary training may elect research, either as majors or minors. (Cr and hrs ar)

## Neurology (Neur)

*All neurology courses are listed in the section on 10-week courses, page 157.*

## Neurosurgery

### REQUIRED COURSES FOR UNDERGRADUATE STUDENTS

**5-127 (127) CLINICAL LECTURES IN NEUROSURGERY**

(1 cr per yr; prereq regis med) Staff

### ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS

**5-500 (188) NEUROSURGERY EXTERNSHIP (University Hospitals)**

(Cr ar; prereq regis med; MTWThF) Staff

**5-510 (189) NEUROSURGERY EXTERNSHIP (Veterans Administration Hospital)**

(Cr ar; prereq regis med; MTWThF) Staff

**5-520 (190) NEUROSURGERY INVESTIGATION**  
(Cr ar; prereq regis med; MTWThF) Staff

**REQUIRED COURSES FOR GRADUATE STUDENTS**

- 8-305 (305) NEUROSURGICAL DIAGNOSIS**  
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, Long
- 8-308 (308) STUDY OF NEUROSURGICAL PROBLEMS**  
Neurosurgical fellow acts as house surgeon at University Hospitals. (4 cr; MTWThF) French, Chou, Long
- 8-311 (311) OPERATIVE NEUROSURGERY**  
Neurosurgical fellow acts as first assistant at operations in University Hospitals, and later may be permitted to operate. (4 cr; MTWThF) French, Chou, Long
- 8-316 (316) NEUROSURGICAL RESEARCH**  
Problems in experimental or clinical surgery. (3 cr; MTWThF) French, Chou, Long, Bloedel
- 8-318 (318) NEUROSURGICAL CONFERENCE**  
A review of X-ray films and case histories on neurosurgical service. (1 cr; F) French, Chou, Long

## **Obstetrics and Gynecology (Obst)**

**REQUIRED COURSES**

**5-135 (135) CLINICAL CLERKSHIP IN OBSTETRICS AND GYNECOLOGY**  
Includes clinics in obstetrics and gynecology. (12 cr; prereq regis med) Sciarra and staff

**ELECTIVE COURSES**

- 5-500 (184) EXTERNSHIP IN OBSTETRICS**  
A clinical experience which includes total care of inpatients and outpatients on obstetrics and gynecology at University Hospitals with emphasis on the medical aspects of obstetrics. (1½-12 cr; limited to 12 students; prereq sr med students only) Sciarra
- 5-505 (184) EXTERNSHIP IN GYNECOLOGY**  
A clinical experience which includes total care of obstetrical and gynecological inpatients and outpatients at University Hospitals with emphasis on the surgical aspects of gynecology. (1½-12 cr; limited to 12 students; prereq sr med students only) Prem
- 5-510 (184) EXTERNSHIP IN OBSTETRICS AND GYNECOLOGY**  
Similar to Obst 5-500 and 5-505 but with time divided equally between obstetrics and gynecology and with emphasis on clinical practice. (1½-12 cr; limited to 12 students; prereq sr med students only) Bendel
- 5-515 (184) OBSTETRICS AND GYNECOLOGY EXTERNSHIP IN CLINICAL PRACTICE**  
A practical community experience in obstetrics and gynecology under the preceptorship of one or more practicing members of the clinical staff. Both office and hospital practice will be included. (1½-12 cr; limited to 12 students; prereq sr med students only...also a hospital-based externship) Sciarra
- 5-520 (190) PROBLEMS IN OBSTETRICS AND GYNECOLOGY**  
A clinical experience at University Hospitals with new private patients referred to a staff member for evaluation and treatment of selected obstetrical or gynecological problems. (1½-12 cr; limited to 6 students; prereq sr med students only; also a hospital-based externship) Sciarra, Prem

- 5-530 SEMINAR: POPULATION STUDIES**  
National and world population problems. (1½-12 cr; limited to 3 students; prereq sr med students only) Sciarra, Foreman
- 5-540 (190) PSYCHIATRIC ASPECTS OF OBSTETRICS AND GYNECOLOGY**  
(Clinical course) Psychiatric problems relating to the reproductive system. (1½-12 cr; limited to 2 students; prereq sr med students only) Bernstein
- 5-550 INTERNSHIP IN OBSTETRICS AND GYNECOLOGY**  
Full-time clinical experience as an *acting intern* on the obstetrical and gynecological service at University Hospitals. (1½-12 cr; limited to 4 students; prereq sr med students only; 12 wks full rotation or, if places available, 6-wk rotation may be taken on obstetrics alone) Sciarra
- 5-560 RESEARCH IN REPRODUCTION**  
Topics selected for each student. (1½-12 cr; limited to 2 students; prereq sr med students only) Sciarra
- 5-570 FELLOWSHIPS IN REPRODUCTION**  
Limited opportunities for study at other institutions, some of which provide a travel stipend. Applications should be prepared prior to mid-April. (1½-12 cr; prereq sr med students only; enrollment is individual) Sciarra

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

- 8-201 (201) ADVANCED OBSTETRICS AND GYNECOLOGY, PART I**  
(Cr ar) Sciarra and staff
- 8-205 (205) ADVANCED OBSTETRICS AND GYNECOLOGY, PART II**  
(Cr ar) Sciarra and staff
- 8-209 (209) ADVANCED OBSTETRICS AND GYNECOLOGY, PART III**  
(Cr ar) Sciarra and staff
- 8-210 (210) ADVANCED OBSTETRICS AND GYNECOLOGY, PART IV**  
(Cr ar) Sciarra and staff
- 8-213 (213) ADVANCED SEMINAR**  
(Cr ar) Sciarra and staff
- 8-221 (221) CLINICAL OBSTETRICS AND GYNECOLOGY**  
(Cr ar) Sciarra and staff
- 8-222 (222) GYNECOLOGICAL ONCOLOGY**  
(Cr ar) Sciarra and staff
- 8-223 (223) GYNECOLOGICAL ENDOCRINOLOGY**  
(Cr ar) Sciarra and staff
- 8-230 (216) RESEARCH IN REPRODUCTION**  
(Cr ar) Sciarra and staff

### **Ophthalmology (Ophth)**

- 8-101 (200) CLINICAL OPHTHALMOLOGY**  
(6 cr; 8:00-6:00 MTWThF; O-P Clin) Harris and staff
- 8-106 (217) STRABISMUS MANAGEMENT**  
(Cr ar; 8:00-9:00 F; Mayo A-675) Letson
- 8-131 (201) PRACTICAL OCULAR SURGERY**  
(3 cr; 7:30-12:00 MTWThF; Oper Rm) Harris and staff
- 8-151 (203) BASIC AND APPLIED OPHTHALMOLOGY**  
(2 cr; 8:00-12:00 S; Owre 117) Harris and staff

# Orthopedic Surgery (OrSu)

## REQUIRED COURSES FOR UNDERGRADUATE STUDENTS

- 5-140 (140) CLINICAL LECTURES IN ORTHOPEDIC SURGERY  
(1 cr; prereq regis med)

## ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS

- 5-185 (185) EXTERNSHIP IN ORTHOPEDIC SURGERY AND FRACTURES  
(Cr ar; prereq regis med)
- 5-185 (185) EXTERNSHIP IN ORTHOPEDIC SURGERY AND FRACTURES  
At St. Paul-Ramsey Hospital. (Cr ar; prereq regis med)
- 5-185 (185) EXTERNSHIP IN ORTHOPEDIC SURGERY AND FRACTURES  
At Gillette State Hospital for Crippled Children, St. Paul. (Cr ar; prereq regis med)
- 5-185 (185) EXTERNSHIP IN ORTHOPEDIC SURGERY AND FRACTURES  
At Fairview-St. Mary's Hospitals. (Cr ar; prereq regis med)
- 5-186 (186) RESEARCH PROBLEMS  
(Cr ar; prereq regis med)

## REQUIRED COURSES FOR GRADUATE STUDENTS

- 8-401 (401) ORTHOPEDIC CONFERENCE  
Review of X-ray films and case histories of patients on the orthopedic inpatient or outpatient service. (3 cr) Moe, Kane, House, Bradford, Lai
- 8-403 (403) FRACTURES  
Orthopedic fellow acts as house surgeon on the fracture service at Hennepin County General Hospital. (5 cr) Gustilo and staff  
Orthopedic fellow acts as house surgeon on the fracture service at St. Paul-Ramsey Hospital. (5 cr) Comfort and staff
- 8-405 (405) ORTHOPEDIC DIAGNOSIS  
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, House, Bradford, Lai
- 8-407 (407) PEDIATRIC ORTHOPEDICS  
Orthopedic fellow acts as house surgeon at Gillette State Hospital for Crippled Children. (5 cr) Moe and staff
- 8-408 (408) STUDY OF ORTHOPEDIC SURGERY PROBLEMS  
Orthopedic fellow acts as house surgeon at University Hospitals and Fairview-St. Mary's. (5 cr) Moe, Kane, House, Bradford, Lai
- 8-410 (410) ORTHOPEDIC PATHOLOGY  
Seminar for systematic review of pathology of ossified tissue and soft tissues of the extremities. (2 cr) Moe, Kane, House, Bradford, Lai
- 8-411 (411) ORTHOPEDIC OPERATIVE SURGERY  
Orthopedic fellow acts as first assistant at operations at University Hospitals and Fairview-St. Mary's and later may be permitted to operate. (5 cr) Moe, Kane, House, Bradford, Lai, and staff
- 8-412 (412) ORTHOPEDIC ANATOMY  
Orthopedic fellow dissects upper and lower extremities and aids in instruction of medical students in anatomy of the extremities. (2 cr) Moe, Kane, House, Bradford, Lai
- 8-416 (416) ORTHOPEDIC RESEARCH  
Problems in experimental or clinical surgery. University Hospitals. (5 cr) Moe, Kane, House, Bradford, Lai

## Otolaryngology (Otol)

### COURSES FOR GRADUATE STUDENTS

- 8-230 (230) **CLINICAL OTOTOLOGY**  
(3 cr; 1:00-4:00 MTWThF; O-P Clin) Paparella and staff
- 8-231 (231) **CLINICAL RHINOLOGY AND LARYNGOLOGY**  
(3 cr; 1:00-4:00 MTWThF; O-P Clin) Paparella and staff
- 8-232 (232) **SURGERY OF EAR, NOSE, AND THROAT**  
(3 cr; 9:00-12:00 MTWThF; Oper Rm) Paparella and staff
- 8-241 (241) **SEMINAR: CURRENT LITERATURE**  
(1 cr; 9:00-11:00 S; Mayo A-675) Staff
- 8-248 (248) **RESEARCH**  
(Cr and hrs ar) Staff

## Pathology (Path)

- 5-104 (104) **AUTOPSIES**  
(Cr and hrs ar; prereq 102) Good
- 5-106 (106) **DISEASES OF THE HEART**  
See section on 10-week courses, page 157.
- 5-111 (111) **CONFERENCE ON AUTOPSIES**  
See section on 10-week courses, page 157.
- 5-112 (112) **DIAGNOSIS OF TUMORS**  
See section on 10-week courses, page 157.
- 5-113 (113) **SURGICAL PATHOLOGY**  
(Cr and hrs ar; prereq 102) Hebbel
- 5-140 **SEMINAR: EXPERIMENTAL PATHOLOGY**  
(1 cr; prereq #) Halberg
- 5-141 **PROBLEMS IN EXPERIMENTAL PATHOLOGY**  
(Cr and hrs ar) Halberg
- 5-150 (150) **PROBLEMS IN PATHOLOGY**  
See section on 10-week courses, page 157.
- 8-201 (201) **RESEARCH**  
Students with the necessary preliminary training may elect research either as a major or minor in pathology. (Cr and hrs ar; prereq #) Good
- 8-207 **RESEARCH IN EXPERIMENTAL PATHOLOGY**  
(Cr and hrs ar) Halberg

## Pediatrics (Ped)

### REQUIRED COURSES

- 5-120 (120) **CLINICAL LECTURES IN PEDIATRICS**  
Physical growth and development. Psychological development. Physiology and metabolism. (2 cr; prereq regis med; 1:00-2:00 W; Eustis Amph) Anderson and staff
- 5-135 (135) **CLINICAL CLERKSHIP IN PEDIATRICS**  
Patients on wards assigned to individual students for examination, treatment, and follow-up observation under supervision including demonstration clinics on contagious and noncontagious diseases. (12 cr; prereq regis med) Anderson and staff

## **ELECTIVE COURSES**

- 5-501 (181) **INPATIENT EXTERNSHIP (Hennepin County General Hospital)**  
(Cr ar)
- 5-502 (181) **INPATIENT AND OUTPATIENT EXTERNSHIP (Children's Hospital)**  
(Cr ar)
- 5-503 (181) **INPATIENT EXTERNSHIP (St. Paul-Ramsey Hospital)**  
(Cr ar)
- 5-511 (181) **OUTPATIENT EXTERNSHIP (University Hospitals)**  
(Cr ar)
- 5-512 (181) **OUTPATIENT EXTERNSHIP (Hennepin County General Hospital)**  
(Cr ar)
- 5-513 (181) **CLINICAL EXPERIENCE (Community-University Health Care Center)**  
(Cr ar)
- 5-515 (181) **OUTPATIENT HEALTH CARE (St. Paul-Ramsey Hospital)**  
(Cr ar)
- 5-516 (181) **CLINICAL PEDIATRICS (Mayo Clinic)**  
(Cr ar) Anderson and staff
- 5-517 (181) **PRECEPTORSHIP IN CLINICAL PEDIATRICS**  
(Cr ar) Anderson and staff
- 5-518 (181) **CHILD DEVELOPMENT INCLUDING MENTAL RETARDATION, NEUROLOGICAL HANDICAPS, AND LEARNING DISABILITIES**  
(Cr ar) Anderson and staff
- 5-531 (182) **NEO-INFANT PROGRAM**  
(Cr ar) Anderson and staff
- 5-532 (182) **CLINICAL IMMUNOLOGY (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-533 (182) **PEDIATRIC CARDIOLOGY (Mayo Clinic)**  
(Cr ar) Anderson and staff
- 5-534 (182) **PEDIATRIC CARDIOLOGY (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-535 (182) **INFECTIOUS DISEASE**  
(Cr ar) Anderson and staff
- 5-536 (182) **PEDIATRIC HEMATOLOGY-ONCOLOGY (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-537 (182) **PEDIATRIC ENDOCRINOLOGY AND METABOLISM (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-539 (182) **INTRODUCTION TO NEONATOLOGY**  
(Cr ar) Anderson and staff
- 5-540 (182) **PEDIATRIC NEUROLOGY (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-541 (182) **PEDIATRIC NEUROLOGY (Mayo Clinic)**  
(Cr ar) Anderson and staff
- 5-542 (182) **CLINICAL PHARMACOLOGY**  
(Cr ar) Anderson and staff
- 5-543 (182) **NEPHROLOGY (University Hospitals)**  
(Cr ar) Anderson and staff

**5-544 (182) PEDIATRIC PULMONARY DISEASE**

(Cr ar) Anderson and staff

**5-545 (182) CHILD PSYCHIATRY (Mayo Clinic)**

(Cr ar) Anderson and staff

**5-546 (182) PEDIATRIC PATHOLOGY**

(Cr ar) Anderson and staff

**5-570 (183) PEDIATRIC RESEARCH**

(Cr ar) Anderson and staff

**5-573 (183) RESEARCH IN IMMUNOCYTOLOGY**

(Cr ar) Anderson and staff

**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.

**8-200 (200) GRADUATE SEMINAR: PEDIATRICS**

(1½ cr; VIII T; Mayo 1450) Anderson and staff

**8-202 (202) PEDIATRIC CLINIC**

(5 cr; II-IV MTWThF; O-P depts of Hennepin County General Hospital or University Hospitals) Anderson and staff

**8-204 (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) Anderson and staff

**8-206 (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 #) Anderson and staff

**8-208 (208) PEDIATRIC RESEARCH**

Special problems. Students may collaborate with members of the staff or with other students. (Cr and hrs ar; peds labs) Anderson and staff

**Pharmacology (Phcl)****5-109 (109) PHARMACOLOGICAL PROBLEMS**

(Cr and hrs ar) Shideman and staff

**8-203 (203) RESEARCH IN PHARMACOLOGY**

(Cr and hrs ar) Shideman and staff

**Physical Medicine and Rehabilitation (PMed)****5-430 (190) PROBLEMS IN PHYSICAL MEDICINE AND REHABILITATION**

(Cr ar; prereq regis med) Staff

- 8-200 (200) PHYSICAL MEDICINE SERVICE**  
(Cr and hrs ar) Staff
- 8-205 (205) READINGS**  
(1 cr; 1 M) Kottke
- 8-206 (206) CONFERENCE**  
(Cr and hrs ar) Staff
- 8-210 (210) RESEARCH IN PHYSICAL MEDICINE**  
(Cr and hrs ar) Staff
- 8-212 (212) ELECTROMYOGRAPHY**  
(Cr and hrs ar) Awad

### *Occupational Therapy*

- 5-396, 5-397 (94, 95) CLINICAL EDUCATION**  
A total of 8 months of supervised training in affiliated hospitals. (18 cr per qtr; for sr OT students) Eliason

### *Physical Therapy*

- 5-255 (88) CLINICAL TRAINING**  
Five weeks of supervised practice at affiliating hospitals. (3 cr) Purtilo
- 8-130 (130) SEMINAR: CURRENT LITERATURE**  
(1 cr; prereq #) Graduate faculty
- 8-170 (170) PROBLEMS IN PHYSICAL THERAPY**  
(Cr ar; prereq physical therapy) Staff
- 8-195 (199) RESEARCH IN PHYSICAL THERAPY**  
(Cr ar; prereq #) Kottke, Skowlund, and staff

#### **ELECTIVE COURSES**

- 5-410 (181) ADULT REHABILITATION MEDICINE**  
(Cr ar; prereq regis med)
- 5-411 (181) PEDIATRIC REHABILITATION MEDICINE**  
(Cr ar; prereq regis med)
- 5-414 (181) PHYSICAL MEDICINE AND REHABILITATION FOR THE FAMILY PHYSICIAN**  
(Cr ar; prereq regis med)
- 5-420 (181) HISTOPATHOLOGY, ELECTRODIAGNOSIS, AND KINESIOLOGY**  
(Cr ar; prereq regis med)
- 5-430 (190) RESEARCH IN PHYSICAL MEDICINE AND REHABILITATION**  
(Cr ar; prereq regis med)

### *Physiology (Phsl)*

- 3-051 (51) HUMAN PHYSIOLOGY**  
Introductory course. (5 cr; primarily for baccalaureate nursing students and physical therapy students; prereq zoology and 1 yr college chemistry; lect VI MW, VII-VIII TTh, VI-VII F; conf IV TTh, Owre 111; lab VII-IX MW, 307 MH) Lee and staff

**5-113, 8-113 (113) PROBLEMS IN PHYSIOLOGY**

Topics assigned for laboratory study; conferences and readings. (Cr and hrs ar) Staff

**5-552, 8-202 (202) READINGS IN PHYSIOLOGY**

Topics selected for each student; written reviews prepared and discussed. (Cr and hrs ar) Staff

**5-553, 8-203 (203) RESEARCH IN PHYSIOLOGY**

(Cr and hrs ar) Staff

## **Psychiatry**

### **Adult Psychiatry (AdPy)**

"Phase D" offerings have not been finalized in time to appear in this bulletin. A listing will be mailed to Phase D medical students at a later date.

**8-201 (251) CLINICAL INPATIENT PSYCHIATRY**

(Cr ar) Staff

**8-202 (252) CLINICAL OUTPATIENT PSYCHIATRY**

(Cr ar) Anderson and staff

**8-203 (254) ADVANCED CLINICAL INPATIENT PSYCHIATRY**

(Cr ar) Staff

**8-204 (255) ADVANCED CLINICAL OUTPATIENT PSYCHIATRY**

(Cr ar) Anderson and staff

**8-205 (257) SPECIAL ASSIGNMENTS**

(1 cr) Staff

**8-206 (258) RESEARCH IN PSYCHIATRY**

(Cr ar) Staff

**8-207 (260) ORIENTATION TO CLINICAL PSYCHIATRY**

(1 cr) Staff

**8-221 (291) SEMINAR: CURRENT LITERATURE**

(1 cr) Simon

**8-222 (292) SPECIAL SUPERVISION IN PSYCHOTHERAPY**

(1 cr) Staff

### **Child Psychiatry (ChPy)**

"Phase D" offerings have not been finalized in time to appear in this bulletin. A listing will be mailed to Phase D medical students at a later date.

**8-201 (253) CLINICAL CHILD PSYCHIATRY**

(Cr ar) Staff

**8-202 (256) ADVANCED CLINICAL CHILD PSYCHIATRY**

(Cr ar) Staff

### **Clinical Psychology (ClPy)**

**8-202 (202) SPECIAL RESEARCH TOPICS**

(Cr ar; prereq #) Staff

- 8-203 (203) PSYCHOMETRIC CLERKSHIP**  
(Cr ar) Staff
- 8-204 (204) INTERNSHIP IN CLINICAL PSYCHOLOGY**  
(2 or 4 cr; prereq PhD candidate in clinical psychology with #) Staff
- 8-206 (206) MEDICAL PSYCHOLOGY I**  
(3 cr; prereq grad) Briggs, Hafner

## Radiology (Rad)

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

- 5-100 (180) EXTERNSHIP: NUCLEAR MEDICINE**  
(Cr and hrs ar; prereq regis med) Loken and others
- 5-101 (181) EXTERNSHIP: DIAGNOSTIC RADIOLOGY (University Hospitals)**  
(Cr and hrs ar; prereq regis med) Gedgaudas and others
- 5-102 (181) EXTERNSHIP: DIAGNOSTIC RADIOLOGY (Veterans Administration Hospital)**  
(Cr and hrs ar; prereq regis med) Kieffer
- 5-103 (181) EXTERNSHIP: DIAGNOSTIC RADIOLOGY (Hennepin County General Hospital)**  
(Cr and hrs ar; prereq regis med) Tsai
- 5-140 (184) SPECIAL PROBLEMS: ROENTGENOLOGY**  
(Cr and hrs ar; prereq regis med) Gedgaudas and others
- 5-240 (183) SPECIAL PROBLEMS: NUCLEAR MEDICINE**  
(Cr and hrs ar; prereq regis med) Loken and others

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

- 0-121 (111) MEDICAL ROENTGENOLOGIC CONFERENCE**  
Weekly meetings with the medical staff at which all the important medical cases which have had X-ray diagnostic procedures are reviewed from both the clinical and roentgenological points of view. (No cr; 10:00-11:00 T; Hosp Todd Amph) Gedgaudas and others
- 0-122 (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. (No cr; 4:00-5:00 M; Rigler Library) Williams
- 0-123 (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 points of view. (No cr; II S; Hosp Todd Amph) Amplatz, Gedgaudas
- 0-124 (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. (No cr; VI F; Hosp Todd Amph) Peterson
- 0-125 (202) CARDIOVASCULAR ROENTGENOLOGIC CONFERENCE**  
(No cr; 12:00-1:00 T; Rigler Library) Amplatz
- 0-127 (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. (No cr; 4:00-5:00 Th; Hosp Todd Amph) Gedgaudas and others

- 8-100 (209) GASTROINTESTINAL ROENTGENOLOGY**  
(Cr ar; prereq #) Gedgaudas and others
- 8-101 (209) UROLOGIC ROENTGENOLOGY**  
(Cr ar; prereq #) Gedgaudas and others
- 8-102 (209) NEUROLOGICAL ROENTGENOLOGY**  
(Cr ar; prereq #) Peterson and others
- 8-103 (209) CARDIOVASCULAR ROENTGENOLOGY**  
(Cr ar; prereq #) Gedgaudas and others
- 8-105 (209) PULMONARY ROENTGENOLOGY**  
(Cr ar; prereq #) Gedgaudas and others
- 8-150 (200) RESEARCH: ROENTGENOLOGY**  
Problems in roentgen diagnosis. (Cr ar) Gedgaudas and others
- 8-450 (205) RESEARCH: RADIATION BIOLOGY, NUCLEAR MEDICINE**  
(Cr ar) Staff

### *Therapeutic Radiology (Rad)*

- 3-450 (205) RESEARCH IN RADIATION BIOLOGY**  
Song and staff
- 5-440 (205) SPECIAL PROBLEMS IN RADIATION BIOLOGY**  
(Cr ar)
- 5-510 (103) BASIC PRINCIPLES OF RADIOLOGICAL PHYSICS**  
Lectures and demonstrations of basic principles in radiology. (1 cr per session) Khan and Moore
- 5-512 (211) DOSIMETRY OF INTERNAL AND EXTERNAL RADIATION EMITTERS**  
Basic principles of radiation dosimetry discussed in detail; clinical applications considered. (1 cr per qtr) Moore, Khan
- 5-540 (211) SPECIAL PROBLEMS IN RADIOLOGICAL PHYSICS**  
(Cr ar) Moore, Khan
- 8-300 (204) RADIATION THERAPY**  
In-service training in the treatment and management of patients with malignant disease. (Cr ar) Staff
- 8-350 (205) RESEARCH IN RADIATION THERAPY**  
(Cr ar) Staff
- 8-410 (212) SEMINAR: RADIATION BIOLOGY**  
Approaches to problems in radiation biophysics. Recent advances reviewed. (1 cr per qtr; prereq #) Staff
- 8-550 (205) RESEARCH IN RADIOLOGICAL PHYSICS**  
(Cr ar) Khan, Moore

## **Surgery (Surg)**

### *General Surgery*

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

- 5-135 (135) CLINICAL CLERKSHIP**  
(16 cr; prereq regis med) Najarian and staff

## **ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS**

- 5-501 (181) CARDIOVASCULAR SURGERY**  
Clinical problems and participation in surgery. (Cr and hrs ar; for srs only)  
Varco, Castaneda
- 5-520 (182) PROBLEMS IN CLINICAL INVESTIGATIONS AND PROBLEMS IN EXPERIMENTAL SURGERY**  
Opportunities for exposure to and participation in research in transplantation, cardiovascular, gastrointestinal, cancer immunology, or pediatric surgery problems. (Cr and hrs ar; University and affiliated hosps)
- 5-500 (190) EXTERNSHIP IN SURGERY—TRANSPLANTATION AND GENERAL SURGERY (University Hospitals)**  
(Cr and hrs ar; prereq regis med) Najarian, Simmons, Goodale
- 5-502 (191) EXTERNSHIP IN SURGERY—WHITE SURGERY (University Hospitals)**  
(Cr and hrs ar; prereq regis med) McKhann, Sullivan, Grage, Gilbertsen, Sosin
- 5-503 (192) EXTERNSHIP IN SURGERY—PEDIATRIC SURGERY (University Hospitals)**  
(Cr and hrs ar; prereq regis med) Leonard
- 5-504 (193) EXTERNSHIP IN SURGERY—RED SURGERY (University Hospitals)**  
(Cr and hrs ar; prereq regis med) Lillehei, Delaney, Buchwald
- 5-510 (194) EXTERNSHIP IN SURGERY—Veterans Administration Hospital**  
(Cr and hrs ar; prereq regis med) Humphrey and staff
- 5-511 (195) EXTERNSHIP IN SURGERY—St. Paul-Ramsey Hospital**  
(Cr and hrs ar; prereq regis med) Perry, Mowlem
- 5-512 (196) EXTERNSHIP IN SURGERY—Hennepin County General Hospital**  
(Cr and hrs ar; prereq regis med) Hitchcock
- 5-513 (197) EXTERNSHIP IN SURGERY—Mount Sinai Hospital**  
(Cr and hrs ar; prereq regis med) Eisenberg
- 5-514 EXPERIMENTAL SURGERY—TUMOR IMMUNOLOGY**  
(Cr and hrs ar; prereq regis med) McKhann
- 5-515 SURGICAL ONCOLOGY**  
(Cr and hrs ar; prereq regis med) McKhann, Grage

## **REQUIRED COURSES FOR GRADUATE STUDENTS**

- 8-200 CLINICAL SURGICAL PROBLEMS AND MANAGEMENT**  
Graduate students act as house surgeons and are required to study all phases of patient care, including their diagnosis, pre- and postoperative management, and operative therapy. (5 cr) Najarian and staff
- 8-201 (215) SURGERY-ROENTGENOLOGY-PATHOLOGY CONFERENCE**  
Weekly reviews of selected surgical patients. (1 cr) Radiology, Pathology and Surgery staffs
- 8-202 (216) SURGICAL RESEARCH**  
Problems in experimental surgery. (5 cr; hrs ar) Najarian and staff
- 8-203 (221, 222) SURGERY COMPLICATIONS AND RESEARCH SEMINAR**  
Evaluation of selected surgical patients including postoperative courses. Current research problems are presented for discussion and critical evaluation. (1 cr) Najarian and staff
- 8-207 (290) TRANSPLANTATION AND BONE MARROW CONFERENCE**  
Current clinical and research problems are presented for interdepartmental discussion and evaluation. (1 cr) Najarian, Good

## Urology

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

**5-180 (180) EXTERNSHIP IN UROLOGY**  
(Cr and hrs ar) Staff

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

**8-250 (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

**8-251 (251) CYSTOSCOPY AND UROLOGICAL DIAGNOSIS**

Urological fellow performs cystoscopies and other diagnostic procedures. (4 cr; hrs ar) Staff

**8-252 (252) UROLOGICAL CONFERENCE**

Problems in diagnosis and treatment are discussed. (4 cr; hrs ar) Staff

**8-253 (253) RESEARCH IN UROLOGY**

Problems in experimental and clinical surgery. (4 cr; hrs ar) Staff

## SCHOOL OF NURSING (Nurs)

**5-610/5-620 (82A-82B) ADVANCED CLINICAL APPLICATION OF NURSING THEORY**

Further integration of various dimensions of adaptation into a holistic approach to patient situations. (8 cr; prereq 5-430 [72], Psy 5-605 [145], Phcl 1-009 [9]; I-IV M, Mayo 100; 9:00-12:00 F, Mayo 125) Staff

**5-635 COMMUNITY HEALTH NURSING**

Instruction and supervised experience in community health nursing. Family oriented, with focus on nursing assessment and intervention, community health care, and health promotion. (3 cr; prereq  $\Delta$ ; lect and lab hrs ar)

**8-200 (191) FOUNDATIONS OF PSYCHIATRIC NURSING**

Current concepts of man, mental health, cultural and societal themes, psychiatric nursing, and interrelations among these. Offered primarily for students who need to take part of their graduate program in summer. (3 cr; prereq  $\Delta$ ; hrs ar) Cowlshaw

**8-009 (199) SPECIAL TOPICS IN NURSING: CURRENT CONCEPTS AND TRENDS IN MATERNAL-CHILD NURSING** (June 14-July 2)

Helps nurses to clarify the nursing role in delivery of health services to mothers and children, to assess the nursing needs of families, and to apply nursing theory to nursing intervention. Selected field experiences will be planned. (3 cr; prereq  $\Delta$ ; I-II MTWThF and lab hrs ar) Rose

**NuEd 8-509 (199) SPECIAL TOPICS IN NURSING EDUCATION: CURRICULUM DEVELOPMENT**

Basic principles of curriculum development; identification of technical and professional components of nursing; rationale for determining content and related learning experiences for students. Students will work in small groups to apply principles of curriculum development to nursing programs. (6 cr; prereq nurse faculty member and  $\Delta$ ; hrs ar) Searight

## COLLEGE OF PHARMACY

*For general information on the College of Pharmacy, see section on Schools, Colleges, and Special Programs, page 167.*

## *Pharmaceutics (Phm)*

- 5-610 (53) FUNDAMENTAL PRINCIPLES, PROCESSES**  
Selected topics in thermodynamics of application to pharmacy. (3 cr; prereq 5-603 [3], Math 1-142 [40A], Phys 1-010 [1], Chem 3-301 [61] or #; I MTWThF; AH 350) Rippe
- 5-650 (58) DISPENSING PHARMACY**  
(3 cr; prereq 5-640 [56], MedC 5-490 [163], or #; lect I MTWTh, ChemAdS 132; lab II-IV MW, AH 104) McRae

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

- 3-001 (50) PERSONAL AND COMMUNITY HEALTH**  
Fundamental principles of health conservation and disease prevention. (3 cr, \$old 2, \$1-001 [3], \$1-002 [4], \$1-003 [5], \$3-002 [51], \$old 52, \$5-002 [100A]; III MTWThF; MMA 100)
- 3-003 (53) INTRODUCTION TO PUBLIC HEALTH**  
Promotion of community health and prevention of disease. (5 cr; open to nurses or nursing students only; prereq #) Downey, Sloan
- 5-005 (123) TOPICS IN PUBLIC HEALTH**  
Selected readings in public health with discussion based on these readings. (Cr ar; prereq #) Staff
- 5-032 (131) EDUCATIONAL ASPECTS OF DRUG USE AND ABUSE**  
Basic background information on alcohol and other drugs and chemicals with emphasis on curriculum concepts, teaching methodology, materials, and referral procedures appropriate for elementary, junior, and senior high school. (3 cr, \$Hlth 5-400; limited to 80 students; prereq education srs, certified tchrs, school nurses; June 21-July 9; 1:30-3:30 MTWThF; NGW 201) Fredlund, Schwanke
- 5-068\*\* (190) COMMUNITY HEALTH EDUCATION PRACTICE**  
See section on 10-week courses, page 157.
- 5-518 (179A) LONG-TERM PATIENT CARE AND REHABILITATION**  
Problems associated with rehabilitation; selected experience correlated with seminars. (Cr ar; prereq #) Anderson
- 5-519 (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 #) Anderson
- 5-536 THE TEAM APPROACH IN SCHOOL NURSING**  
Designed to deepen the school nurse's understanding of her responsibility for the health of school children in relation to multidisciplinary pupil personnel teams and nursing teams. Consists of lecture-discussions, student projects, films, and field trips. (3 cr; open to nurses employed in schools or to those interested in such employment; III-IV MWF; rm ar) Fredlund
- 5-537 CHILD HEALTH ASSESSMENT AND CARE**  
Clinical course designed to strengthen the nurse's ability to do developmental health assessments of infants and preschool children and to plan health care for children within the context of the family and the community. (Cr ar; prereq #) Carver, Leonard
- 5-600 (189) FIELD COURSE IN PUBLIC HEALTH NUTRITION**  
Placement in an approved agency with opportunity for experience in nutritional aspects of public health programs. (Cr ar; prereq #) Stief and associates
- 5-601\* (196) SEMINAR: PUBLIC HEALTH NUTRITION**  
(Cr ar; prereq #) Stief

## ***Biometry (PubH)***

### **5-403 (120H) COMPUTER APPLICATIONS IN HOSPITAL AND HEALTH CARE ADMINISTRATION**

Introduction to digital computer and FORTRAN programming with applications in hospital and health care administration. (3 cr; prereq hospital and health care administration students only, others #; I-IV MTWThF; PoH Amph) Johnson

### **5-450 (110A) BIOMETRY I**

Basic concepts in probability; binomial, Poisson, and normal probability models; estimation and testing statistical hypotheses of parameters of probability models. (3 cr; prereq familiarity with basic concepts of calculus desirable and ¶5-451 [111A]; IV MTWThF; ForH 120) Bartsch

### **5-451 (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 ¶5-450 [110A]; III TThF [ForH 130] and 7 morning hrs per wk ar...afternoon hrs by special ar only; ForH 80) Jeffries

### **5-456 BIOMETRY CONSULTING SEMINAR**

Consultant and consultee interaction; communication and formulation of the biometric problem. Role and responsibility of the biometrician. Robustness and relevance of frequently used analytical techniques. Biometry student internship experiences. (3 cr; prereq biometry major) Boen and others

### **5-470 (123) TOPICS IN BIOMETRY**

Selected readings with discussion based on these readings. (Cr ar; prereq #) Staff

## ***Environmental Health (PubH)***

### **5-150 (123) TOPICS IN ENVIRONMENTAL HEALTH**

Selected readings and discussions of problems in environmental health. (Cr ar; prereq #) Staff

### **5-170 (123) TOPICS IN ENVIRONMENTAL BIOLOGY**

Selected readings in environmental biology with discussion of control techniques. (Cr ar; prereq #) Staff

### **5-180 (123) TOPICS IN AIR POLLUTION**

Selected readings in air pollution with discussion based on these readings. (Cr ar; prereq #) Staff

### **5-183 (186) PROBLEMS OF AIR POLLUTION CONTROL**

Special supervised studies involving laboratory and field investigation procedures; pertinent literature review. (Cr ar; prereq 5-181 [155], #)

### **5-200 (123) TOPICS IN RADIOLOGICAL HEALTH**

Selected readings in radiological health with discussion based on these readings. (Cr ar; prereq #) Staff

### **5-210 (123) TOPICS IN OCCUPATIONAL HEALTH**

Selected readings in occupational health with discussion based on these readings. (Cr ar; prereq #) Staff

### **5-220 (123) TOPICS IN FOOD SANITATION**

Review of literature and practice to identify association of food sanitation problems to public health. (Cr ar; prereq #) Staff

### **5-230 (123) TOPICS IN INSTITUTIONAL ENVIRONMENTAL HEALTH**

Review of literature and practice to identify institutional environmental health problems. (Cr ar; prereq #) Staff

- 8-150 (200) RESEARCH: ENVIRONMENTAL HEALTH**  
 Opportunities will be offered for qualified students to pursue research in the public health importance of environmental stresses on the health of man. (Cr ar) Staff
- 8-170 (200) RESEARCH: ENVIRONMENTAL BIOLOGY**  
 (Cr ar; prereq #) Olson, Greene
- 8-180 (200) RESEARCH: AIR POLLUTION**  
 (Cr ar; prereq #) Paulus
- 8-200 (200) RESEARCH: RADIOLOGICAL HEALTH**  
 (Cr ar; prereq #) Barber
- 8-208 FIELD PRACTICE IN RADIOLOGICAL HEALTH**  
 (Cr ar; prereq #) Barber
- 8-210 (200) RESEARCH: OCCUPATIONAL HEALTH**  
 (Cr ar; prereq #) Michaelsen
- 8-220 (200) RESEARCH: FOOD SANITATION**  
 (Cr ar; prereq #) Pflug
- 8-230 (200) RESEARCH: INSTITUTIONAL ENVIRONMENTAL HEALTH**  
 (Cr ar; prereq #) Michaelsen
- 8-246\*\* (231) GROUNDWATER DEVELOPMENT**  
 See section on 10-week courses, page 157.
- 8-248 (233) WATER QUALITY INVESTIGATION AND RESEARCH TECHNIQUES**  
 Field techniques and special research methods for establishing pollution base-lines; recognition and appraisal of advancing eutrophication. (6 cr; prereq #) Olson, Odlaug, Ruschmeyer
- 8-249 (234) WATER QUALITY RESEARCH**  
 Design and implementation of independent short-term research activity. Literature review, statistical design, and data processing. (6 cr; prereq #) Olson, Odlaug, Ruschmeyer

## *Epidemiology (PubH)*

### **SUMMER GRADUATE COURSES (offered June 20-July 10)**

- 5-331 (199A) FUNDAMENTALS OF BIostatISTICS**  
 Rates, probability methods, statistical inference, sampling distributions. (3 cr) Bearman and staff
- 5-332 (199B) FUNDAMENTALS OF EPIDEMIOLOGY**  
 Basic epidemiologic concepts and methods of investigation of diseases. (3 cr) Lilienfeld
- 5-336 (199E) ACUTE DISEASE EPIDEMIOLOGY**  
 Factors involved in epidemic occurrence, clinical response to infection, impact on man of zoonoses, immunologic responses, vaccine evaluation. (3 cr; prereq basic epidemiology and biostatistics) Fox
- 5-341 (199H) HEALTH SURVEY METHODS**  
 Practical aspects of survey design, execution, analysis, and interpretation. (2 cr; prereq basic epidemiology and biostatistics) Syme
- 5-345 (199C) EPIDEMIOLOGY OF CANCER**  
 Epidemiology of selected cancer sites. Emphasis on existing gaps in knowledge. (3 cr; prereq basic epidemiology and biostatistics and 5-357 [199F] or ¶5-357) Terris
- 5-346 (199D) EPIDEMIOLOGY OF CARDIOVASCULAR DISEASES**  
 Epidemiologic aspects of various types of cardiovascular disease with emphasis on multivariate setting of etiologies. (3 cr; prereq basic epidemiology and biostatistics and 5-357 [199F] or ¶5-357) Peacock

**5-349 EPIDEMIOLOGY OF CHRONIC RESPIRATORY DISEASE**

Critical review of current status of chronic respiratory disease epidemiology and methods. Design and analysis of longitudinal studies. (2 cr; prereq basic epidemiology and biostatistics) Stebbings

**5-350 EPIDEMIOLOGIC BASIS FOR HEALTH SERVICES PLANNING AND EVALUATION**

Discussions on epidemiologic approaches to planning and criteria of evaluation. (2 cr; prereq basic epidemiology and biostatistics) Henderson

**5-357 (199F) SELECTED STATISTICAL TOPICS IN EPIDEMIOLOGY**

Rate adjustment, relative risk, measures of association, matched pair analyses, force of mortality, and estimation of survivorship. (3 cr; prereq basic epidemiology and biostatistics) Kjelsberg

***Hospital and Health Care Administration (PubH)***

**5-766 MENTAL HEALTH ADMINISTRATION**

Examination of management within mental health organizations; emphasis on unique characteristics and historical perspective; lectures, case studies. (3 cr; prereq #) Malban

**5-768 LONG-TERM CARE ADMINISTRATION**

Examination of management within long-term care organizations; emphasis on nursing home administration; lectures, case studies. (3 cr; prereq #) Newberg

**5-769 COMPREHENSIVE HEALTH PLANNING**

Alternative health systems and their planning requirements; planning strategies and technologies; application to planning agency work programs; lectures, case studies, seminars. (3 cr; prereq #) Staff

# College of Liberal Arts

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

## Afro-American Studies (Afro)

- 1-101 (1) LANGUAGE ARTS FROM A BLACK PERSPECTIVE**  
Personal consciousness in Black literature. (4 cr; V-VI MTWTh; BlegH 105) Zulu
- 1-015 THE BLACK PROTEST FROM COLONIAL TIMES TO THE PRESENT**  
A critical analysis of chronological events and history of Black protest movements. (5 cr; II-III MTWThF; BlegH 210) Ward
- 1-036 (36) BLACK PARTICIPATION IN AMERICAN POLITICS**  
The course will examine the participation of the American Black man in administrative, judicial, electoral, and confrontation politics in the United States. (3 cr; III MTWThF; AndH 310) Craig
- 1-221 (21) BEGINNING SWAHILI**  
Beginning grammar and vocabulary with emphasis on conversational drill. (5 cr; II-III MTWThF; BlegH 350) Grant
- 1-301 (30) THE MUSIC OF BLACKNESS**  
Lectures, discussion, demonstration of Black music in America. (4 cr; I-II MTWTh; BlegH 250) Buckner
- 3-061 (60) BLACK FAMILY**  
This course will deal with the basic fabric of family life. In the course we will attempt to help arrive at a fuller understanding of the Black family, both as a unit within Black society and within society as a whole. (4 cr; II-III MTWTh; BlegH 435) Johnson
- 3-105 BLACK MUSIC PRIOR TO WORLD WAR I**  
Musical contributions and achievements of Black Americans in the United States during the 19th and early 20th centuries. (5 cr; III-IV MTWThF; BlegH 250) Southall
- 3-301 AFRICAN MUSIC IN THE AMERICAN HERITAGE**  
Links between African Music and music of Black America, West Indies, South and Central America. The Afro-Cuban style and modern jazz. (4 cr; VII-VIII MTWTh; BlegH 250) Southall
- 3-970 (70) INDEPENDENT STUDY**  
Special assignments in Afro-American Studies supervised by department faculty. (Cr ar) Staff

## American Indian Studies (AmIn)

- 3-061 (60) AMERICAN INDIANS IN THE MODERN WORLD**  
Brief review of the history of Indian-white contacts. Impact of federal policy on American Indians. Adaptation of American Indian cultures to contemporary and social conditions. (3 cr; limited to 30 students; prereq Anth 1-002 [2A], an introductory social science course, or GC 1-811 [27A], 1-812 [27B] or 1-813 [27C]; IV MTWThF; BlegH 110) Staff
- 5-211 (140) THE ARTS OF THE AMERICAN INDIAN**  
Emphasis on visual arts of North American Indians. Some attention to the other arts and to Latin-American Indians. (3 cr; limited to 40 students; prereq 3-061 [60] or 3 cr in art history or #; II MTWThF; BlegH 205) Morrison

**5-960 TOPICS IN AMERICAN INDIAN STUDIES: CONTEMPORARY INDIAN CULTURES IN MIDDLE AMERICA**

Following a brief survey of Indian peoples in Middle America the course will concentrate on selected groups and their reactions to acculturative forces which threaten the existence of indigenous cultures. (3 cr; limited to 30 students; III MTWThF; BlegH 115) Dunnigan

## American Studies (AmSt)

(See section on Special Programs)

**1-101 (Hum 21) AMERICAN LIFE I**

Individualism in American life and thought. (3 cr; limited to 49 students; I MTWThF; E 203) Simutis

**5-101 INTRODUCTION TO AMERICAN FOLKLORE**

See section on 10-week courses, page 157.

**8-202 (201) INTRODUCTION TO AMERICAN STUDIES**

Exposition of interdisciplinary methods and of the concept of American studies, reading of classics in American civilization; extended exploration of a topic. (3 cr; limited to 12 students; prereq MA candidates and  $\Delta$ ; V-VI WTh; BA 837) Chambers

**8-970 (250) INDEPENDENT READINGS IN AMERICAN CIVILIZATION**

(Cr and hrs ar; prereq consent of program chairman) Staff

## Anthropology (Anth)

**1-001 (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. (5 cr; each sec and each rec limited to 36 students) Peterson

Sec 1, I-II MTWTh, VH 301 (CCTV)

Sec 2, I-II MTWTh, VH 311

Sec 3, III-IV MTWTh, VH 301

Sec 4, III-IV MTWTh, VH 311

Rec 1, I-II F, VH 301

Rec 2, I-II F, VH 311

Rec 3, III-IV F, VH 301

Rec 4, III-IV F, VH 311

**1-002 (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 way in which primitive men organize their lives, directed toward a deeper and broader understanding of human capacity and purposes. (5 cr; each sec limited to 45 students and each rec limited to 36 students) Spencer

Sec 1, I-II MTWTh, BlegH 130 (CCTV)

Sec 2, I-II MTWTh, BlegH 150

Sec 3, III-IV MTWTh, BlegH 130

Sec 4, III-IV MTWTh, BlegH 150

Rec 1, I-II F, ForH 30

Rec 2, I-II F, ForH 40

Rec 3, I-II F, ForH 60

Rec 4, III-IV F, ForH 30

Rec 5, III-IV F, ForH 40

Rec 6, III-IV F, ForH 60

**3-211 (80) INDIANS OF NORTH AMERICA**

Survey; aboriginal cultures of North America. Effects of culture contact. Contemporary problems of Indian reservations and communities. (3 cr; limited to 100 students; prereq 1-002 [2A] or 5-101 [100]; VI MTWThF; ForH 155) Spencer

**5-222 (119) PEOPLES AND CULTURES OF MIDDLE AMERICA**

Survey of both Indian and Spanish-speaking people of Middle America. Analysis of processes of acculturation that have produced contemporary cultures of Mexico and Central America. (3 cr; limited to 50 students; prereq 1-002 [2A] or 5-101 [100], waived for majors in Latin-American Area Studies; II MTWThF; ForH 130) Ingham

**5-312 (164) SOCIAL ANTHROPOLOGY: KINSHIP AND MARRIAGE**

Examination of systems of kinship and marriage in cross-cultural perspective; relationship to economic, religious, and political institutions; significance of kinship studies for theory and methods in social anthropology. (3 cr; limited to 50 students; prereq 1-002 [2A] or 5-101 [100] or #; IV MTWThF; ForH 285) Rew

**5-361 (165) CULTURE AND PERSONALITY**

Role of culture in formation of personality. Problems of individual adjustments to demands of culture. Psychological approach to culture. (3 cr; limited to 100 students; prereq 1-002 [2A] or 5-101 [100] or #; waived for majors in public health, nursing, psychology, sociology, and social work; IV MTWThF; ForH 55) Staff

**5-385 (152) URBAN ANTHROPOLOGY**

Structure and process in non-western urban centers; emphasis on the role of rural migrants, relationship of urbanism to political and economic development, role of voluntary associations, adjustment of kinship groups to urban life. (3 cr; limited to 50 students; prereq 1-002 [2A] or 5-101 [100] or #; II MTWThF; ForH 120) Rew

**5-521 (134) ARCHAEOLOGY OF MIDDLE AMERICA**

Developmental stage survey of major features of prehistoric cultures of Mexico and Central America. (3 cr; limited to 40 students; I MTWThF; ForH 15) Adams

**5-522 (135) ARCHAEOLOGY OF SOUTH AMERICA**

Developmental stage survey of major features of prehistoric cultures of South America. All major ecological zones will be covered. (3 cr; limited to 40 students; III MTWThF; ForH 15) Adams

**5-591 (140) FIELD RESEARCH IN ARCHAEOLOGY**

(8 cr [may be taken for cr only once]; limited to 22 students; prereq #) Henning

**5-970 (190) DIRECTED RESEARCH**

(Cr and hrs ar; prereq sr, #) Staff

**8-508 (237) ADVANCED FIELD TECHNIQUES IN ARCHAEOLOGY**

(8 cr; prereq #) Henning

**8-950 (295) ADVANCED RESEARCH**

(Cr and hrs ar; prereq sr, #) Staff

## Applied Statistics††

**Biom 5-020 (110) COMPUTERS IN AGRICULTURAL AND BIOLOGICAL RESEARCH**

Impact of computers on research, FORTRAN programming, use of current libraries in processing statistical data, simulation techniques. (3 cr; prereq Biom 5-011 [101] or equiv; III MTWThF; FP 125) Ar

**Stat 5-911 (181A) TOPICS IN STATISTICS (PART I)**

See section on 10-week courses, page 157.

†† See Theoretical Statistics offerings on page 144.

## Art History (ArH)

### 1-001 (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, \$3-001 [50]; limited to 140 students; II MTWThF; Arch 25) Torbert

### 1-011 (11) HISTORY OF SCULPTURE, PAINTING, AND ARCHITECTURE: RENAISSANCE AND BAROQUE

A survey from the Italian Renaissance of the fifteenth century through the Rococo period of the eighteenth century. (3 cr, \$4, \$58; limited to 140 students; IV MTWThF; Arch 25) Simon

### 1-013 (13) 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; limited to 140 students; III MTWThF; Arch 25) Poor

### 5-433 (176) TWENTIETH-CENTURY PAINTING

Art Nouveau, Fauvism, Cubism, Futurism, Orphism, Matisse, Picasso, Braque, Gris, Leger, Boccioni, Rousseau, de Chirico, Duchamp. (3 cr, \$133; limited to 60 students; prereq sr, grad or #; II MTWThF; J 207B) Simon

### 5-766 (166) CHINESE PAINTING

Major works from 4th to 17th centuries. Primary emphasis: development of landscape tradition and literary genre of later Chinese painting. (3 cr; limited to 60 students; prereq 9 cr art history or #; V MTWThF; J 207B) Poor

### 5-911 ASPECTS OF ARCHITECTURE, SCULPTURE, AND PAINTING OF PRE-COLUMBIAN AMERICA

Principally Mexico and Guatemala, with emphasis on Olmec and Maya cultures. (3 cr; limited to 60 students; prereq 3 cr art history, #; IV MTWThF; J 207B) Torbert

## Studio Arts (ArS)

### 1-101 (20) BASIC DRAWING

Introduction to studio work; exploration of contemporary and traditional methods. Work from nature, various drawing mediums. (3 cr; each section limited to 25 students)

Sec 1, I-II MTWThF, ArtB 141, Myers

Sec 2, I-II MTWThF, ArtB 140, Routon

Sec 3, I-II MTWThF, ArtB 160, Cowette

### 1-102 (23) DRAWING

Work from life and nature; introduction to color and pictorial structure. (3 cr; each section limited to 25 students; prereq 1-101 [20])

Sec 1, III-IV MTWThF, ArtB 140, Routon

Sec 2, I-II MTWThF, ArtB 150, Gray

### 1-104 (25) COLOR

Continuing and elaborating upon drawing experiences of 1-102; serves as bridge between Lower Division drawing courses and Upper Division painting, printmaking, and other courses where color is used. (3 cr; limited to 25 students; prereq 1-102 [23]; I-II MTWThF; ArtB 151) Somberg

### 1-301, 1-302 (40, 41) SCULPTURE

(Sequence limited to 20 students) Baldwin

1-301 (40) Beginning course. Intensive study of structure with emphasis on form and space. Construction in metal and plaster. (3 cr; I-II MTWThF; ArtB bsmt)

1-302 (41) Integrates basic principles examined in 1-301. Natural form studied for sculptural concepts. Imaginative approach to form is encouraged. (3 cr; prereq 1-301 [40]; I-II MTWThF; ArtB bsmt)

**1-501, 1-502 (32, 33) ELEMENTS OF PRINTMAKING**

(Sequence limited to 20 students) Bethke

**1-501 (32)** Foundation course in mediums of printmaking. Problems in engraving, etching, and other techniques employed in working on metal plate, as well as lithography, woodcuts, and combined processes. (3 cr; prereq 1-101 [20]; I-II MTWThF; ArtB 170)

**1-502 (33)** Introduction to various techniques of etching and engraving employed in working on metal plates, as well as lithography, woodcuts, and combined processes. (3 cr; prereq 1-501 [32]; I-II MTWThF; ArtB 170)

**1-701 (10) PHOTOGRAPHY**

Introduction to photographic medium, its background and meaning today. Lectures in contemporary and historical use of photography. Problems in use of camera, printing, and enlarging. (3 cr; each section limited to 20 students)

Sec 1, I-II MTWThF, ArtB 131, Arndt

Sec 2, III-IV MTWThF, ArtB 131, Arndt

Sec 3, V-VI MTWThF, ArtB 131, Hallman

**1-702 (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 20 students; prereq 1-701 [10]; III-IV MTWThF; ArtB 131) Hallman

**1-801 (45) CERAMIC PROCESSES**

Introduction to building pottery by hand and forming on potter's wheel. Experiments with decorative techniques on wet clay and on bisque-fired pottery. Primarily concerned with pottery as creative expression but includes technical considerations of clays, glazes, and kilns. (3 cr; limited to 20 students; I-II MTWThF; ArtB bsmt) Hoard

**3-101/3-102/3-103 (53-54-55) DRAWING**

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

Sec 1, III-IV MTWThF, ArtB 160, Cowette

Sec 2, III-IV MTWThF, ArtB 150, Gray

**3-111/3-112/3-113 (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 1-101 [20] or equiv, with #; III-IV MTWThF; ArtB 141) Myers

**3-121/3-122/3-123 (70-71-72) PAINTING**

Introduction to medium of oil; individual projects and instruction. (3 cr; limited to 25 students; prereq 3-103 [55] or #; III-IV MTWThF) Somberg

**3-302, 3-306, 3-307 (80B, 81B, 82B) SCULPTURE**

(Sequence limited to 20 students; III-IV MTWThF; ArtB bsmt) Baldwin

**3-302 (80B). Direct Carving in Stone and Wood.** Some work in combinations of materials. (3 cr; prereq 1-303 [42])

**3-306 (81B). Carving, Modeling, Plastics, and Assemblage of Sculpture.** (3 cr; prereq 3-301 [80A], 3-302 [80B], 3-303 [80C])

**3-307 (82B). Experimental Work in Plastics and Assemblage.** Assigned class problems. (3 cr; prereq 3-306 [81B])

**3-501/3-502/3-503 (90-91-92) PRINTMAKING, INTAGLIO PROCESSES**

(3 cr; limited to 20 students; prereq 1-501 [32] or #; III-IV MTWThF; ArtB 170) Bethke

**3-701/3-702/3-703 (66-67-68) INTRODUCTION TO ART OF FILM MAKING**

Lectures and practical aspects of making films. (3 cr; limited to 20 students; prereq 1-701 [10]; I-II MTWThF; ArtB 120) Skelton

**3-801/3-802/3-803 (93-94-95) CERAMIC DESIGN**

(Continuation of 1-801) 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; limited to 20 students; prereq 1-801 [45] or #; III-IV MTWThF; ArtB bsmt) Hoard

**5-101/5-102/5-103 (120-121-122) ADVANCED DRAWING**

Drawing in all mediums from life and from imagination. Studies of history of drawing. Primarily for painting majors. (3 cr; prereq 3-103 [55] or equiv; I-II MTWThF; ArtB 161) Kerns, Rowan

**5-104/5-105/5-106 (150-151-152) PROBLEMS IN PAINTING**

(3 cr; prereq 3-123 [72] and #; limited to 25 students; III-IV MTWThF; ArtB 161) Rowan

**5-110 (130) ART WORKSHOP FOR TEACHERS**

Modern concepts of form and structure and their use in everyday arts. The combining of practice and theory related to classroom experience for teachers of art with emphasis upon contemporary art trends. (3 cr; limited to 25 students; prereq high school or jr college or college art tchrs; VI-VII MTWThF; ArtB 141) Busa

**8-101/8-102/8-103/8-104/8-105/8-106 (200-201-202-203-204-205) ADVANCED PROBLEMS IN PAINTING**

(3 cr; prereq #; hrs and rm ar) Busa

## Classics

### Classics (Clas)††

**5-085 (85) INTRODUCTION TO GREEK PHILOSOPHY; GREEK PHILOSOPHICAL THOUGHT IN GREEK CULTURE**

The major Greek philosophers in the context of their times. Presocratic philosophy, Socrates, Plato, Aristotle, Epicurus, the Stoics, and their cultural, historical, literary relationships, but with focus on philosophical thought. Requires additional work for graduate credit. (3 cr; prereq jr; IV MTWThF; FolH 308) Hershbell

**5-124 (124) FIELD RESEARCH IN ARCHAEOLOGY**

Field excavation, survey, and research in archaeological sites in Greece, Turkey, Italy, Israel, or the Mediterranean area. Intensive training in techniques of excavation and exploration as well as analysis and interpretation of archaeological materials. (3-6 cr; prereq 9 cr from 5-101 [100] through 5-105 [120] or equiv and Δ) McDonald, Kraabel

### Greek (Grk)

**3-466 (66) PLATO**

(4 cr; prereq 1-103 [3] or Δ; II MTWThF; FolH 302) Hershbell

**8-120 (121-122-123-124-125-126) GREEK TEXT COURSE**

For graduate students in departments other than Classics who wish text work in Greek for a minor or related field. Students will attend Grk 3-466 if they meet the prerequisites for this course. Supplementary work at the discretion of the instructor. (3 cr; prereq Δ; II MTWThF; FolH 302) Hershbell

### Latin (Lat)

**3-472 (72) OVID: ELEGIACS**

(4 cr; prereq 1-103 [3] or Δ; I MTWThF; FolH 302) Sonkowsky

†† No knowledge of Greek or Latin is required.

**5-038 (108) ORAL INTERPRETATION OF CLASSICAL LATIN LITERATURE**

Phonetics, prosody, and oral performance of selected texts in classical Latin. (4 cr, §Th 5-831 [108]; prereq Th 3-801 [81] or 3-321 [61] or Mus 1-104 [12E] or 3-104 [62E] or equiv, and 2 yrs Latin or equiv; III MTWThF; FolH 308) Sonkowsky

**8-120 (121-122-123-124-125-126) LATIN TEXT COURSE**

For graduate students in departments other than Classics who wish text work in Latin for a minor or related field. These students will attend Lat 3-472 if they meet the prerequisites for this course. Supplementary work at the discretion of the instructor. (3 cr; prereq Δ; I MTWThF; FolH 302) Sonkowsky

*Note*—Graduate students majoring in Classics may undertake Independent Study courses by contacting Professors Hershbell and Sonkowsky about arrangements before the term begins.

## Communication (Comm)

**1-003 (3) COMMUNICATION**

Language and public discourse; structure, content, and social implications of utterances through mass media of communication. (3 cr, §Engl 1-003 or §Engl 1-313; limited to 28 students; prereq 1-002 [2]; II MTWThF; rm ar)

## Communication Disorders (CDis)

**3-101 (99) INTRODUCTION TO SPEECH SCIENCE, PATHOLOGY, AND AUDIOLOGY**

Survey of concepts basic to understanding normal and abnormal speech and hearing function. Introduction to causes, characteristics, and modifications of communication problems. (3 cr; I MTWThF; FolH 303) McDermott

**5-304 (122) VOICE SCIENCE**

Inspection of research data relevant to basic processes as a generator, vocal folds and articulators as sound sources, and vocal tract as an acoustic modifier of sound source. Laboratory experience and exercises. (3 cr; prereq 5-303 [121]; IV MTWThF; FolH 303) Speaks

**5-305 (123) LABORATORY INSTRUMENTATION**

Description of basic concepts in electronics and of electroacoustic systems appropriate to the study of speech and hearing. (3 cr; prereq 5-301 [119] or #; III MTWThF; FolH 303) Speaks

**5-514 SPEECH DELAY: DEVELOPMENT AND ASSESSMENT**

Continued application of psycholinguistics to delayed speech and language, plus consideration of language assessment. (4 cr; limited to 25 students; prereq 5-513 or #; VI MTWThF; FolH 303) Siegel

**5-970 (101-102-103) READINGS**

Directed readings and preparation of reports on selected subjects. (Cr and hrs ar; prereq #) Chaiklin, Henrikson, Martin, Siegel, Speaks

**8-210 (201) SEMINAR: ADVANCED PROBLEMS**

(3 cr [may be repeated for cr]; prereq #) Siegel

**8-511 (249) SEMINAR: CURRENT ISSUES IN SPEECH PATHOLOGY**

Significant problem areas in speech pathology; relation to other rehabilitation programs and personnel. Class projects involving in-depth exploration of a specific problem. (3 cr; prereq grad major in speech pathology or #; II MTWThF; FolH 303) Henrikson

**8-520 (266) CLINICAL METHODS AND PRACTICE IN SPEECH PATHOLOGY: SPECIALIZED PRACTICA**

Specialized practica may be taken in one or more of the following areas: cleft palate, voice, articulation, stuttering, neuromuscular disorders, apha-

sia, laryngectomy, hearing impaired. (1-3 cr [may be repeated]; prereq #: hrs ar) Henrikson, McDermott, Haroldson

**8-990 (204-205-206) RESEARCH**

(Cr ar; open to grad students engaged in research on special problems; prereq #) Chaiklin, Martin

## East Asian Languages

### Chinese (Chin)

For complete course listings in Chinese, see section on 10-week courses, page 157.

### Japanese (Jpn)

For complete course listings in Japanese, see section on 10-week courses, page 157.

## Economics (Econ)

**1-001 (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. (3 cr, §1-004 [1T], §1-015 [C], §3-001 [50A]; each section limited to 40 students; prereq 3rd qtr fr)

- Sec 1, I MTWThF, BlegH 230, Staff
- Sec 2, II MTWThF, BlegH 230, Staff
- Sec 3, III MTWThF, BlegH 420, Staff
- Sec 4, IV MTWThF, BlegH 420, Staff
- Sec 5, V MTWThF, BlegH 230, Staff

**1-002 (2) PRINCIPLES OF ECONOMICS**

(Continuation of Econ 1-001) Demand and supply, competition and monopoly, and the distribution of income. (3 cr, †1-001/1-002 [1-2], §1-005 [2T], §1-015 [C], §3-002 [50B]; each section limited to 40 students; prereq 1-001 [1] or equiv)

- Sec 1, I MTWThF, BlegH 415, Staff
- Sec 2, III MTWThF, BlegH 155, Staff

**3-101 (65) MICROECONOMIC THEORY**

Behavior of firms and industries under competitive and monopolistic conditions; factors influencing production, price, and advertising decisions. (3 cr, §3-104 [65T], §5-151 [165]; each section limited to 40 students; prereq 1-001/1-002 [1-2] or ‡)

- Sec 1, I MTWThF, BlegH 135, Staff
- Sec 2, II MTWThF, BlegH 240, Staff
- Sec 3, IV MTWThF, BlegH 215, Staff

**3-102 (66) MACROECONOMIC THEORY**

Determinants of national income, employment, and price level; attention given to aggregate consumption and investment. (3 cr; limited to 40 students; prereq 3-101 [65] or §; III MTWThF; BlegH 135) Staff

- 3-131 (75) WELFARE ECONOMICS**  
Introduction to welfare economics. Economic efficiency and the conditions necessary to sustain it. Conflicts between the efficiency and income distribution goals. How market structure and public policies increase or decrease efficiency. (3 cr; limited to 45 students; prereq 3-101 [65] or 3-101H [65H] or equiv; II MTWThF; BlegH 240) Staff
- 3-651 (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; limited to 45 students; prereq 3-101 [65], 3-131 [75] recommended or #; III MTWThF; BlegH 220) Staff
- 3-751 (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; limited to 45 students; prereq 3-102 [66] or equiv; IV MTWThF; BlegH 220) Staff
- 3-851 (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; limited to 45 students; prereq 3-101, 3-102 [65, 66] or equiv; I MTWThF; BlegH 225) Staff
- 3-970 (60) READINGS**  
(Cr ar; prereq 1-002 [2], consent of adviser, #)
- 5-151 (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, §3-101 [65]; prereq grad or #; IV MTWThF; BlegH 215) Staff
- 5-152 (166) ELEMENTS OF ECONOMIC ANALYSIS: INCOME AND EMPLOYMENT**  
Determinants of national income, employment, and price level; aggregate consumption, investment, and asset holding. (3 cr, §3-102 [66]; prereq grad or #; III MTWThF; BlegH 135) Staff
- 5-161 (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 5-151 [165] or equiv; III MTWThF; BlegH 260) Staff
- 5-164 (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 5-152 [166] or equiv or #; II MTWThF; BlegH 360) Staff
- 5-301 (103) ECONOMIC DEVELOPMENT**  
Problems of economic growth in low income countries. Theory of aggregate and per capita income growth. Role of population growth, productivity increases, and capital formation. Allocation of resources between consumption and investment and among sectors. International assistance and trade. (3 cr, §5-331 [103A]; not open to economics majors; limited to 50 students; prereq 1-002 [2] or equiv; II MTWThF; BlegH 155) Staff
- 5-315 (184) ECONOMICS OF ASIA**  
Economic development following contact with Western civilization. Some current problems; population, growth, capital formation, international economic relations, choice between types of economic organization. (3 cr; prereq 1-002 [2] or equiv; IV MTWThF; BlegH 235) Staff
- 5-331 (103A) ECONOMIC DEVELOPMENT**  
Problems of economic growth in low income countries. Theory of aggregate and per capita income growth. Role of population growth, productivity increases and capital formation. Allocation of resources between con-

sumption and investment and between sectors. International assistance and trade. (3 cr, §5-301 [103]; limited to 36 students; prereq 3-101, 3-102 [65, 66] or equiv or §; II MTWThF; BlegH 260) Staff

**5-401 (104) INTERNATIONAL ECONOMICS**

The case for free trade. Effects of tariffs; protection of infant industries; common markets. Balancing international receipts and payments, the role of exchange rate changes, international monetary reform. (3 cr, §5-431 [104A]; not open to economics majors; limited to 25 students; prereq 1-002 [2] or equiv; III MTWThF; BlegH 120) Staff

**5-431 (104A) INTERNATIONAL ECONOMICS**

The case for free trade. Effects of tariffs; protection of infant industries; common markets. Balancing international receipts and payments, the role of exchange rate changes, international monetary reform. (3 cr, §5-401 [104]; limited to 25 students; prereq 3-101, 3-102 [65, 66] or equiv or §; III MTWThF; BlegH 120) Staff

**5-970 (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

**8-311 (213A) ECONOMIC GROWTH AND NATIONAL PLANNING**

Models of the process of economic growth; exogenous factors to which growth is attributed. Techniques useful in planning, input-output, national income accounting programming. Questions of policy. (3 cr; prereq 5-163 [185C], 5-166 [176C], plus a course in development; IV MTWThF; BlegH 350) Staff

**8-990 (290) INDIVIDUAL GRADUATE RESEARCH**

(Cr ar) Staff

## English (Engl)§§

**1-001 (1) FRESHMAN ENGLISH**

(3 cr, §A or 1A or 1B or 1-311H [10H] or Comm 1-001 [1]; each section limited to 28 students; prereq assignment to category 1 or 1A or 2)

- Sec 1, I MTWThF, E 320
- Sec 2, I MTWThF, E 325
- Sec 3, II MTWThF, E 320
- Sec 4, III MTWThF, E 320
- Sec 5, IV MTWThF, E 320

**1-003 (3) FRESHMAN ENGLISH**

(3 cr, §C or 3A or 3B or 1-313H [12H] or Comm 1-003 [3]; each section limited to 28 students; prereq 1-002 [2])

- Sec 1, I MTWThF, E 340
- Sec 2, II MTWThF, E 325
- Sec 3, III MTWThF, E 325
- Sec 4, IV MTWThF, E 325

**1-821 (21) INTRODUCTION TO LITERATURE**

Medieval and Renaissance literature. (4 cr; limited to 60 students; prereq ††; I MTWThF; E 305) Haley

**1-938 (38) MODERN LITERATURE**

Prose fiction. (4 cr; limited to 48 students; prereq soph ††; I MTWThF; E 229) Solotaroff

**3-155 (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

§§ Credit in English will be allowed for certain Classics courses numbered between 1-042 [40] and 3-083 [82]. Consult English Department for approval.

†† Completion of or exemption from Freshman English requirement.

two or three other plays from the early and middle periods. (4 cr; limited to 35 students; may not be taken concurrently with 3-156 [56])

Sec 1, I MTWThF, E 217, Furia

Sec 2, III MTWThF, E 217, McNaron

**3-156 (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. (4 cr; limited to 35 students; prereq 3-155 [55]...may not be taken concurrently with 3-155 [55]; I MTWThF; E 302) Clayton

**3-722 (73) AMERICAN LITERATURE**

Notable authors from Whitman through James. (4 cr; limited to 60 students; prereq 3-721 [72]; III MTWThF; E 305) Solotaroff

**5-129 (129) DRAMA SINCE ca. 1920**

Survey of chief dramatists, English, American, and Continental. (4 cr; prereq 3-156 [56]; IV MTWThF; E 229) Leyasmeyer

**5-511 (179) CLASSICS OF LITERARY CRITICISM**

(4 cr; II MTWThF; E 302) Clayton

**5-645 (165) STRUCTURE OF MODERN ENGLISH**

Introduction to three English grammars: traditional, structural, and transformational, with applications in the study of social and regional variations. (4 cr; II MTWThF; Arch 5) Steinmann

**5-713 (113) AMERICAN SHORT STORY**

Historical examination of American short story from 18th century to present. (4 cr; IV MTWThF; E 302) Furia

**5-771 (171) BLACK WRITERS OF THE UNITED STATES**

Prose, poetry, and drama with emphasis on writers of the 20th century. (4 cr; II MTWThF; E 302) Anderson

**5-801 (100) OLD ENGLISH (ANGLO-SAXON)**

Introduction to sounds and grammar with some prose reading. Relation to modern English stressed. (6 cr; III-IV MTWThF; E 215) Clark

**5-829 (119) ENGLISH NOVEL**

Late 19th and early 20th centuries. (4 cr; II MTWThF; E 229) Madden

**5-837 (137) VICTORIAN LITERATURE**

Prose, poetry, and selected fiction. Emphasis on critical study of particular works of major authors and their relation to recurrent themes and literary interests of the period. (4 cr; IV MTWThF; E 203) Madden

**5-844 (142) JAMES JOYCE**

Critical reading of the texts. (4 cr; IV MTWThF; E 217) Anderson

**5-862 (162) MILTON**

Minor poems: *Areopagitica*, *Paradise Lost*, and *Samson Agonistes*. (4 cr; IV MTWThF; E 217) Steinmann

**5-886 (187) EIGHTEENTH-CENTURY LITERATURE**

Survey of English literature from 1700 to 1790. Parallel readings and critical essays. (4 cr; II MTWThF; E 215) Leyasmeyer

**5-899 (199) SEVENTEENTH-CENTURY LITERATURE**

Dryden and his contemporaries. (4 cr; III MTWThF; E 302) Haley

## Family Studies (FamS)

**1-001 (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; each section limited to 40 students)

Sec 1, I MTWThF, J 2, Laube

Sec 2, IV MTWThF, J 4, Kokosh

**1-002 (1A) DYNAMICS OF DATING, COURTSHIP, AND MARRIAGE**

(See FamS 1-001) Designed for engaged or married students or ♀. (3 cr, §1-001 [1]; each section limited to 40 students)

Sec 1, III MTWThF, BlegH 205, del Solar

Sec 2, IV MTWThF, BlegH 155, Sprengle

**1-025 (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; III MTWThF; J 2) Huyck

**5-001 (100) HUMAN SEXUAL BEHAVIOR**

The nature of sexual functioning; sexual development, ethics and attitudes, research problems. (3 cr; limited to 50 students; prereq 15 cr psychology or sociology; II MTWThF; AndH 330) Neubeck

## Foreign Study (FS)

**5-960 (161) SEMINAR FOR FOREIGN STUDY I**

See section on 10-week courses, page 157.

## French and Italian

### French (Fren)

**1-004 (25) INTERMEDIATE FRENCH**

(4 cr; prereq 1-103 or 1-003 [3] or 3 yrs high school French...addtl lab work required; III MTWThF; VH 211)

**1-005 (26) INTERMEDIATE FRENCH**

Readings in contemporary culture. Development of vocabulary and improvement of ability to read, write, and speak the language. (3 cr; prereq 1-004 [25]; I MTWThF; FoIH 201)

**1-101 (1) BEGINNING FRENCH**

(5 cr; III-IV MTWThF; P 110)

**1-103 (3) BEGINNING FRENCH**

(5 cr; prereq 1-102 or 1-002 [2] or 2 yrs high school French; I-II MTWThF; ME 302)

**3-011 (54) FRENCH COMPOSITION**

A course in writing paragraphs developing into short essays based on models and collections of essays. (3 cr; prereq 1-004H [25H] or 1-005 [26]...§3-021 [55] highly recommended; IV MTWThF; FoIH 302)

**3-021 (55) FRENCH CONVERSATION AND PRONUNCIATION**

In addition to regular conversation course, an hour each week is devoted to practical phonetics and pronunciation drill. (3 cr; prereq 1-004H [25H] or 1-005 [26]...§3-011 [54] highly recommended; III MTWThF; FoIH 302)

**3-022 (58) ADVANCED FRENCH CONVERSATION**

(3 cr; prereq 3-021 [55] or ♀; II MTWThF; FoIH 203)

**3-104 (53) INTRODUCTION TO FRENCH LITERARY TEXTS**

Variety of literary works representing principal genres are examined through stylistic analyses and literary explications. Students learn critical terminology and discuss literary problems and techniques. (3 cr; prereq 1-004H [25H] or 1-005 [26] or 4 yrs high school French or ♀; II MTWThF; FoIH 201)

- 3-269 (84) TOPICS IN 19th-CENTURY FRENCH LITERATURE**  
Reading and discussion of selected texts. Taught in French. (3 cr; prereq 3-201 [64]; II MTWThF; FoIH 202)
- 3-301 (86) FRENCH LYRIC POETRY**  
Reading and discussion of selected texts and development of notions of convention and genre. Taught in French. (3 cr; prereq 3-201 [64]; III MTWThF; FoIH 203)
- 3-701 (90) DEVELOPMENT OF THE FRENCH LANGUAGE**  
Introduction to a study of the origins and development of the French language. Readings of selected texts. (3 cr; prereq 3-011 [54] or #; IV MTWThF; FoIH 203)
- 5-013 (150) INTRODUCTION TO FORMAL ANALYSIS**  
Outstanding literary texts from Middle Ages to 20th century. Designed to reveal how language, themes, and structure analyzed as a whole, in depth, lead to maximal appreciation of beauty and significance of great literary texts. (3 cr; prereq 3-209 [80] or above; I-II MW; FoIH 208) Mack
- 5-355 (140) NOVEL OF THE 18th CENTURY**  
Emphasis on novels of Prevost, Marivaux, Rousseau, Diderot, and Laclos. (3 cr; prereq 3-209 [80] or above; III-IV TTh; FoIH 304) Waldauer
- 5-443 (127) CLASSICAL COMEDY: MOLIERE**  
(3 cr; prereq 3-209 [80] or above; III-IV MW; FoIH 304) Renaud
- 5-560 (133) NINETEENTH-CENTURY POETIC THEORY**  
Investigation of the poetic theory concerning language, versification, and aesthetics of the 19th century. (3 cr; prereq 3-209 [80] or above; I-II TTh; FoIH 208) Lock
- 5-970 (189) INDEPENDENT READINGS FOR UPPER DIVISION STUDENTS**  
(1-3 cr; prereq # and consent of dept chm; hrs ar) Staff
- 8-202 (202) FRENCH LITERATURE IN THE MIDDLE AGES: GRADUATE SURVEY**  
(3 cr per qtr; prereq 8-201 [201] or #; V MTWThF; FoIH 203) Akehurst
- 8-970 (259) DIRECTED READINGS FOR GRADUATE STUDENTS**  
(1-3 cr; prereq #; hrs ar) Staff

**OFFERED ONLY IN LA MAISON FRANCAISE††**

All students who enroll in La Maison Française should register for Fren 5-000. After the ability of students enrolled in La Maison Française has been determined, students will be assigned to one of the following courses:

- 3-001\*\* (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 1-102 [2] or equiv; VI-VII MTWThF; FoIH 203) Staff
- 3-023\*\* (56A) ADVANCED PRACTICAL FRENCH CONVERSATION**  
Fluency acquired by presenting short oral reports and oral explications de texte, and participating in debates. (5 cr; prereq 1-004 [25] or equiv; VI-VII MTWThF; FoIH 302) Staff
- 5-001\*\* (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; FoIH 204) Staff

Note—The General Extension Division will offer French for Graduate Students (Fren 0-001). Please address all inquiries to the General Extension Division.

†† See Modern Language Residence Houses in the section on Special Programs. Permission of French and Italian Department is required for registration.

## Italian (Ital)

### 1-001, 1-002, 1-003 (1, 2, 3) BEGINNING ITALIAN

See section on 10-week courses, page 157.

### 1-003 (3) BEGINNING ITALIAN

(5 cr; prereq 1-002 [2] or 2 yrs of high school Italian; III-IV MTWThF; FolH 202)

## Geography (Geog)

### 1-301 (4) HUMAN GEOGRAPHY

Geography of population and principal ways of life; capacity of earth for future population. (5 cr; I-II MTWThF; AndH 250) Hart

### 1-401 (1) PHYSICAL GEOGRAPHY

Major features of distribution patterns of climate, relief, vegetation and soils; regional differences in problems of physical development. (5 cr; III-IV MTWThF; AndH 250) Barrett

### 1-425 (25) INTRODUCTION TO METEOROLOGY

Pre-calculus introduction to nature of the atmosphere and its behavior. Topics include atmospheric composition, structure, stability and motion; precipitation processes, air masses, fronts, cyclones and anticyclones; general weather patterns; meteorological instruments and observations; plotting and analysis of maps; forecasting. (4 cr; limited to 60 students; prereq high school algebra and physics or #; III MWF, BlegH 425; and VI-VIII TTh, BlegH 445) Skaggs

### 3-511 (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; limited to 20 students; prereq 5 cr geography or #; III MTWThF; BlegH 445) Brown

### 3-970 (70) DIRECTED READINGS

Course devised for independent study program and designed to permit student to pursue interests in special reading and/or study. (1-15 cr) Hart

### 5-113 (137) CANADA AND ALASKA

Analysis of physical and human geography. Both internal and external areal relationships. (3 cr; prereq 10 cr geography or #; I MTWThF; AndH 330) Mather

### 5-391 (175) RURAL GEOGRAPHY

Geographic components and assemblages of rural settlement. World patterns and geographic problems of rural settlement on American scene. (3 cr; III MTWThF; BlegH 235) Mather

### 5-441 (157) LANDFORM GEOGRAPHY

Detailed consideration of landform resources in regional setting; emphasis on North America. (3 cr; limited to 25 students; prereq 1-401 [1] or #; II MTWThF; BlegH 445) Brown

### 8-970 (200) DIRECTED READINGS

(1-5 cr) Barrett

### 8-990 (301) RESEARCH PROBLEMS IN GEOGRAPHY

(Cr ar) Skaggs

## German (Ger)

### 1-101 (1A) BEGINNING GERMAN

(5 cr; each section limited to 20 students) Staff

Sec 1, I-II MTWThF, Arch 20

Sec 2, I-II MTWThF, Arch 30

Sec 3, I-II MTWThF, Arch 140

- 1-103 (3A) BEGINNING GERMAN**  
 (5 cr; each section limited to 20 students; prereq 1-102 [2A] or 2 yrs high school German) Staff  
 Sec 1, I-II MTWThF, J 2  
 Sec 2, I-II MTWThF, NH 107
- 1-301 (4) INTERMEDIATE GERMAN**  
 (3 cr; limited to 27 students; prereq 1-003 [3] or 1-103 [3A] or 1-203 [3B] or 3 yrs high school German; II MTWThF; FolH 108) Plummer
- 1-302 (5) INTERMEDIATE GERMAN**  
 (3 cr; limited to 27 students; prereq 1-301 [4] or 4 yrs high school German; I MTWThF; FolH 108) Plummer
- 3-104 (56A) READING AND ANALYSIS OF LITERARY TEXTS**  
 (3 cr; not open to students who have had 3-301 [70] or above; limited to 30 students; prereq 1-302 [5] or 1-301 [4] and # or 4 yrs high school German; II MTWThF; E 203) Staff
- 3-302 (71) LYRIC POETRY: HEINE TO END OF 19th CENTURY**  
 (3 cr; limited to 30 students; prereq 3-104 [56A] or 1-301 [4] and #; IV MTWThF; FolH 306) Taraba
- 3-312 (74) NINETEENTH-CENTURY DRAMA**  
 (3 cr; limited to 30 students; prereq 3-104 [56A] or 1-301 [4] and #; I MTWThF; FolH 207) Menze
- 3-322 (77) GERMAN PROSE OF THE 20th CENTURY**  
 (3 cr; limited to 30 students; prereq 3-104 [56A] or #; III MTWThF; FolH 205) C Wood
- 5-323 (178) THE 19th-CENTURY DRAMA: GRILLPARZER, HEBBEL**  
 (3 cr; limited to 27 students; prereq 14 cr in 3-301 [70] and above or equiv; IV MWF; FolH 108) Menze
- 5-406 GOETHE: NOVELS**  
 (3 cr; limited to 27 students; prereq 14 cr in 3-301 [70] or above or equiv; III-IV TTh; FolH 108) Ramras
- 5-723 (112) MIDDLE HIGH GERMAN LANGUAGES**  
 (3 cr; limited to 30 students; prereq 5-722 [111]; VI-VII TTh; FolH 305) C Wood
- 8-202 GERMAN LITERATURE: AGE OF CLASSICISM**  
 (3 cr; limited to 30 students; VI-VII MW; FolH 305) Ramras

Note—The General Extension Division will offer German for Graduate Students (Ger 0-221), First Term, MTh 5:30-8:00 p.m.; and Ger 0-222, 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 5-000. After the ability of students enrolled in Deutsches Haus has been determined, they will then be assigned to one of the following courses:

- 3-001 (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) Staff

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

**3-031 (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) Staff

**5-001 (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 #) Russell

## History (Hist)

**1-001 (1) INTRODUCTION TO MODERN EUROPEAN HISTORY, PART I**

Development of western European civilization to 1715. (3 cr; I MTWThF; BlegH 5) Tracy

**1-002 (2) INTRODUCTION TO MODERN EUROPEAN HISTORY, PART II**

Revolution, liberalism, and nationalism, to 1870. (3 cr; II MTWThF; BlegH 5) Kieft

**1-003 (3) INTRODUCTION TO MODERN EUROPEAN HISTORY, PART III**

1870 to recent times. (3 cr; II MTWThF; AndH 230) Rudolph

**1-051 (14) ANCIENT CIVILIZATION, PART I**

Near East to 500 B.C. (3 cr; IV MTWThF; BlegH 210) T Jones

**1-101 (11) MEDIEVAL AND RENAISSANCE HISTORY, PART I**

Early Middle Ages. (3 cr; I MTWThF; BlegH 10) Bachrach

**1-152 (5) ENGLISH HISTORY, PART II**

Tudors, Stuarts, and Hanoverians. (3 cr; II MTWThF; BlegH 10) Lehmberg

**1-301 (23) AMERICAN HISTORY, PART I**

Colonial, early national period through sectional crisis. (4 cr; II MTWThF; AndH 310) Carroll

**1-302 (24) AMERICAN HISTORY, PART II**

Modern America. (4 cr; III MTWThF; AndH 270) A Jones

**1-432 (31) HISTORY OF AFRICA, PART II**

From 1500 to the 19th century establishment of European rule. (3 cr; II MTWThF; BlegH 125) Isaacman

**3-051 (50) ANCIENT CIVILIZATION, PART I**

See Hist 1-051. (3 cr; IV MTWThF; BlegH 210) T Jones

**3-152 (57) ENGLISH HISTORY, PART II**

See Hist 1-152. (3 cr; II MTWThF; BlegH 10) Lehmberg

**3-823 (81) UNITED STATES IN 20th CENTURY, PART III**

From 1932 to present. (3 cr; IV MTWThF; AndH 230) A Jones

**5-101 (106A) WESTERN EUROPE IN THE EARLY MIDDLE AGES, PART I**

From the settlement of the Franks in Gaul to the end of the Merovingians. (3 cr; IV MTWThF; BlegH 245) Bachrach

**5-211 (115B) FRENCH REVOLUTION AND NAPOLEON, PART I**

Background and emergence of the Revolution. (3 cr; II MTWThF; BlegH 105) Bamford

- 5-222 (116D) **EUROPE IN 20th CENTURY, PART II**  
From 1918 to 1938. (3 cr; II MTWThF; BlegH 220) Munholland
- 5-232 (119A) **MODERN FRANCE, PART II**  
Third and Fourth Republics. (3 cr; III MTWThF; BlegH 105) Munholland
- 5-256 (120K) **HISTORY OF ITALY FROM ERA OF FRENCH REVOLUTION TO PRESENT, PART III**  
From 1901 to present. (3 cr; II MTWThF; BlegH 235) Thayer
- 5-265 (119F) **MODERN RUSSIA, PART II**  
The 19th Century. (3 cr; II MTWThF; AndH 270) Stavrou
- 5-281 (121C) **INTELLECTUAL AND CULTURAL HISTORY OF MODERN EUROPE, PART I**  
The 18th Century and its background. (3 cr; IV MTWThF; SocSci 860) Thayer
- 5-287 (121F) **DIPLOMATIC HISTORY OF EUROPE**  
From 1648 to 1789. (3 cr; III MTWThF; AndH 230) Kieft
- 5-292 (123A) **ECONOMIC HISTORY OF EUROPE, PART II**  
Modern European economic history. (3 cr; III MTWThF; SocSci 860) Rudolph
- 5-346 (144C) **HISTORY OF AMERICAN LABOR, PART III**  
From 1917 to present. (3 cr; II MTWThF; BlegH 115) Berman
- 5-379 (139B) **PURITANISM IN AMERICAN HISTORY**  
Puritanism as reality and as concept for historical interpretation. (3 cr; prereq #; III MTWThF; BA 632) Carroll
- 5-402 (146A) **SURVEY OF LATIN-AMERICAN HISTORY, PART II**  
Latin-American republics. (3 cr; III MTWThF; AndH 270) Schwartz
- 5-804 (181B) **ERA OF AMERICAN REVOLUTION, PART I**  
(3 cr; 1:00-3:00 W; SocSci 628) Howe
- 5-821 (181J) **AMERICAN HISTORY IN 20th CENTURY, PART I**  
(3 cr; prereq #; 8:00-11:00 MTh; BA 837) Chambers
- 5-901 (190A) **LATIN AMERICAN HISTORY, PART I**  
(3 cr; prereq reading knowledge of Spanish; VI W; BA 735) Schwartz
- 5-941 (197D) **PROSEMINAR: AFRICAN HISTORY**  
Research training with emphasis on West and North Africa. (3 cr; prereq #; 10:00-12:00 TTh; BlegH 360) Isaacman
- 5-970 (100B) **DIRECTED STUDY**  
(3 cr; prereq #) Staff

## Humanities (Hum)

- 1-004 (4) **HUMANITIES IN THE MODERN WORLD IV**  
The humanities between two wars. 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, §3-004 [54]; each section limited to 65 students)  
Sec 1, II MTWThF, Arch 15, Franklin  
Sec 2, III MTWThF, Arch 45, Fields
- 1-101 (1A) **HUMANITIES IN THE MODERN WORLD**  
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, §1-001 [1] or §3-001 [51]; limited to 65 students; II MTWThF; Arch 45) Milgrom
- 3-001 (51) **HUMANITIES IN THE MODERN WORLD**  
See Hum 1-101. (3 cr, §1-001 [1] or §1-101 [1A]; limited to 65 students; III MTWThF; Arch 40) Toth

- 3-002 (52) HUMANITIES IN THE MODERN WORLD**  
The Industrial Revolution, liberalism, and socialism. Period from about 1776 to 1890. Authors: the classical economists, Marx, Mill, Ibsen, Dostoevski. (3 cr, §1-002 [2] or §1-102 [2A]; limited to 65 students; IV MTWThF; Aero 209) Milgrom
- 3-003 (53) HUMANITIES IN THE MODERN WORLD**  
From about 1840 to about 1914. Authors: Darwin, Nietzsche, Kierkegaard, and Mann. (3 cr, §1-003 [3] or §1-103 [3A]; limited to 56 students; I MTWThF; ForH 130) Bisztray
- 3-004 (54) HUMANITIES IN THE MODERN WORLD**  
See Hum 1-004. (3 cr, §1-004 [4]; limited to 65 students; IV MTWThF; Arch 45) Franklin
- 3-005 (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; limited to 65 students; I MTWThF; Arch 5) Toth
- 3-006 (56) THE IMAGINATION IN THE 20th CENTURY**  
Examines the nature of the imagination in a study of key works on the imagination in the 20th century and works that exemplify as forcibly as possible the quality of imagination in art. (3 cr; limited to 65 students; III MTWThF; Aero 209) Bauer
- 3-045 (90) RACIAL THOUGHT: A CONCEPTUAL SURVEY, 19th AND 20th CENTURIES**  
Introduces "racism" as an assemblage of historically and conceptually diverse philosophic and cultural ideologies. Selected readings include Gobineau, Disraeli, Renan, Taine, Chamberlain, Putnam, Benedict, Montague, etc. (3 cr; limited to 65 students; prereq jr or sr or §; I MTWThF; Arch 45) Penn
- 3-211 (61B) THE GREAT PERIOD OF GREECE**  
From the Persian Wars to Macedonian conquest. Tragedy, comedy, philosophy of Plato and Aristotle. (3 cr, §1-011 [11] or §3-011 [61]; limited to 40 students; II MTWThF; Aero 211) Erasmi
- 3-213 (63B) THE AGE OF REFORMATION**  
The Renaissance in Northern Europe and an analysis of the Reformation and Counter-Reformation. The baroque era in France and Spain. (3 cr, §1-013 [13] or §3-013 [63]; limited to 65 students; IV MTWThF; Ex 193) Erasmi
- 3-049 (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, Bronowski, 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; limited to 50 students; prereq jr or sr or §; III MTWThF; Arch 135) Penn
- 3-970 (70) DIRECTED STUDY**  
(Cr ar; prereq §) Staff
- 5-030 (131-132-133) 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; ForH 359) Ames

## Journalism and Mass Communication (Jour)

- 1-003 (3) COMMUNICATION IN MODERN WORLD—MASS MEDIA**  
Mass media and their social and cultural effects. Interaction between

audience and media. Popular arts. Related areas of communication; advertising, public relations, propaganda. Future of mass media. (3 cr, §Spch 1-103 [3]; I MTWThF; MurH 311) Robbins

**1-005 (5) VISUAL COMMUNICATION**

Introduction to functions of visual communication in news and advertising for print and electronic media. Evaluation and criticism of current typography, photography. Lectures (CCTV), recitations, projects, critiques. (3 cr; each section limited to 25 students; prereq 3rd qtr fr) Schuneman  
Sec 1, II MWF, ForH 150 (CCTV); rec II TTh, MurH 311  
Sec 2, II TThF, ForH 160 (CCTV); rec II MW, MurH 311  
Sec 3, III MTW, ForH 150 (CCTV); rec III TTh, MurH 302

**1-011 (11) JOURNALISTIC WRITING FOR NONMAJORS**

Newspaper fact-gathering and newswriting; specialized reporting; fundamentals of press law. (3 cr; limited to 24 students; for journalism minors and others in College of Agriculture, College of Forestry, College of Home Economics, College of Education, Institute of Technology, and School of Business Administration; prereq soph, C avg, completion of freshman English or exemption from requirement; III MTWThF; MurH 311) Fang

**1-201 (18) PRINCIPLES OF ADVERTISING**

Theory, principles, and functions of advertising; its role in economic, social and marketing structure. Newspapers, magazines, radio, television as advertising media. (3 cr; limited to 35 students; prereq soph, 1-001 [1], C avg and ¶Comp 1-027 [27]...1-001 [1] or ¶1-001 for Upper Division students; IV MTWThF; MurH 308) Peterman

**3-221 (60) GRAPHIC ARTS: PROCESSES**

Letterpress, offset, lithography, and gravure printing processes; engravings and copy preparation; significant graphic arts trends. (3 cr; limited to 20 students; prereq jr; I MTWThF; MurH 308) Wilson

**3-241 (79) ADVERTISING COPY WRITING**

Advertising appeals and strategy; techniques of writing and editing advertising copy for newspapers, magazines, radio-TV, direct mail, outdoor, brochures; planning advertising campaigns; laboratory work. (5 cr; limited to 25 students; prereq 1-201 [18], 3-231 [57]; II-III MTWThF; MurH 212) Harris

**3-451 (84) BROADCAST NEWS WRITING, EDITING**

Introduction to television and radio news. Writing, monitoring, and interviewing; editing audio tape, preparing radio newscasts and a radio documentary. (3 cr; limited to 20 students; prereq 3-121 [50]; II MTWThF; MurH 30) Fang

**5-142 (141) INTERPRETATION OF CONTEMPORARY AFFAIRS**

Analysis of major political, economic, and social developments and their interpretation in editorial and interpretative articles. (3 cr; prereq sr, 3-151 [51] and 15 cr in social science; II MTWThF; MurH 302) Gerald

**5-182 (182) PUBLICATIONS WORKSHOP**

Intensive study of the role of the high school newspaper and yearbook; analysis of content; study of design and make-up, typography, photography processes. Specially planned for secondary school publication advisers. (3 cr; not open to journalism majors; prereq jr, sr or grad or #; June 15-25; 1:00-4:30 MTWThF; MurH 311) Wilson

**5-184 (184) FILM AND TELEVISION COMMUNICATIONS: MASS MEDIA AND THE CLASSROOM**

Lecture with afternoon and evening labs arranged—film showings Sunday evenings and Wednesdays at noon. Relevancy of film in the mass media. Developing an understanding of film as a communication medium in the high school classroom. Lectures, viewings, and discussions with an introduction of basic production techniques. (6 cr; limited to 12 students; prereq #; II-IV MTWThF; afternoon labs ar; MurH 20) Bay

**5-251 (156) PSYCHOLOGY OF ADVERTISING**

Examination of psychological principles, research techniques, and applications in advertising and selling. Analysis of relevant consumer attitudes

and behavior. Psychological mechanisms upon which effectiveness of advertisements and commercials depend. (3 cr, \$Psy 5-751 [156]; prereq Psy 1-002 [2]; III MTWThF; SciCB 375) Peterman

**5-501 (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; III MTWThF; MurH 308) Carter

**5-777 (177) CONTEMPORARY PROBLEMS IN FREEDOM OF SPEECH AND PRESS**

Anglo-American concept of freedom and responsibility, constitutional development in United States, areas of present tension. Bill of Rights and journalism today. (3 cr; prereq 15 cr in social sciences; IV MTWThF; MurH 311) Gerald

**8-531 (231) SEMINAR: PUBLIC OPINION AND PROPAGANDA**

Theoretical bases of public opinion and propaganda. Developing literature in this field of specialization. (3 cr; prereq 5-131 [102], consent of adviser; hrs and rm ar) Carter

## Library School (Lib)††

**5-001 (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 50 students; V MTWThF; JohH 114) Kromer

**5-101 (101) LIBRARY ADMINISTRATION**

Principles of library administration, organization, and management. A general course for all librarians. (3 cr; limited to 50 students; III MTWThF; JohH 114) Kittilson

**5-201 (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; I MTWThF; JohH 114) Pankake

**5-202 (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 50 students; VI MTWThF; JohH 114) Colberg

**5-203 (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 45 students; prereq 5-202 [104]; IV MTWThF; AH 350) Thornley

**5-204 (195) PRINT MATERIALS IN THE LIBRARY**

Selection, evaluation, and the use of books, periodicals, and other printed sources of information and recreation for youth in school and public libraries; reading patterns of children and adolescents, and implications for the selection of printed materials to meet the requirements, purposes, and abilities of different age groups. (3 cr; limited to 45 students; VII MTWThF; JohH 114) Thornley

†† The graduate Library School is a professional school. Courses numbered 8-000 and above 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 8-000 are open to anyone who has been admitted to the Graduate School or to the Minimum Certification Program for School Librarians, and to any undergraduate in the College of Liberal Arts or the College of Education. A student who does not fall in one of the above categories must have his registration for a library science course approved by an adviser in the Library School office, 3 Walter Library.

**5-205 (197) MATERIALS RELATED TO THE CURRICULUM**

Survey of elementary and secondary school curricula with emphasis on a multi-media approach to teaching and optimum use of school libraries by teachers; consideration of teacher and librarian relations; exploration in depth of materials in at least one curriculum area. (3 cr; limited to 45 students; prereq 5-202 [104], 5-203 [194], and 5-204 [195]; V MTWThF; AH 350) Kittilson

**5-401 (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 40 students; II MTWThF; JohH 114) Brekhus

**8-002 (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; prereq 5-001 [105]; III MTWThF; WaLib 4B) Shove

**8-206 (265) ADVANCED BIBLIOGRAPHY**

The national and trade bibliographies of the world, with emphasis on those of the United States, Great Britain, France, Germany, and Russia. Their use in the selection and acquisition of books and in the preparation of subject bibliographies. (3 cr; prereq 5-201 [102]; I MTWThF; WaLib 4B) Shove

**8-208 (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 28 students; prereq 5-201 [102]; VII MTWThF; WaLib 4B) Kromer

**8-212 (269) GOVERNMENT DOCUMENTS**

Current and retrospective bibliographies and indexes to U.S. and international government documents; scope and content of various government publications; problems of acquiring and organizing documents for libraries. (3 cr; limited to 28 students; prereq 5-201 [102]; VI MTWThF; BlegH 135) Heer

**8-411 (241) LIBRARY MECHANIZATION AND SYSTEMS ANALYSIS**

Application of systems analysis to library operations; principles, problems, and examples of library mechanization. (3 cr; limited to 28 students; prereq 5-101 [101] and 5-401 [103] or #; IV MTWThF; WaLib 4B) Brekhus

**8-701 (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 28 students; II MTWThF; WaLib 4B) McDiarmid

**8-970 (298) INDEPENDENT STUDY IN LIBRARY SCIENCE**

(3 cr; prereq #) Staff

**8-990\* (295, 296, 297) LIBRARY RESEARCH**

Graduate students under Plan B may register for at least 3 credits in library research with the approval of the professor who will guide the research paper. (3-9 cr; prereq #) Staff

## Linguistics (Ling)

**3-001 (50) INTRODUCTION TO LINGUISTIC SCIENCE**

(3 cr; II MTWThF; FolH 105) Nash

**5-001 (170) INTRODUCTION TO GENERAL LINGUISTICS**

(3 cr [no cr for ling maj]; II MTWThF; FolH 105) Nash

**5-900 (190) APPLIED TRANSFORMATIONAL GRAMMAR FOR TEACHERS I**

(3 cr; IV MTWThF; FolH 107) Hutchinson

# Music (Mus)

(See also Music Education under College of Education)

## 1-001 (4) FUNDAMENTALS OF MUSIC

Study of basic musical symbols, vocabulary, rhythm, design, scale structures, intervals, chords. The development of basic piano skills; the playing of simple accompaniments. (2 cr; each section limited to 24 students; for nonmusic majors)

Sec 1, II MTWThF, MusEd 200, Lauritzen

Sec 2, III MTWThF, MusEd 200, Lauritzen

Sec 3, IV MTWThF, MusEd 200, Lauritzen

## 1-507 (8A) SURVEY OF MELODIC AND HARMONIC PROCEDURES

A study of the principles of melodic and harmonic structure. (3 cr; prereq #: I MTWThF, ScH 3; IV TTh, ScH 3) Humphries

## 1-517 (7A) EAR TRAINING AND SIGHT-SINGING

Development of aural skills with concentration on sight-singing, interval recognition, melodic and harmonic dictation, and vocal improvisation. (3 cr; prereq #: II MTWThF, ScH 3; IV MWF, ScH 3) Humphries

## 3-531 (84) ANALYSIS I

Study of various procedures and techniques of analysis applied to tonal and pre-tonal music. (3 cr; prereq 1-506 [6T]; III MTWThF; ScH 3) Argento

## 5-384 (183A) CHORAL CONDUCTING

Advanced study of the art of choral conducting—the study of hand techniques, sound control, articulation, breath control, intonation, etc. (3 cr; prereq #: III MTWThF; ScH 2) Lancaster

## 5-480 (167-168-169) OPERA AND OPERETTA PRODUCTION

The singer prepares and performs roles in opera and operetta. Special projects, including stage direction, musical direction, and accompanying coaching, are offered for the non-singer. (3 cr; prereq singers with #: II MTWThF; WuH 7) Sutton

## 5-551, 5-552, 5-553 (127, 128, 129) COMPOSITION I

Original work in various forms. The student is exposed to a variety of techniques and styles of composition after which he is encouraged to develop his own original approach. (2 cr each; prereq 1-506 [6T]; hrs ar; ScH 205) Argento

## 5-554, 5-555, 5-556 COMPOSITION II

Original works in various forms. (2 cr each; prereq 3-543 [99], 5-553 [129]; hrs ar; ScH 205) Argento

## 5-564/5-565 (161-162) BAND ARRANGING

Analysis of current scoring techniques for wind and percussion instruments. Scoring for band. Creative arrangements for marching or concert band. (3 cr each; prereq 1-506 [6T], 5-563 [143] or MuEd 3-557 [65] or #: hrs ar; ScH 322) Schultz

## 5-603 (126) HISTORY OF OPERA

Origins of opera; its development as a musico-dramatic form through analysis of libretto and music of representative masterpieces of the late Renaissance, Baroque, Classic, Romantic and Contemporary periods. (3 cr; prereq 9 cr in history of music or history of art or history of theatre or European history from 1600 or #: V MTWThF; ScH 103) Argento

## 5-634 (164) MUSIC IN BAROQUE ERA

Development of vocal, instrumental, and sacred styles of the Baroque Era. (3 cr; prereq 1-603 [36]; V MTWThF; ScH 3) Riedel

## 5-701 (104) AMERICAN MUSIC

From colonial times to present. American Indian music; folk music; sacred music in America, Puritan New England to the present time; jazz; music education; the symphony orchestra; contemporary music. (3 cr; prereq 1-603 [36] or 9 cr in American history or American studies or #: IV MTWThF; ScH 4) Riedel

**5-755 (140) CHORAL LITERATURE: LARGE FORMS**

Study of selected sacred and secular choral compositions (large forms, i.e., mass, oratorio, magnificat, Stabat Mater, cantata) from 16th century to the present. (3 cr; prereq sr or grad, 1-506 [6T] or #: IV MTWThF; ScH 2) Lancaster

**5-757 (130) SYMPHONIES OF THE CLASSICAL ERA**

Through Haydn and Mozart; evolution of form and style in relation to contemporary thought and art through 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 #: II MTWThF; ScH 103) Oberg

**5-758 (131) SYMPHONIES OF BEETHOVEN**

Evolution of Beethoven's symphonic form and style as reflection of intellectual, political, and artistic currents of the Napoleonic era. (3 cr; prereq 6 cr in music history or art history or political history since 1750 or English or German literature since 1750, or #: III MTWThF; ScH 103) Oberg

**5-841 (110) MUSIC BIBLIOGRAPHY**

Survey and examination of music bibliographies, reference materials and monuments of music. (3 cr; prereq 1-603 [36] or #: I MTWThF; ScH 4) Holum

**8-551, 8-552, 8-553 (227, 228, 229) COMPOSITION III**

Original works in various forms. Emphasis on advanced work in composition. (3 cr each; prereq grads who have completed undergrad major sequence in music theory and composition incl 3-543 [99], 5-503 [123], 5-553 [129], 5-563 [143]; hrs ar; ScH 205) Argentó

## *Courses in Applied Music*

Offerings in applied music are classified according to three modes: elective (with or without credit), applied, and performance; and four levels: Lower Division (prefix 1, or 0 for no credit), Upper Division (prefix 3), and two Graduate levels (prefixes 5 and 8). A student may not register for a course in applied music for credit until he has passed the required applied entrance examination. The examining committee will determine the mode(s) for which a student may register. Students should consult with the Music Department regarding the mode and level of applied music appropriate for fulfillment of specific requirements in each degree program. To register for Upper Division credit in applied music, the student must have completed 12 credits at the Lower Division level on the same instrument and must pass an Upper Division qualifying examination.

Courses in applied music carry either 2 credits (minimum of 10 private half-hour lessons) per quarter or 4 credits (minimum of 10 hour-lessons) per quarter. A special fee of \$50 for 2 credits, or \$100 for 4 credits, per quarter is charged for individual lessons for all Lower Division students and non-music majors. (See chart on page 131.)

## COURSES IN APPLIED MUSIC

Instrument	Applied: Elective				Applied			Applied: Performance			Instructor
	Non-Cr	Lower Div	Upper Div	Grad	Lower Div	Upper Div	Grad	Lower Div	Upper Div	Grad	
Piano	0-101	1-101	3-101	5-101	1-201	3-201	8-201	1-301	3-301	8-301	Weiser, Freed
Harp	0-102	1-102	3-102	5-102	1-202	3-202	8-202	1-302	3-302	8-302	Ar
Organ	0-103	1-103	3-103	5-103	1-203	3-203	8-203	1-303	3-303	8-303	Fleischer
Voice	0-104	1-104	3-104	5-104	1-204	3-204	8-204	1-304	3-304	8-304	Ware, Wilson, Wittich
Violin	0-105	1-105	3-105	5-105	1-205	3-205	8-205	1-305	3-305	8-305	Roche
Viola	0-106	1-106	3-106	5-106	1-206	3-206	8-206	1-306	3-306	8-306	Venittelli
Cello	0-107	1-107	3-107	5-107	1-207	3-207	8-207	1-307	3-307	8-307	Jamieson
Double Bass	0-108	1-108	3-108	5-108	1-208	3-208	8-208	1-308	3-308	8-308	Ar
Flute	0-109	1-109	3-109	5-109	1-209	3-209	8-209	1-309	3-309	8-309	Niosi, Opava
Oboe	0-111	1-111	3-111	5-111	1-211	3-211	8-211	1-311	3-311	8-311	Angelucci
Clarinet	0-112	1-112	3-112	5-112	1-212	3-212	8-212	1-312	3-312	8-312	Fitch, Haugen, Williams
Saxophone	0-113	1-113	3-113	5-113	1-213	3-213	8-213	1-313	3-313	8-313	Fitch, Haugen, Williams
Bassoon	0-114	1-114	3-114	5-114	1-214	3-214	8-214	1-314	3-314	8-314	Ar
French Horn	0-115	1-115	3-115	5-115	1-215	3-215	8-215	1-315	3-315	8-315	Ar
Trumpet	0-116	1-116	3-116	5-116	1-216	3-216	8-216	1-316	3-316	8-316	Chenette, Hasselmann
Trombone	0-117	1-117	3-117	5-117	1-217	3-217	8-217	1-317	3-317	8-317	Zellmer
Baritone	0-118	1-118	3-118	5-118	1-218	3-218	8-218	1-318	3-318	8-318	Ar
Tuba	0-119	1-119	3-119	5-119	1-219	3-219	8-219	1-319	3-319	8-319	Walton
Percussion	0-121	1-121	3-121	5-121	1-221	3-221	8-221	1-321	3-321	8-321	Fine
Harp	0-122	1-122	3-122	5-122	1-222	3-222	8-222	1-322	3-322	8-322	Miller
Guitar	0-123	1-123	3-123	5-123	1-223	3-223	8-223	1-323	3-323	8-323	Pederson
Accordion	0-124	1-124	3-124	5-124	1-224	3-224	8-224	1-324	3-324	8-324	Hane

## Natural Science (NSci)

### 1-001†† (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, §equiv courses in science depts; each lab limited to 12 students; prereq 1 yr high school algebra or §; III-IV MTWThF, Ph 131; 2 hrs lab, Ph 246) 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

### 1-004 (4) PHYSICAL WORLD

Topics from astronomy and physics selected to illustrate the methods of science and to acquaint the student with the physical universe around him. (4 cr, §equiv courses in physics [to receive cr, student must complete both NSci 1-004 and 1-005 [4 and 5] but not necessarily in Summer Session]; prereq 1 yr high school algebra; II MTWThF; Ph 133; 4 lab hrs per wk) Ar

### 5-165 (165) SCIENCE IN WORLD AFFAIRS

A survey of major aspects of science that exert an impact on modern history: (1) atomic energy; (2) race and evolution; (3) population and natural resources; (4) life on other planets and space travel. Object is to organize data and ideas and help students and teachers present an intelligent perspective of issues. (3 cr; prereq 1 yr biological and physical science in high school, or §; III MTWThF; Ph 236a) Graubard

### 5-175 (175) A SURVEY OF SCIENCE HISTORY

Brief glimpses into major works constituting classics of science from Hippocrates to Einstein. Actual books and experimental efforts are stressed, rather than secondary sources. Representative scientific works are chosen from antiquity, and medieval, early modern, and recent periods. (3 cr, §5-171 [171], §5-172 [172], §5-173 [173]; prereq 1 yr biological and physical science in high school or college, or §; IV MTWThF; Ph 236a) Graubard

## Philosophy (Phil)

### 1-001 (2A) LOGIC

Difference between logical and fallacious reasoning; functions and uses of language; rules of good definition and sound argument. (3 cr)

Sec 1, limited to 36 students, II MTWThF, ForH 175, Dahl

Sec 2, V MTWThF, ForH 155, Lewis

### 1-002 (1A) PROBLEMS OF PHILOSOPHY

Introduction to permanent problems; principal methods and schools of philosophy; historical and contemporary views. (3 cr)

Sec 1, I MTWThF, ForH 120, Mason

Sec 2, limited to 50 students, II MTWThF, ForH 285, Brodbeck

### 1-003 (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; limited to 56 students; III MTWThF; ForH 115) Sartorius

†† To receive credit, a student must complete both NSci 1-001 [1] and 1-002 [2] but not necessarily in the Summer Session.

- 1-004 (4A) POLITICAL PHILOSOPHY**  
Nature of law and the state. Philosophical foundations of such political ideologies as democracy, communism, and fascism. (3 cr; limited to 56 students; IV MTWThF; ForH 130) Sartorius
- 3-001 (50A) HISTORY OF WESTERN PHILOSOPHY**  
Greek philosophy, pre-Socratics, Socrates, Plato, Aristotle. (3 cr; limited to 50 students; III MTWThF; ForH 285) Dahl
- 5-311 (150) ETHICAL THEORY**  
Distinguishing characteristics of a moral judgment; application of moral judgments to motives, acts, and person; moral freedom and responsibility; moral relativity, skepticism, and the justification of moral standards; examination of representative systems. (3 cr; prereq 1-003 [3] or §; II MTWThF; ForH 349) Mason
- 5-601 (160) PHILOSOPHY OF SCIENCE**  
Meaning, methods, and implications of modern science through examination of basic concepts, presuppositions, and procedures. Topics: description, explanation, prediction, experimentation; space, time, number, matter, energy; causality, probability, statistics; organic life, evolution, mind. (3 cr; prereq 1-001 [2] or §; IV MTWThF; ForH 349) Brodbeck
- 5-701 (140) SURVEY OF CONTEMPORARY PHILOSOPHY**  
Current systematic and critical philosophies, especially idealism, naturalism, realism, pragmatism, positivism as represented by their principal exponents. (3 cr; prereq 3-003 [52] or §; III MTWThF; ForH 349) Lewis

## Political Science (Pol)

- 1-001 (1) AMERICAN GOVERNMENT AND POLITICS**  
Analysis of principles, organization, processes, functions of government and the interplay of political forces in United States—national, state, and local. Attention given throughout to current issues. (3 cr; IV MTWThF; AndH 330) Riggs
- 1-025 (25) WORLD POLITICS**  
Introduction to contemporary international relations; forms of state interaction; problems of conflict and cooperation. (3 cr; V MTWThF; BlegH 240) Riggs
- 1-041 (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; VI MTWThF; BlegH 235) Ar
- 1-051 (A) THE STATE IN MODERN WORLD**  
Examination of principles, structure, operation of modern state. Emphasis on nation state: historical development, democratic government, and totalitarian government. (3 cr; III MTWThF; AndH 330) Poochigian
- 3-382 (81) STATE AND LOCAL GOVERNMENT AND POLITICS**  
Analysis of state constitutions; legislative, executive, and judicial organization and procedures; political parties, political interest groups and elections; state-local government relations; personnel, finance, and major functions. (3 cr, §1-002 [2]; not open to soph; limited to 50 students; I MTWThF; BlegH 125) Crew
- 5-308 (108) LEGISLATIVE ORGANIZATION AND PROCEDURE**  
Congress and state legislatures at work. (3 cr; limited to 36 students; prereq 1-002 [2] or §; IV MTWThF; BlegH 260) Shaw
- 5-317 (117) COMMUNITY POWER STRUCTURES**  
Analysis of political elites and leadership in various kinds of communities. (3 cr; limited to 60 students; prereq 1-002 [2] or §; V MTWThF; BlegH 220) Koepfen

**5-448 (148) GOVERNMENT AND POLITICS OF AFRICAN COUNTRIES**

Political institutions and behavior in sub-Saharan African countries in their social and cultural settings, influence of class and tribal structure; parties and elections; source and nature of ideologies; economic and social policies. (3 cr; limited to 22 students; prereq 1-052 [B] or 12 cr in social science or #; III MTWThF; BA 735) Pirro

**5-659 (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; limited to 60 students; prereq 1-052 [B] or 9 cr in social science or #; I MTWThF; BlegH 435) Poochigian

**5-661 (161) PROBLEMS OF DEMOCRACY**

Analysis of postulates and implications; moral foundations; democratic theory and the economic order; liberty and authority; equality; representation; spiritual order, critics of democracy. (3 cr; limited to 63 students; prereq 1-052 [B] or 9 cr in social science or #; II MTWThF; BlegH 135) Shaw

**5-737 (137) 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; limited to 45 students; prereq 1-002 [2] or #; II MTWThF; BlegH 225) Crew

**5-739 (139) THE POLITICS OF ETHNIC COMMUNITIES**

Cross-cultural study of politics of ethnic communities with special emphasis on the politics of black communities in the United States. Topics on internal community politics and their local and national political systems. (3 cr; limited to 60 students; prereq 6 cr in social science; IV MTWThF; BlegH 435) Koeppen

**5-884 (184) INTERNATIONAL POLITICS I**

Analysis of systems of interaction among nation-states; balance of power; bipolar, and other types of international systems; theories of stability, change, conflicts, and cooperation. (3 cr; limited to 45 students; VI MTWThF; BlegH 255) Pirro

**8-501 (285) RESEARCH SEMINAR: JUDICIAL PROCESS AND ADMINISTRATIVE LAW**

See section on 10-week courses, page 157.

## Psychology

### Personal Orientation (PO)

**1-001 (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 added to CLA grad requirement; limited to 30 students; I MTWThF; J 1)

### Psychology (Psy)

**1-001/1-002† (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; III-IV MTWThF; NH 45) Jenkins

**1-004/1-005† (4-5) INTRODUCTORY LABORATORY PSYCHOLOGY**

Experiments illustrating contemporary subject matter such as sensory psychology, psychophysics, perception, motivation, verbal behavior, animal and human learning, problem solving, and psychological measurement. (2

cr for each; each section limited to 40 students; prereq soph, 1-001/1-002 [1-2] or ¶1-001/1-002)

Sec 1, I-III MTWThF, WeH 101, Dorworth

Sec 2, IV-VI MTWThF, WeH 101

Sec 3, VII-IX MTWThF, WeH 101

**3-990 (190) PROJECT IN PSYCHOLOGY**

Individual library study or empirical investigation. (Cr ar; prereq sr, #) Darley

**5-012/5-013† (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 3-011 [75] except for students in Sequence A and grads; III-IV MTWThF; Ph 210) Trapold

**5-041/5-042† (132-133) PSYCHOLOGY OF MOTIVATION**

Classical and contemporary theories of motivation. Elaboration of basic drives into motives, acquisition of new drives and goals; dynamics of elaborated drive structure. Motivation in complex situations involving set, level of aspiration, Zeigarnik effect, frustration, etc. (3 cr for each; prereq 9 cr; I-II MTWThF; AH 150) Davisson

**5-604/5-605† (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 1-002 [2] or 12 cr in a social science; I-II MTWThF; Ph 150) Phillips

**5-751 (156) PSYCHOLOGY OF ADVERTISING**

Examination of psychological principles, research techniques, and applications in advertising and selling. Analysis of relevant consumer attitudes and behavior. Psychological mechanisms upon which effectiveness of advertisements and commercials depend. (3 cr, §Jour 5-251 [156]; prereq 1-002 [2]; III MTWThF; SciCB 375) Peterman

**8-520 (230) FIELD WORK IN APPLIED PSYCHOLOGY**

(Cr ar; prereq #) Staff

**8-990\* (210) RESEARCH PROBLEMS**

(Cr ar) Warnken

## Public Affairs (PA)

**8-114 (214) CURRENT ISSUES OF PUBLIC ADMINISTRATION AND POLICY DEVELOPMENT IN MINNESOTA**

Background study through lectures, panel discussions, and seminar sessions on selected public policy issues which currently confront Minnesota's governmental units. (3 cr; prereq Δ; 1:30-4:30 W, AndH 270; VI-VII TTh, BlegH 335) Staff

**8-140 SEMINAR: NATURAL ENVIRONMENT POLICY**

Analysis and discussion of major public policy issues concerning the natural environment, including water and air pollution; assessment of the effectiveness of existing programs; consideration of policy alternatives and analysis of their consequences. (3 cr; prereq #; IV-V TTh; BlegH 335) Arnold

**8-871 (283A) RESEARCH SEMINAR: PUBLIC POLICY**

Selected policy area study. (3 cr; prereq Δ; II-III TTh; BlegH 335) Staff

## Scandinavian

### Swedish (Swed)

**1-101/1-102/1-103 (1-2-3) INTENSIVE BEGINNING SWEDISH**

See section on 10-week courses, page 157.

## Scandinavian (Scan)

- 5-612 (162) CONTEMPORARY TRENDS IN SCANDINAVIAN NOVEL**  
Characteristic trends in Scandinavian life and thought in 20th century as expressed in prose fiction. (3 cr; prereq 8 cr in literature or 4...reading knowledge of a Scandinavian language required for majors only; II MTWThF; FoH 104)
- 5-616 (172) STRINDBERG AND DRAMA IN REVOLT AND TRANSITION**  
Strindberg as master of naturalistic drama and as "father of modernity" in European and American theater since his day. (3 cr; prereq 8 cr in literature or 4...reading knowledge of a Scandinavian language required for majors only; IV MTWThF; FoH 205)

## Slavic and East European Languages

### Russian (Russ)

- 1-101/1-102/1-103 (1-2-3) BEGINNING INTENSIVE RUSSIAN**  
See section on 10-week courses, page 157.
- 1-104/1-105/1-106 (4-5-6) INTERMEDIATE INTENSIVE RUSSIAN**  
See section on 10-week courses, page 157.
- 5-021 SOVIET UNION STUDY TOUR**  
See section on Special Programs, page 167. (12 cr; application through dept)

## Social Science (SSci)

- 3-103 (53) THE MEANING OF HUMANITY: COMMUNITY**  
The nature of man as a social being; the variety of groups in which human beings participate. The analysis deals with the factual division, as well as with the exploration of some social ideals. (4 cr; limited to 70 students; IV MTWThF; AndH 370) Riggi
- 3-104 (54) LIBERTY: A CONCEPTUAL AND INSTITUTIONAL ANALYSIS**  
The meaning of liberty, in theory and practice. Individual and collective liberty. Liberty and civilization. Conflict among different values of liberty. (3 cr; limited to 70 students; III MTWThF; AndH 350) Roshwald
- 3-203 (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. (3 cr; limited to 70 students; prereq 9 cr in related social science; III MTWThF; AndH 370) Riggi
- 3-403 MODERN ISRAEL**  
One of a sequence of courses presenting and analyzing modern Israel, its historical origins and political and social institutions. (3 cr; limited to 70 students; IV MTWThF; AndH 350) Roshwald
- 3-503 (93) URBAN CRISIS**  
An examination of the effects of white racism and projections of the image of white supremacy on the socio-economic and political life chances of Black people in America followed by an examination of the nature of and basis for social unrest in Minneapolis. Will combine classroom work and field experience. Resource persons from the Black community will be utilized, visits to agencies providing services to the Black community, and to selected Black families will be made in an effort to gain first-hand experience. (5 cr; limited to 35 students; prereq  $\Delta$ ; VIII-IX MTWThF; BlegH 330) Glover

### **3-981 SOCIETIES OF THE FUTURE**

Application of disciplinary analysis to the problems of specialization and generalization of human understanding, with emphasis upon the future of formal and informal social systems. Aspects of the anticipated impacts of long-range social trends (such as computer controlled education systems, political, economic, social and moral structural changes). Interaction of the social sciences, business, and humanities and arts with basic facets of long-range social development. Long-range alternatives pertaining to human societies remain open to examination. (3 cr; I MTWThF; BlegH 155) Harkins

## **Social Work (SW)**

### **3-001 (90) AMERICAN SOCIAL WELFARE**

Analysis of American social welfare as a basic social institution. (5 cr; prereq Soc 1-003 [3]; VI-VII MTWThF; BlegH 215) Galaway

### **3-002 (124) GOVERNMENT AND SOCIAL WELFARE**

Philosophy, policy development, and administration of federal, state, and local programs in the fields of social insurance, public assistance, welfare services, housing, and like public programs. (3 cr; prereq Pol 1-002 [2] or #; IV MTWThF; BA 632) Newhouse

### **3-005 (91) INTRODUCTION TO SOCIAL WORK PROCESS**

Analysis of the nature of social work helping processes through study of development of social work theory and its implementation in the field of practice. (4 cr; prereq 3-001 [90]; VIII MTWThF, IX W; BlegH 430) Galaway

### **3-010 (95) FIELD EXPERIENCE**

Direct experience under supervision in a social welfare agency. (1-3 cr; prereq sr, 3-005 [91]; hrs ar) Broeker

### **3-970 DIRECTED STUDY**

Independent study under tutorial guidance. (Cr and hrs ar; prereq #; SocSci 980) Newhouse

### **3-990 DIRECTED RESEARCH**

Under guidance, to conduct a research program. (Cr and hrs ar; prereq #; SocSci 823) Sterne

### **5-010 (101) SPECIAL TOPIC (A): The Deprived Child**

A consideration of the problems of children suffering from various forms of deprivation. Review of pertinent literature; suggested societal problem solutions. Designed for teachers and others working with children. (3 cr; limited to 25 students; II MTWThF; Arch 135) Brusseau

### **5-010 (102) SPECIAL TOPIC (B): Group Influence on Personality**

Analysis of the force of small group experiences on individual development of attitudes and ways of meeting life problems. (3 cr; III MTWThF; VH 2) Kamps

### **8-010 (212) FIELD INSTRUCTION IN SOCIAL WORK**

Field practice in social work under supervision. (Cr and hrs ar; prereq admission as grad social work student, 8-100 [245] and #) Yesner and others

### **8-990 (287) SPECIAL STUDIES IN SOCIAL WORK**

Selected projects previously approved by instructor. (Cr and hrs ar; open only to social work students in 2nd grad yr; VII MTWThF; SocSci 860) Sterne

## **Sociology (Soc)**

### **1-001 (1) INTRODUCTION TO SOCIOLOGY**

A survey of the main substantive fields of sociology for nonprospective sociology majors. Illustrative material drawn from current social problems areas. (3 cr; II MTWThF; AndH 370) Odenyo

**1-006 (49) PRINCIPLES OF SOCIOLOGY II**

An integrated 2-quarter course (with Soc 1-005) required of prospective sociology majors usually taken during the freshman year. The course is focused upon the basic concepts and variables used in the analysis of individual-to-group relationships and the organization and structure of social groups. (4 cr; prereq prospective major or major in sociology; IV MTWThF; AndH 310) Cleveland

**3-101 (53) ELEMENTS OF CRIMINOLOGY**

General survey of field of criminology. (3 cr; prereq 1-001 [1] or 1-005 [48], 1-006 [49] or #; I MTWThF; AndH 350) Pepinsky

**3-801 (80) SOCIOLOGICAL METHODS I: DESCRIPTIVE STATISTICS**

See section on 10-week courses, page 157.

**3-802 (81) SOCIOLOGICAL METHODS II: STATISTICAL INFERENCE**

See section on 10-week courses, page 157.

**5-111 (101) SOCIOLOGY OF DEVIANT BEHAVIOR**

Examination of the various sociological conceptions of the nature of deviant behavior, the social processes associated with the careers of deviants, and the relationship of deviancy to the problems of social control. (3 cr; prereq 3-101 [53] or #; III MTWThF; BlegH 10) Pepinsky

**5-201 (120) INTRODUCTION TO SOCIAL PSYCHOLOGY**

Research and theory regarding relation of 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 1-001 [1] or 1-005 [48], 1-006 [49] or #; II MTWThF; AndH 350) Reynolds

**5-301 (124) SOCIAL MOVEMENTS IN A CHANGING SOCIETY**

Examination of factors underlying social change in modern mass society. Consideration of recent research on social movements, reform and revolution, culture contact, impact of rapid technological change. The individual and social structure under conditions of rapid social change. (3 cr; prereq 1-001 [1] or 1-005 [48], 1-006 [49] or #; IV MTWThF; BlegH 135) Odenyo

**5-401 (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 1-001 [1] or 1-005 [48], 1-006 [49] or #; V MTWThF; AndH 330) Cleveland

**5-411 (146) FORMAL ORGANIZATIONS**

Sources, types and consequences of variations in organizational structures and functions. Varying organizational arrangements as they affect and are affected by changes in input and output. Bureaucracy and its impact from a comparative perspective. (3 cr; prereq 1-001 [1] or 1-005 [48], 1-006 [49] and 15 cr in sociology, psychology, political science, or economics; IV MTWThF; BlegH 145) Reynolds

## South Asian Languages

### *Bengali (Ben)*

**1-101/1-102/1-103 (1-2-3) INTENSIVE BEGINNING BENGALI**

See section on 10-week courses, page 157.

## Spanish and Portuguese

### *Portuguese (Port)*

**1-101/1-102/1-103 (1-2-3) BEGINNING PORTUGUESE**

See section on 10-week courses, page 157.

## Spanish (Span)

- 1-101 (1) BEGINNING SPANISH**  
(5 cr; limited to 98 students; I-II MTWThF; Ph 210)
- 1-103 (3) BEGINNING SPANISH**  
(5 cr; limited to 90 students; prereq 1-102 [2] or 2 yrs high school Spanish; I-II MTWThF; Aero 209)
- 1-104 (25) INTERMEDIATE SPANISH**  
(5 cr; limited to 60 students; prereq 1-103 [3] or 3 yrs high school Spanish; III-IV MTWThF; VH 6)
- 1-105 (26) INTERMEDIATE SPANISH**  
(3 cr; limited to 36 students; prereq 1-104 [25] or 4 yrs high school Spanish; III MTWThF; FoH 207)
- 3-011 (54) SPANISH COMPOSITION**  
(3 cr; limited to 36 students; prereq 1-104 [25] or equiv; IV MTWThF; FoH 207)
- 3-014 (55) SPANISH CONVERSATION**  
(3 cr; limited to 30 students; prereq 3-011 [54] or equiv; III MTWThF; FoH 208)
- 3-021 (57) ADVANCED SPANISH COMPOSITION AND CONVERSATION**  
(3 cr; limited to 30 students; prereq 3-014 [55]; IV MTWThF; FoH 208) Braga-Arrieta
- 3-104 (53) 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; limited to 25 students; prereq 1-105 [26] or #; II MTWThF; Aero 313)
- 3-212 (66) SURVEY OF SPANISH LITERATURE: GOLDEN AGE**  
(3 cr; limited to 27 students; prereq 3-104 [53]; IV MTWThF; FoH 103)
- 3-251 (74) SURVEY OF THE LITERATURE OF SPANISH AMERICA**  
(3 cr; limited to 36 students; prereq 3-104 [53]; II MTWThF; FoH 207) Floripe
- 3-501 (60) SPANISH CIVILIZATION AND CULTURE**  
(3 cr; limited to 27 students; prereq 3-014 [53]; III MTWThF; FoH 103) Suris
- 3-721 (90) ORIGINS, HISTORY OF SPANISH AND PORTUGUESE**  
(3 cr; limited to 46 students; prereq 3-011 [54] or Port 3-011 [54]; III MTWThF; FoH 109) Narváez
- 5-392 (178) CONTEMPORARY SPANISH POETRY: FROM 1936**  
(3 cr; prereq 3-211 [65], 3-212 [66], 3-213 [67] or #; IV MTWThF; FoH 109) Floripe
- 5-454 CLARIN**  
(3 cr; prereq Upper Division literature course or #; III MTWThF; FoH 105) Ullman
- 5-584 (149) CONTEMPORARY LATIN-AMERICAN NOVEL**  
(3 cr; prereq 3-253 [76] or #; V MTWThF; FoH 302) Hughes
- 5-711 (107) STRUCTURE OF MODERN SPANISH: PHONOLOGY**  
(3 cr; prereq 3-021 [57] or # or ¶3-021; II MTWThF; FoH 109) Mantini
- 5-712 (108) STRUCTURE OF MODERN SPANISH: MORPHOLOGY**  
(3 cr; prereq 3-021 [57] or # or ¶3-021; III MTWThF; FoH 201) Mantini
- 5-713 (109) STRUCTURE OF MODERN SPANISH: SYNTAX**  
(3 cr; prereq 5-711 [107] or # or ¶5-711; IV MTWThF; FoH 201) Narváez

**5-970 (189) INDEPENDENT READINGS FOR UPPER DIVISION STUDENTS**

(1-3 cr; prereq # and consent of dept chm; hrs ar) Floripe, Hughes, Mantini, Narváez, Suris

**8-970 (260) DIRECTED READINGS IN ROMANCE LANGUAGES**

(1-3 cr; prereq Δ; hrs ar) Staff

**Note**—The General Extension Division will offer Spanish for Graduate Students (Span 0-221). Please address all inquiries to the General Extension Division.

## Speech, Communication, and Theatre Arts

(For special department activities see: *Acting Workshop; High School Forensics Workshop; High School Theatre Workshop; and University Theatre*)

### Speech (Spch)

**1-101 (5) FUNDAMENTALS OF SPEECH**

Development of basic understanding of speech processes. Examines nature of speech and speech skills; provides opportunities for individual speaking and evaluation. (5 cr, §1-106 [6]; limited to 22 students per section) Purnell and staff

Sec 1, I-II MTWThF, FolH 304

Sec 2, II-III MTWThF, ForH 170

Sec 3, III-IV MTWThF, FolH 305

**1-106 (6) FUNDAMENTALS OF SPEECH**

Emphasis on investigation and persuasion ranging from informal committee session to formal meeting requiring parliamentary rules. (3 cr, §1-101 [5]; limited to 22 students; prereq 1-102 [2]; I MTWThF; FolH 306) Purnell and staff

**3-190 (99) ATTAINING UNDERSTANDING OF SPEECH-COMMUNICATION THROUGH TEACHING OTHERS**

Directed study through teaching others. Students will work with an instructor in planning and teaching an undergraduate course. (1-3 cr; may be repeated once) Staff

**3-201 (65) INTRODUCTION TO BROADCASTING PRODUCTION**

Fundamentals of practice and theory. Emphasis on projects and exercises in performance and scripting; introduction to studio equipment and procedures. (3 cr; each section limited to 16 students; prereq 1-101 [5])

Sec 1, IV MTWThF, MurH 302, Aero 309, Goldstein

Sec 2, V MTWThF, MurH 302, Aero 309, Reeder

**3-203 (68) RADIO PRODUCTION**

An introduction to radio production. Equipment and staff organization; program design and presentation. Directed experience in organization, writing, production, direction, and performance of radio news, music, dramatic, and documentary programs. (3 cr; limited to 12 students; prereq 3-201 [65]; I MTWThF; MurH 302) Boyd

**3-401 (61) THE PROCESS OF INTERPERSONAL COMMUNICATION**

Basic orientation on the place of speech and language in human behavior; discussion and nature and function of the communication process. (3 cr; limited to 50 students; prereq 1-101 [5] or 1-106 [6] or #, Psy 1-002 [2]; I MTWThF; FolH 202) Smith

**3-601 (50) PUBLIC SPEAKING**

The principles of preparing and presenting public speeches; directed practice in public speaking. Consideration of the functions of public speaking in contemporary life. (3 cr, §1-101 [5]; limited to 22 students; prereq upper div standing; I MTWThF; FolH 307)

- 3-605 (51) ADVANCED PUBLIC SPEAKING**  
Preparation and delivery of speeches on current public issues. (3 cr; limited to 22 students; prereq 1-101 [5] or 1-106 [6]; IV MTWThF; FolH 307) Ar
- 3-641 (52) DISCUSSION AND CONFERENCE METHODS**  
Cooperative thinking in task-oriented groups. Planning, preparing for, participating in and leading private and public meetings. (3 cr; limited to 22 students; prereq 1-101 [5] or 1-106 [6] or #; II MTWThF; FolH 305) Jensen
- 5-101 (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 1-101 [5] or 1-106 [6], Psy 1-002 [2]; VI MTWThF; FolH 307) Bormann
- 5-211 (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 3-201 [65]; II MTWThF; FolH 307) Browne
- 5-401 (161) ADVANCED PROCESS OF INTERPERSONAL COMMUNICATION**  
(3 cr, §3-401 [61]; limited to 20 students; prereq grad; I MTWThF; FolH 202) Smith
- 5-411 (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; limited to 25 students; prereq 3-641 [52] or #; II MTWThF; FolH 306) Smith
- 5-615 (125) INTRODUCTION TO RHETORICAL CRITICISM**  
Introduction to traditional and contemporary rhetorical theory and its application to contemporary public address. (3 cr; prereq 1-101 [5] or 1-106 [6]...3-615 [55] recommended; III MTWThF; FolH 307) Jensen
- 5-970 (181, 182, 183) READINGS IN SPEECH**  
Directed reading and preparation of reports on selected subjects. (Cr and hrs ar; prereq 9 cr in upper div speech and #) Staff
- 8-203 (243) SEMINAR: RADIO AND TELEVISION RESEARCH**  
Research literature and studies. Execution of individual research projects. (1-3 cr; prereq 8-201 [241] or #; III-IV MW; FolH 305A) Browne
- 8-411 (235) SEMINAR: SMALL GROUP COMMUNICATION**  
(3 cr; prereq 5-411 [106] or #; VII MTWThF; FolH 307) Bormann
- 8-603 (203) SEMINAR: ARGUMENTATION**  
Theory of argumentation and debate. Use of argumentation in formal debate and in contemporary public address. (3 cr; prereq 1-101 [5], Psy 1-002 [2], 10 cr in social science; VI-VII MTh; FolH 305A; first meeting on Tuesday) Brock
- 8-990 (291) RESEARCH**  
(Cr and hrs ar; open to grad students engaged in research on special problems) Staff
- SeEd 5-177 (EdCI 177) DIRECTING SECONDARY SCHOOL SPEECH ACTIVITIES**  
Philosophy, organization and administration of extemporaneous speaking, oratory, interpretive reading, and debate. (3 cr; prereq Spch 1-101 [5] or 1-102 [2] and 1-106 [6] and #; III MTWThF; FolH 306) Brock

## *Theatre (Th)*

- 1-101 (11) INTRODUCTION TO THEATRE ARTS**  
History and theory of plays and production as well as various arts and crafts of theatre. (3 cr; limited to 500 students; I-II TWTh; ScH 108) Ballet

- 1-311 (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 15 students; prereq soph, 1-501 [12] or ¶1-501; I-II TF; ShH 115) Corrigan
- 1-321 (21) BEGINNING ACTING: CREATIVE APPROACH**  
Creation and presentation of original scenes and skits. Ability to respond to the imaginative situation with individuality and effectiveness stressed. (3 cr; limited to 18 students; prereq fr with Δ, soph, 1-501 [12] or ¶1-501; III-IV MTWThF; NH 304) Kanter
- 1-322 (22) BEGINNING ACTING: CREATING A ROLE**  
Application of creative techniques to the analysis, understanding, and theatrically effective communication of roles from dramatic literature. (3 cr; limited to 18 students; prereq 1-501 [12], 1-321 [21]; I-II MTWThF; NH 304) Kanter
- 1-326 (23) BEGINNING ACTING: TECHNIQUE**  
Fundamentals of body movement, rhythms, and acting technique. Individual and group performances. (3 cr; limited to 20 students; prereq 1-321 [21]; V MTWThF; WeH 302) Livingston
- 1-501 (12) LABORATORY SECTIONS: INTRODUCTION TO THE THEATRE**  
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 1-101 [11] or ¶1-101; VII first day, ScH 108; hrs and rm ar thereafter) Dunn
- 1-502 (24) STAGE MAKE-UP**  
Theory and practice in the art of stage make-up. (1 cr; limited to 15 students; prereq 1-501 [12] or ¶1-501; VI-VII TTh; ScH 23) Jasorka
- 1-503 (34) STAGECRAFT: CONSTRUCTION AND PAINTING**  
Theory and practice in construction, painting, and shifting of stage scenery. (3 cr; limited to 22 students; prereq 1-501 [12]; III MTWThF; WeH 306) Dunn
- 3-321 (61) ADVANCED ACTING**  
Presentation of scenes from great plays. (3 cr; limited to 18 students; prereq 1-322 [22] or 1-326 [23]; I-II MTWThF; ScH 19) Frost
- 3-512 (90) COSTUMING**  
Theory of design and construction of costumes for theatrical production. (3 cr; limited to 10 students; prereq 1-503 [34]; V-VI MWF; NH 315) Pieper
- 3-514 (91) SCENE DESIGN**  
(3 cr; limited to 15 students; prereq 1-503 [34]; IV MTWThF; WeH 306) Josal
- 3-516 (92) STAGE LIGHTING**  
Theory and practice of lighting for theatrical production. (3 cr; limited to 15 students; prereq 1-503 [34]; V MTWThF; ScH 108) Ar
- 3-708 (75) PLAY PRODUCTION IN THE SECONDARY SCHOOL**  
Fundamentals including the analysis and production of selected scenes. (3 cr; limited to 12 students; prereq 3-707 [74] or 1-503 [34] and 3-514 [91]; III MTWThF; ShAn 128) Adey
- 3-801 (81) ORAL INTERPRETATION OF FICTION**  
Study of selected short stories. Solo and group readings. (3 cr; limited to 20 students; prereq 1-313 [20] or 1-321 [21] or Spch 1-101 [5] or 1-106 [6], jr; II MTWThF; FolH 103) Fredricks
- 5-100 (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. (2-6 cr; limited to 15 students; prereq permission of theatre practicum committee, #) Josal and staff

- 5-131 (131) CREATIVE DRAMA**  
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 80 students; prereq 1-501 [12] or ¶1-501 or elementary education major or #...1-321 [21] recommended; IV MTWThF; ShH 115) Graham
- 5-171 (171) HISTORY OF THEATRE**  
Plays, arts and crafts of the theatre from their beginnings to present. Reports and projects. 5-171: Ancient and Medieval. (3 cr; prereq sr, or grad theatre major or #; I MTWThF; ShH 102) Nolte
- 5-186 (180) AMERICAN THEATRE**  
The theatre as an aspect of American culture from 1752 to the present. (3 cr; prereq sr or grad theatre major or #; II MTWThF; ShH 102) Nolte
- 5-311 (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. Required attendance at taped listening sessions. (2 cr; limited to 15 students; prereq grad and theatre major; I-II MTTh; ShH 115) Corrigan
- 5-321 (121) PROBLEMS IN ACTING**  
Acting problems stemming from differences in genres and styles of dramatic production from the Greeks to the present. Emphasis on intensive scene and character analysis and on skill in communicating character and concept to an audience in individual and group performance. (3 cr; limited to 18 students; prereq 3-321 [61] or #; IV-V MTWThF; ScH 19) Frost
- 5-334 (127) PRODUCTION FOR THE LYRIC STAGE**  
Problems in acting, staging, and administration for the lyric stage. (3 cr; limited to 18 students; prereq Mus 5-470 [147] or #; II MTWThF; WeH 302) Balk
- 5-516 (192) ADVANCED PROBLEMS IN STAGE LIGHTING**  
Theory of stage lighting. Special projects and reports. (3 cr; prereq 3-516 [92], 5-711 [111], or #; VI MTWThF; WeH 306) Josal
- 5-712 (112) STAGE DIRECTION**  
Rehearsal problems and direction of two one-act plays. (3 cr; limited to 12 students; prereq 1-321 [21], 6 cr from 3-512 [90], 3-514 [91], 3-516 [92]; IV MTWThF; ShAn 128) Adey
- 5-813 (105) THEORY OF READING AND ACTING**  
Exploration of aesthetic and literary theories as they relate to oral interpretation and acting. (3 cr; prereq 3-802 [82] or 3-803 [83] or grad; II MTWThF; FoIH 103) Fredricks
- 5-831 (108) ORAL INTERPRETATION OF CLASSICAL LATIN LITERATURE**  
Phonetics prosody and oral performance of selected texts in classical Latin. (4 cr, §Lat 5-038; prereq 3-801 [81] or 3-321 [61] or Mus 1-104 [12E] or 3-104 [62E] or equiv, and 2 yrs Latin or equiv; III MTWThF; FoIH 308) Sonkowsky
- 5-970 (181, 182, 183) DIRECTED READINGS**  
Directed readings and preparation of reports on selected subjects. (Cr and hrs ar; prereq 9 cr in theatre and #) Staff
- 8-990 (281, 282, 283) RESEARCH**  
(Cr ar; prereq #) Staff

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

See *Communication Disorders* on page 114.

## **Statistics (Stat)**

See *Applied Statistics* on page 110.

See *Theoretical Statistics* below.

## **Theoretical Statistics (Stat)**

### **3-091 (90) INTRODUCTION TO PROBABILITY AND STATISTICS**

Elements of probability and probability distributions, sampling and elements of inference. (4 cr; prereq differential and integral calculus; III MTWThF plus 2 hrs ar; VH 203) Ar

### **5-121 (121) THEORY OF STATISTICS**

Random variables and probability distributions, moments, central limit theorem, sampling, estimation. (3 cr; for nonmajors; prereq Math 1-443 [43] or equiv; II MTWThF plus 2 hrs ar; VH 203) Ar

# Institute of Technology

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

## COLLEGE OF ENGINEERING

### Aerospace Engineering and Mechanics (AEM)

#### 1-015 (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; limited to 40 students; prereq Math 1-240 [31] or ¶Math 1-240 and Phys 1-210 [21]; I-II MWF, II TTh; Aero 21)

#### 3-036 (MM 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 5-010 [100] or §Phys 5-020 [100A]; limited to 40 students; prereq Math 1-250 [32] or ¶Math 1-250 and Phys 1-210 [21]; III-IV MWF, III TTh; Aero 21)

#### 5-840, 5-841 INDUSTRIAL ASSIGNMENT

See section on 10-week courses, page 157.

### Civil Engineering and Mineral Engineering (CE)

#### 8-510 (264) SANITARY ENGINEERING UNIT OPERATIONS

Lectures, laboratory and pilot plant studies of unit operations in water and waste water treatment, screening, gravity separation, coagulation-flocculation, aeration filtration, drying, incineration, and digestion. (3-6 cr; prereq #) Maier

### Electrical Engineering (EE)

#### 1-500 (30) CIRCUIT ANALYSIS

Steady-state and transient response of linear passive circuits under dc, step, and sinusoidal excitation. (3 cr; each section limited to 20 students; prereq Phys 1-280 [8] or 1-220 [22T], Math 1-240 [31] or ¶Math 1-240; lect I-II MWF; Arch 40) Ar

Rec 1, I-II T, EE 115

Rec 2, I-II Th, EE 115

#### 1-700 (30A) ELECTRICAL ENGINEERING LABORATORY

Laboratory to accompany EE 1-500. (1 cr; each section limited to 18 students; prereq ¶1-500)

Lab 1, III-IV MW, EE 121

Lab 2, VI-VII MW, EE 121

#### 3-000 (46) CIRCUITS

Analysis of linear, passive circuits; natural and forced response. Steady-state ac analysis; resonance. (4 cr, §1-500 [30], 1-700 [30A]; not for EE majors; each section limited to 18 students; prereq Phys 1-230 [23H], Math 1-250 [32] or ¶Math 1-250; lect I-II MWF; Arch 50) Ar

Lab 1, VI-VII MW, EE 118

Lab 2, I-II TTh, EE 118

Lab 3, I-II TTh, EE 121

- 3-051 (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; limited to 60 students; prereq 3-050 [64]; I-II MTWThF; Arch 55) Ar
- 3-401 (85) JUNIOR ELECTRICAL ENGINEERING LABORATORY**  
 Experimental study of electronic circuits. (2 cr; each section limited to 16 students; prereq 3-400 [84], §3-051 [65]) Ar  
 Lab 1, V-VIII MW, EE 216  
 Lab 2, V-VIII MW, EE 205  
 Lab 3, V-VIII TTh, EE 205
- 5-100 (76) ELECTROMAGNETIC FIELDS III**  
 Applications of Maxwell's equations. Transmission lines, wave propagation, antennas, and radiation. (3 cr; limited to 25 students; prereq 3-101 [75]; III-IV MWF; Arch 55) Ar

## Mechanical Engineering

### Engineering Graphics (EG)

- 0-001 (1) THE SLIDE RULE**  
 Computation practice and theory. Design of special scales. (1 cr [no cr for IT students]; limited to 25 students; prereq higher algebra and trigonometry or §; VI TTh; Arch 10) Springer
- 1-025 (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 1-210 [21A] or §; lect V MTWThF, VI W, Arch 10; rec VI MF, Arch 10; lab hrs ar, ME 308) Springer

### Industrial Engineering (IE)

- 5-520 (175) ELEMENTS OF RELIABILITY**  
 Principles of experimentation, systems design, measurement, simulation, and field data utilization necessary for a total approach to producing a reliable product. (3 cr; prereq Stat 3-091 [90] or ME 3-720 [99]; II MTWThF, 1 hr ar; Aero 215) White
- 5-530 (177) INDUSTRIAL SAMPLING TECHNIQUES**  
 Selection and operation of attributes sampling plans; operating characteristic curves; sampling techniques for continuous production; variables sampling plans; administrative and economic comparisons. (3 cr; prereq §5-520 [175] or §; lect I MTWThF, 1 hr ar; Aero 215) White

### Mechanical Engineering (ME)

- 3-240 (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; limited to 32 students; prereq 3-201 [23] or §3-201, AEM 3-016 [37]; lect III MTWTh, Aero 317; lab IV-V TTh, ME 302) Kleinhenz
- 3-301 (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 1-230 [23T], Math 1-250 [32]; IV MTWThF, III TWTh; ME 302) Murphy

- 3-700 (33) MEASUREMENTS LABORATORY I**  
 Fundamental principles of measurement. Standards, accuracy, calibration. Treatment of experimental data. (2 cr; limited to 25 students; prereq Math 1-250 [32]; lect VI TTh, ME 321; lab VII-IX TTh, ME 352)
- 3-702 (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; limited to 24 students; prereq 3-701 [34]; lect VI TTh, ME 302; lab VII-IX TTh, ME 370)
- 3-740, 3-741, 3-742, 3-743 (90, 91, 92, 93) INDUSTRIAL ASSIGNMENT, PART I**  
 See section on 10-week courses, page 157.
- 5-170 (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; limited to 18 students; prereq MetE 3-401 [56]; lect VI MTWThF and 1 hr ar, Aero 21; lab VII-IX MW, ME 70) Holtby
- 5-252 (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; limited to 12 students; prereq 4th yr engr or #; IV-V MWF; ME 325) Frohrib

## SCHOOL OF ARCHITECTURE AND LANDSCAPE ARCHITECTURE

### Architecture (Arch)

- 1-021 (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 the ancient periods until the present time. (4 cr; 1-021 is prereq to all architectural history; II MTWThF; Arch 130) Winterowd
- 3-055 (55) AMERICAN ARCHITECTURE AND THE 19TH CENTURY**  
 The history of pre-Columbian and colonial architecture in America and European architecture through the early 19th century. (3 cr; prereq 1-021 [21] or #; IV MTWThF; Arch 130) Winterowd
- 3-081/3-082/3-083† (81-82-83) ARCHITECTURAL DESIGN I**  
 See section on 10-week courses, page 157.
- 3-091/3-092/3-093† (91-92-93) ARCHITECTURAL DESIGN II**  
 See section on 10-week courses, page 157.
- 5-111/5-112/5-113† (111-112-113) ARCHITECTURAL DESIGN III**  
 See section on 10-week courses, page 157.
- 5-121/5-122† (121-122) ARCHITECTURAL DESIGN IV**  
 See section on 10-week courses, page 157.
- 5-130 (130) SEMINAR: THE DEVELOPMENT OF URBAN FORM**  
 The physical development of urban places—from early Middle East urban revolution to the Industrial Revolution—as a manifestation of the changes underlying social, political, and economic forces as well as to planning theories, if any, to which they gave rise. (3 cr; hrs and rm ar) Iskander

# SCHOOL OF CHEMISTRY

## Chemical Engineering and Materials Science

### Metallurgy-Materials Science (MetE)

#### 3-401 (56) PHYSICAL METALLURGY

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) Sivertsen

#### 5-481/5-482/5-483\*‡ (141-142-143) SPECIAL PROBLEMS IN METALLURGICAL ENGINEERING

Laboratory investigation of problems involved in metallurgical unit processes. (Cr ar; prereq sr) Staff

## Chemistry (Chem)

#### 1-004 (GeCh 4) GENERAL PRINCIPLES OF CHEMISTRY

General laws of chemistry, principles of structure, and chemical behavior of matter. (5 cr, 1-004 [4], 1-005† [5]; for premedics, predentals, etc.; not open to College of Engineering student [see Chem 1-014]; prereq predicted math GPA of 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 375; rec V MWF, lab VI-VIII MWF, C ar) Staff

#### 1-006 (GeCh 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, preparation and spectrochemical studies of some transition metal complexes in solution, and analyses of simple solids and alloys. (4 cr; prereq 1-005 [5], 1-015 [15], or 1-032 [32]; lect II MTWThF, SciCB 375; lab V-VIII MWF, C ar) Staff

#### 1-014 (GeCh 14) GENERAL PRINCIPLES OF CHEMISTRY

Basic principles and concepts of chemistry with a similar but more rigorous treatment than that of Chem 1-004. (4 cr, 1-014 [14], 1-015† [15]; limited to College of Engineering students; prereq Phys 1-210 [21], 1-220 [22T], or ‡; lect I MTWThF, SciCB 125; rec V MWF, lab VI-VIII MWF, C ar) Staff

#### 1-031 (GeCh 31) GENERAL PRINCIPLES OF CHEMISTRY

Basic principles and concepts of chemistry with a similar but more rigorous treatment than that of Chem 1-004. (5 cr, 1-031 [31], 1-032 [32], 1-033† [33]; for chemistry and chemical engineering majors; lect I MTWThF, SciCB 125; rec V MWF, lab V-VIII MWF, C ar) Staff

#### 3-099 (OrCh 96) SENIOR THESIS

A written final senior thesis report is required. (Cr ar; prereq ‡, 4th yr) Staff

#### 3-100 (AnCh 57A) QUANTITATIVE ANALYSIS

(Lecture) A survey of modern quantitative methods of analysis. (3 cr, 3-100 [57A], 3-101† [57B]; for nonchemistry majors; prereq 1-005 [5]; V-VI MWF; C 325) Staff

#### 3-101 (AnCh 57B) QUANTITATIVE ANALYSIS

(Laboratory) A survey of modern quantitative methods of analysis including elementary physicochemical procedures. (2 cr; for nonchemistry majors; prereq 3-101 [57B] or †3-101; I-III MTWThF; C 310) Staff

**3-102 (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 1-014 [14], 1-015 [15]; lect, rec, quiz V-VI MWF, C 325; lab I-III any 2 days of wk, C 310) Staff

**3-301 (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 1-005 [5] or 1-032 [32] or equiv; lect I MTWThF, C 325; rec II TTh, C 325; lab II-IV MWF, C 390; lab conf III TTh, C 325) Ar

**3-304 (OrCh 65) ELEMENTARY ORGANIC CHEMISTRY LABORATORY**

Reactions of typical functional groups and introduction to methods of organic qualitative analysis. (4 cr; prereq 3-303 [63]; lab VI-IX MTWTh, C 390; lab conf II MTW, C 315) Ar

**5-302 (OrCh 139) ADVANCED ORGANIC CHEMISTRY LABORATORY**

Selected laboratory synthetic problems, which may include original work. Includes considerable individual instruction. (2-5 cr; prereq 3-304 [65]; 12-30 hrs lab work ar) Ar

**5-365 (OrCh 165) ORGANIC QUALITATIVE ANALYSIS**

Reactions of typical functional groups and introduction to methods of organic qualitative analysis. (4 cr, §3-364; prereq 3-303 [63]; lab VI-IX MTWTh, C 390; lab conf II MTW, C 315) Ar

**5-501 (PCh 101) PHYSICAL CHEMISTRY**

Basic thermodynamics. (4 cr; prereq 1 yr college chemistry, Phys 1-290 [9] or ¶Phys 1-290, or Phys 1-060 [6] with §, Math 1-240 [31] or Math 1-444 [44]; I-II MTThF; C 131) Staff

**5-510 (PCh 105) ANALYSIS OF DATA**

Statistical and numerical treatment of physicochemical measurements. (1 cr; prereq 5-501 [101], 5-502 [102], or 5-521 [108]; lect III TTh; C 111) Staff

**5-511, 5-512 (PCh 106A-B) LABORATORY**

Measurement and interpretation of physicochemical properties. (1 or 2 cr; prereq 5-510 [105]; lab VI-VIII MTWTh; C 190) Staff

**5-520 (PCh 107) ELEMENTARY PHYSICAL CHEMISTRY**

Introduction to chemical thermodynamics. (3 cr; not open to chemistry and chemical engineering majors; prereq 1 yr college chemistry, Phys 1-290 [9] or ¶Phys 1-290 or Phys 1-060 [6] or §, Math 1-240 [31] or Math 1-444 [44], or Math 1-142 [40A] with §; lect I-II MWF; C 111) Staff

**8-991 (AnCh 201) SPECIAL TOPICS**

Analytical topics not covered in regular courses are selected after discussion with instructor. (Cr and hrs ar; prereq  $\Delta$ ) Staff

**8-999 (AnCh 301, OrCh 301) RESEARCH IN CHEMISTRY**

(Cr and hrs ar; prereq  $\Delta$ ) Staff

## Computer, Information, and Control Sciences (CICS)

**1-100 (Math 14A) ALGORITHMS AND LANGUAGES I**

Construction of algorithms to solve problems. Methods of solution stated in the appropriate language. Languages of the computer, including FORTRAN. Use of computers and computer languages. Accompanying laboratory problems on the computer. (2 cr, §1-104 [Math 30], §3-101 [Math 65]; limited to 65 students; prereq Math 1-210 [21A] or ¶Math 1-210; V MTThF; Ex 193) Hanson

**1-101 (Math 14B) ALGORITHMS AND LANGUAGES II**

Continuation of CICS 1-100. (2 cr; limited to 65 students; prereq Math 1-210 [21A] or ¶Math 1-210 and CICS 1-100 [Math 14A], or ¶CICS 1-100; II MTThF; Ex 193) Hanson

**3-101 (Math 65) 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. Three lectures and nonscheduled laboratory. (4 cr, §5-101 [Math 164]; limited to 100 students; prereq Math 1-230 [22H]; IV MTWThF; Arch 5) Ibarra

**5-000 FUNDAMENTALS OF COMPUTERS AND PROGRAMMING**

See section on Special Programs, page 167.

**5-301 (Math 184) NUMERICAL ANALYSIS**

Finite differences, interpolation, summation of series, numerical integration, Euler-MacLaurin formula and asymptotic expansions. Numerical solutions of algebraic and transcendental equations. Newton-Raphson method. (3 cr; limited to 65 students; prereq Math 1-250 [32] or §; III MTWThF; Ex 193) Ar

## SCHOOL OF EARTH SCIENCES

### Geology and Geophysics (Geo)

**1-001 (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 78 students; prereq high school physics and chemistry recommended; lect II MTWThF; P 110) Bartels

Lab 1, III-IV MWF, ForH 180

Lab 2, VI-VII MWF, ForH 180

Lab 3, III-IV MWF, ForH 185

**5-110 (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; limited to students majoring in geology, geophysics, and geological engineering; prereq 3-201 [63], 3-100 [65] and §) Bright

**5-099 (103) GEOLOGIC PROBLEMS**

(Cr and hrs ar; prereq §)

**5-051 (109C) PHYSICAL GEOLOGY FOR TEACHERS**

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 1-001 [1], §Geo 1-111 [11]; only for students holding degrees in education; limited to 12 students; prereq 1 term college chemistry or physics; lect II MTWThF; seminar V TTh; P 110) Rapp, Bartels

Lab 1, III-IV MWF, ForH 180

Lab 2, VI-VII MWF, ForH 180

Lab 3, III-IV MWF, ForH 185

## SCHOOL OF MATHEMATICS (Math)

**0-009 (2) PREPARATORY MATHEMATICS**

Supplements 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; limited to 40 students; I-II MTWThF; VH 6)

- 1-005 (5A) 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]; limited to 75 students; prereq 1 yr elementary algebra and 1 yr high school geometry or equiv, and enrollment as elementary education student, or  $\Delta$ ; III MTWThF; Arch 35)
- 1-008 (T) 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 1-443 [43], even to students with high school trigonometry]; limited to 50 students; prereq plane geometry and high school algebra...[1-111 [10] allowed; II MTWThF; Arch 35)
- 1-111 (10) 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 1-441 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, §1-141 [10A], §1-210 [21A], §1-441 [15]; limited to 43 students; prereq 0-009 [Z] or high school higher algebra and satisfactory mathematics placement score; III-IV MTWThF; GH 202)
- 1-141 (10A) ALGEBRA, PROBABILITY, AND PRE-CALCULUS**  
(First course of a 2-quarter sequence for students in pre-business administration curriculum and others requiring college algebra and a minimal amount of calculus; students who plan to take several quarters of mathematics should register for Math 1-441, 1-442, 1-443, 1-444 sequence) Inequalities, elementary set theory, functions and analytic geometry, general systems of linear equations, linear inequalities and programming, combinations, permutations, probability, sequences, limits, and continuity. (5 cr, §1-111 [10], §1-210 [21A], §1-441 [15]; limited to 60 students; prereq high school higher algebra, 1-008 [T] or high school trigonometry, and satisfactory mathematics placement score; III-IV MTWThF; VH 1)
- 1-142 (40A) INTRODUCTION TO CALCULUS OF ONE AND SEVERAL VARIABLES**  
(A second course of a 2-quarter sequence for students in pre-business administration curriculum and for other students requiring college algebra and a minimal amount of calculus; students who plan to take several quarters of mathematics should register for Math 1-441, 1-442, 1-443, 1-444 sequence) Limits, derivatives, and integrals, some calculus of several variables and differential equations, rates of change, maxima and minima, several applications to a variety of disciplines. (5 cr, §1-220 [22A], §1-442 [42]; prereq 1-141 [10A] and 1-008 [T] or high school trigonometry...may enter 1-443 [43] from 1-142 [40A] if grade in 1-142 is A or B)  
Sec 1, limited to 60 students, I-II MTWThF, Aero 225, Ar  
Sec 2, limited to 60 students, III-IV MTWThF, Aero 225, Ar
- 1-210 (21A) ANALYSIS I**  
Review of high school algebra; analytic geometry, calculus of functions of one variable, applications. (5 cr, §1-111 [10], §1-141 [10A], §1-441 [15]; primarily for IT students; limited to 55 students; prereq 0-012 [12] or 4 yrs high school mathematics including trigonometry; I-II MTWThF; VH 20)
- 1-220 (22A) ANALYSIS II**  
See Math 1-210 for course description. (5 cr, §1-142 [40A], §1-442 [42]; limited to 60 students; prereq 1-210 [21A]; I-II MTWThF; VH 1) Ar
- 1-230 (23A) ANALYSIS III**  
See Math 1-210 for course description. (5 cr, §1-443 [43]; limited to 40 students; prereq 1-220 [22A]; IV-V MTWThF; VH 2) Ar

- 1-240 (31) CALCULUS IV**  
Vector algebra, solid analytic geometry, elementary linear algebra, multi-dimensional differential and integral calculus, infinite series, elementary differential equations. (5 cr, §1-444 [44]; limited to 55 students; prereq 1-230 [22H]; III-IV MTWThF; VH 20) Ar
- 1-250 (32) CALCULUS V**  
See Math 1-240 for course description. (5 cr; limited to 40 students; prereq 1-240 [31]; III-IV MTWThF; Aero 313) Ar
- 1-260 (33) CALCULUS VI**  
Vector calculus; continuation of multidimensional calculus and of infinite series. (5 cr; limited to 36 students; prereq 1-250 [32]; I-II MTWThF; VH 211) Ar
- 1-441 (15) COLLEGE ALGEBRA**  
A standard 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, §1-111 [10], §1-141 [10A], §1-210 [21A]; limited to 30 students; prereq high school higher algebra, 1-008 [T] or high school trigonometry, and satisfactory mathematics placement score; III-IV MTWThF; VH 209) Ar
- 1-442 (42) ANALYTIC GEOMETRY AND CALCULUS I**  
(Math 1-442, 1-443, 1-444 comprise a full-year course) 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 integral. Infinite series. Taylor's theorem. Multiple integrals in two and three dimensions. (5 cr, §1-142 [40A], §1-220 [22A]; prereq 1-441 [15] and 1-008 [T] or high school trigonometry; may enter 1-443 from 1-142 if grade in 1-142 is A or B)  
Sec 1, limited to 30 students, II-III MTWThF, VH 206, Ar  
Sec 2, limited to 32 students, IV-V MTWThF, VH 203, Ar
- 1-443 (43) ANALYTIC GEOMETRY AND CALCULUS II**  
See Math 1-442 for course description. (5 cr; limited to 148 students; Math 1-443 and 1-444 are available for Upper Division cr to all except mathematics and physics majors; prereq 1-442 [42] or 1-142 [40A] with grade of B; III-IV MTWThF; VH 16)
- 1-444 (44) ANALYTIC GEOMETRY AND CALCULUS III**  
See Math 1-442 for course description. (5 cr; limited to 40 students; Math 1-443 and 1-444 are available for Upper Division cr to all except mathematics and physics majors; prereq 1-443 [43]; III-IV MTWThF; Aero 215)
- 3-061 (60A) OPERATIONAL METHODS FOR LINEAR SYSTEMS**  
Review of Fourier series and their applications to linear ordinary differential equations. The Fourier transform, mathematical properties, amplitude and phase spectra, energy. The Laplace transform, mathematical properties and elementary inversion techniques, applications to systems of ordinary differential equations, transfer function of a filter, time and frequency domain relations. (3 cr; primarily for EE students; limited to 30 students; prereq 1-250 [32]; IV MTWThF; VH 207)
- 3-161 (60) SYNTHETIC METRIC GEOMETRY**  
Euclidean geometry including ruler and compass constructions and theorems on triangle and circle not studied in high school course in plane geometry. (3 cr; limited to 30 students; prereq 1-442 [42]; III MTWThF; VH 207)

**3-675 (75) INTRODUCTORY MATHEMATICS**

Prepares the sophomore mathematics major for the theoretical courses he will encounter during his junior and senior years. (3 cr; limited to 40 students; prereq 1-443 [43] or 1-230 [23A]; V MTWThF; VH 206)

**5-151 (112) 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; limited to 40 students; prereq 1-240 [31] or 1-444 [44]; III MTWThF; Aero 211)

**5-242 (142) MATRIX THEORY WITH APPLICATIONS**

Systems of linear equations, determinants, finite dimensional vector spaces, matrices, characteristic values and their numerical estimation, reduction to canonical forms, quadratic and bilinear forms. Applications. (3 cr, §§5-211 [149], §5-283 [131B] and 5-284 [131C]; limited to 60 students; prereq 1-240 [31] and 1-444 [44]; V MTWThF; VH 113)

**5-341 (181A) INTRODUCTION TO TOPOLOGY**

Metric spaces; completeness, compactness, uniform continuity. Abstract topologies: comparison of topologies, separation axioms, homeomorphisms. Product and function spaces. Connectedness. Local connectedness, Hahn-Mazurkiewicz theorem, characterization of arc, Jordan curve theorem. Introduction to algebraic topology. (3 cr; limited to 50 students; prereq 1-250 [32] or 3-445 [55]; IV MTWThF; Arch 135)

**5-366 (117A) GEOMETRY**

Selected chapters of geometry, such as convex bodies, projective geometry, geometry and imagination, elementary algebraic geometry, geometry of transformation groups, axiomatic geometry, geometrical constructions. (3 cr; limited to 75 students; prereq 1-240 [31] or 1-444 [44]; I MTWThF; VH 16)

**5-506 (106) DIFFERENTIAL EQUATIONS**

Problem course; methods for solving ordinary differential equations of various types with necessary theory for developing these methods. (3 cr, §1-250 [32]; limited to 40 students; prereq 3-445 [55]; IV MTWThF; VH 206)

**5-512 (148) 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. Mostly a technique course, intended mainly for students whose interests are not theoretical but who wish to learn the relevant mathematical facts and methods. (3 cr, §5-521 [150]; limited to 40 students; prereq 1-250 [32] or 5-506 [106]; III MTWThF; VH 213) Ar

**5-514 (135) INTEGRAL EQUATIONS**

Introduction to integral equations with emphasis on applications and techniques of solution including Fredholm formula, Neumann series, Laplace transforms, successive approximations, and numerical methods. Relation of integral equations to systems of linear algebraic equations and to differential equations. (3 cr; limited to 50 students; prereq 1-250 [32] or 5-506 [106]; III MTWThF; VH 113)

**5-567 (167) FOURIER SERIES AND BOUNDARY VALUE PROBLEMS**

Partial differential equations of theoretical physics, Fourier series, proof of convergence, orthogonal systems. Sturm-Liouville systems, solution of boundary value problems by separations of variables, applications. (3 cr, §5-571 [173]; limited to 60 students; prereq 1-250 [32] or 5-506 [106]; V MTWThF; VH 1)

**5-568 (168A) ELEMENTARY THEORY OF COMPLEX VARIABLES**

Derivative and integral of a function of a complex variable. Cauchy's integral theorem and formula, residues. Application to evaluation of integrals, conformal mapping. (3 cr; limited to 50 students; prereq 5-602 [107B] or 5-211 [149], 5-403 [147], 5-512 [148]; IV MTWThF; E 215)

**5-601 (107A) ADVANCED CALCULUS**

Differentiation of functions of several variables; vector algebra; curves in three dimensions; directional derivative and gradient; inverse transformation and implicit function theorems; change of variables in multiple integrals. (3 cr; limited to 75 students; prereq 1-250 [32] or 3-445 [55]; II MTWThF; VH 16)

**5-606 (125A) CRITICAL REASONING IN MATHEMATICAL ANALYSIS**

Based on the elementary concepts of mathematical analysis; designed to develop in the student an understanding of mathematical rigor. (3 cr, §5-612 [130A] or 5-613 [130B] or 5-614 [130C]; limited to 30 students; prereq 1-240 [31] or 1-444 [44]; II MTWThF; VH 207)

## SCHOOL OF PHYSICS AND ASTRONOMY

### Astronomy (Ast)

**1-012 (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, §1-011 [11]; II MTWThF and 1 clear evening per wk for observations with telescope; Ph 166) Kaufmanis

**1-013 (13) STARS AND GALAXIES**

Discussion of constellations, properties and motions of stars, and the structure of the sidereal universe. Nonmathematical course. (3 cr, §1-011 [11]; may be taken concurrently with 1-012 [12]; III MTWTh and 2 clear evenings per wk for observation; Ph 166) Kaufmanis

### Physics (Phys)

**1-010 (1) INTRODUCTORY PHYSICS**

Demonstration lectures on the principles of physics and physical phenomena underlying these principles. Mechanics. (3 cr; prereq high school algebra and plane geometry; may be taken with or without accompanying lab, 1-015 [1A]; I MTWThF; Ph 133) Ar

**1-015 (1A) INTRODUCTORY PHYSICS LABORATORY**

Laboratory course given in conjunction with Phys 1-010 [1]. (1 cr [P-N grading only]; prereq 1-010 [1] or §1-010) Ar

**1-220 (22T) GENERAL PHYSICS**

See section on 10-week courses, page 157.

**1-225 (22A) PHYSICS LABORATORY**

See section on 10-week courses, page 157.

**1-230 (23T) GENERAL PHYSICS**

See section on 10-week courses, page 157.

**1-235 (23A) PHYSICS LABORATORY**

See section on 10-week courses, page 157.

**3-500 (50T) MODERN PHYSICS**

See section on 10-week courses, page 157.

**3-505 (50A) PHYSICS LABORATORY**

See section on 10-week courses, page 157.

**5-983 (107C) MODERN PHYSICS I**

See section on Special Programs, page 167.

**5-986 (123C) STATISTICAL PHYSICS**

See section on Special Programs, page 167.

**5-989 (180C) PHYSICS SEMINAR**

See section on Special Programs, page 167.

# College of Veterinary Medicine††

All classes scheduled by arrangement

## Veterinary Anatomy (VAna)

### 5-791\* (191) TOPICS IN ORGANOLGY

Lecture and laboratory presentation regarding selected organ systems of domestic and laboratory animals. (1-5 cr [regis for more than 1 term permitted]; prereq 8-261 [250] or equiv, #) Weber, Fletcher, Czarnecki, Vanden Berge, Heath

### 8-201, 8-202 (201, 202) COMPARATIVE VETERINARY NEUROLOGY

Correlated studies of the central nervous system of domestic animals. Emphasis on relating neuroanatomy to neurophysiology. (4 cr each; prereq 5-201 [101], #) Fletcher

### 8-203 EXPERIMENTAL COMPARATIVE VETERINARY NEUROLOGY

Principles, methods, and laboratory exercises in investigating the central nervous system of domestic animals. (3 cr; prereq 8-202 [202], #) Fletcher

## Veterinary Medicine (VM)

### 5-510, 5-511 CLINICS

Medical, obstetrical, radiological, surgical, and laboratory examination of diseases of animals. (3 cr; for 4th yr VetMed; prereq 5-502) Mather and others

### 8-220 ADVANCED DIAGNOSIS AND THERAPEUTICS OF ANIMAL DISEASES

Detailed examination, discussion, treatment, and prevention of animal disease problems. (Cr ar; prereq 5-203, 5-303) Sorensen, Mather, Anderson, L Johnson, D Johnson, Larson, Gelatt, Osborne, Farnsworth

## Veterinary Microbiology and Public Health (VMIC)

### 5-410 (128) PROBLEMS IN VETERINARY BACTERIOLOGY AND PUBLIC HEALTH

(Cr ar; prereq 5-103 [103] or equiv, #) Pomeroy, Anderson, Lindorfer, Loken, Diesch, Maheswaran

### 8-210 (201) ADVANCED POULTRY DISEASES

Investigations of specific infectious disease problems of poultry. (Cr ar; prereq 5-331 [131], #) Pomeroy, Higbee, Nelson, Barnes

### 8-205 (205) ADVANCED VETERINARY BACTERIOLOGY

Special topics, techniques, collateral reading, and conferences. (Cr ar; prereq #) Pomeroy, Anderson, Loken, Lindorfer, Diesch

†† Tuition fees per term in College of Veterinary Medicine are \$208 for resident and \$516 for nonresident students; student services fee per term is \$20.50. Students taking less than a full program will pay at the summer rate or academic year rate, whichever is higher.

## **Veterinary Obstetrics (VObs)**

### **5-105 (105) INFERTILITY CLINICS**

Investigation of hospital cases and field problems of infertility of domestic animals. Includes clinical examination, discussion of diagnosis, prognosis, and therapy. Assignment of special study of certain reproductive disorders. (Cr ar; prereq 5-211 [102], 5-103 [103], or #)

### **8-600\* (204) SPECIAL PROBLEMS IN ANIMAL REPRODUCTION**

(Cr ar; prereq #) Zemjanis

## **Veterinary Pathology and Parasitology (VPaP)**

### **5-401x (157) VETERINARY NECROPSIES**

Necropsy techniques, examination of tissue sections, and preparation of records. (1-5 cr; prereq 5-203 [153] or equiv) Staff

### **5-402x (158) SURGICAL PATHOLOGY**

Preparation and interpretation of surgical and necropsy specimens. (3 cr; prereq 5-401 [157], #) Barnes and staff

### **5-404x (160) DIAGNOSTIC PATHOLOGY**

Interpretation of history, necropsy findings, laboratory findings and histopathology in the diagnosis of animal diseases. (5 cr; prereq 5-401 [157], #) Barnes and staff

### **8-803x (241) PROBLEMS IN VETERINARY PARASITOLOGY**

(Cr ar; prereq 5-102 [102] or equiv, #) Griffiths

## **Veterinary Surgery and Radiology (VSR)**

### **8-401 (210) ADVANCED VETERINARY RADIOLOGY**

Lecture and laboratory. Radiological diagnostic procedures and interpretation as applied to veterinary medicine. (2 cr; prereq 5-401 [121] or equiv, #) Hanlon

### **8-501 (220) ANESTHESIA**

Selection of proper anesthetic agent; administration of local, regional, and general anesthesia in large or small animals. (Cr ar; prereq 5-021 [103] or equiv, #) Arnold, Usenik, Piermattei

### **8-121 (225) ADVANCED SMALL ANIMAL SURGERY**

Surgery of the various systems in small animals with preoperative and postoperative evaluation and treatment. (Cr ar; prereq 5-021 [103] or equiv, #) Piermattei

### **8-221 (230) ADVANCED LARGE ANIMAL SURGERY**

Surgery of the various systems in large animals with preoperative and postoperative evaluation and treatment. (Cr ar; prereq 5-021 [103] or equiv, #) Arnold, Usenik, Myers



Course Descriptions

*10-Week Courses*

## 10-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 (††).

### Aerospace Engineering and Mechanics (AEM)

#### 5-840 INDUSTRIAL ASSIGNMENT

Engineering intern industrial laboratory. A formal technical report, covering the work during the industrial assignment, is required. (2 cr for both terms; prereq regis in engineering intern program)

#### 5-841 INDUSTRIAL ASSIGNMENT

See AEM 5-840. (2 cr for both terms; prereq regis in engineering intern program)

#### 5-842 INDUSTRIAL ASSIGNMENT

See AEM 5-840. (2 cr for both terms; prereq regis in engineering intern program)

### American Studies (AmSt)

#### 5-101 INTRODUCTION TO AMERICAN FOLKLORE

An exploration of the nature and range of American folklore. The forms studied will include many of the following: riddles, proverbs, superstitions, games, music, dance, and tales. (4 cr; prereq consent of instructors only; MTh afternoon hrs ar; see American Studies bulletin board) Geffen, Roth, Titon

### Anesthesiology (Anes)

#### ELECTIVE COURSES

#### 5-169†† (169) RESEARCH IN ANESTHESIOLOGY

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

#### 5-181†† (181) EXTERNSHIP IN ANESTHESIOLOGY

(Cr and hrs ar) Van Bergen and staff

#### 5-182†† (182) EXTERNSHIP IN ANESTHESIOLOGY AND RESPIRATORY PROBLEMS

(Cr and hrs ar) Van Bergen and staff

#### REQUIRED COURSES FOR GRADUATE STUDENTS

#### 8-265†† (265) GENERAL ANESTHESIA

Instruction and experience in general anesthesia. (12 cr) Van Bergen and staff

#### 8-266†† (266) REGIONAL ANESTHESIA

Observation, instruction, and administration of all types of local, regional, and spinal anesthesia. (4 cr) Van Bergen and staff

**8-267†† (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

**8-268†† (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

**ELECTIVE COURSE FOR GRADUATE STUDENTS**

**8-269†† (269) RESEARCH IN ANESTHESIA**

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

## Applied Statistics

**Stat 5-911 (181A) TOPICS IN STATISTICS (Parts I and II)**

Topics vary according to needs and available staff. Topic for summer 1971: Matrices for statistical applications. (3 cr for both terms [may be repeated for cr]; prereq Stat 5-123 [123] or 5-133 [133] and #; IV MWF; FP 125) Martin

## Architecture (Arch)

**3-081†† (81) ARCHITECTURAL DESIGN I**

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 students and Δ; VI-X MTWThF; Arch 210) Bennett

**3-082†† (82) ARCHITECTURAL DESIGN I**

See Arch 3-081. (6 cr for both terms; prereq 3-081; VI-X MTWThF; Arch 210) Bennett

**3-083†† (83) ARCHITECTURAL DESIGN I**

See Arch 3-081. (6 cr for both terms; prereq 3-082; VI-X MTWThF; Arch 210) Bennett

**3-091†† (91) ARCHITECTURAL DESIGN II**

Architectural problems with emphasis on development of structure as an integral part of design; site planning. (6 cr for both terms; prereq 3-083; VI-X MTWThF; Arch 210) Bennett

**3-092†† (92) ARCHITECTURAL DESIGN II**

See Arch 3-091. (6 cr for both terms; prereq 3-091; VI-X MTWThF; Arch 210) Bennett

**3-093†† (93) ARCHITECTURAL DESIGN II**

See Arch 3-091. (6 cr for both terms; prereq 3-092; VI-X MTWThF; Arch 210) Bennett

**5-111†† (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 3-093; VI-X MTWThF; Arch 210) Bennett

**5-112†† (112) ARCHITECTURAL DESIGN**

See Arch 5-111. (7 cr for both terms; prereq 5-111; VI-X MTWThF; Arch 210) Bennett

**5-113†† (113) ARCHITECTURAL DESIGN**

See Arch 5-111. (7 cr for both terms; prereq 5-112; VI-X MTWThF; Arch 210) Bennett

**5-121†† (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 5-113, CE 3-602; VI-X MTWThF; Arch 210) Bennett

**5-122†† (122) ARCHITECTURAL DESIGN**

See Arch 5-121. (9 cr for both terms; prereq 5-121; VI-X MTWThF; Arch 210) Bennett

## **Educational Administration (EdAd)**

**5-128‡‡ (128) WORKSHOP: EDUCATIONAL ADMINISTRATION (Parts I and II)**

(Leadership Development Seminar) A component of a unique block-time approach in educational administration; student-planned and directed activities will be emphasized in the development of skills in group process, interpersonal competencies, and planning. Participants will be acquainted with current problems of education and will participate in polling community opinions on educational issues confronting schools in urban areas. Preapplication is required and inquiries concerning applications, requirements, and procedures should be addressed to Professor W. Ray Cross, Division of Educational Administration, 225 Health Services Building, University of Minnesota, St. Paul, Minnesota 55101. Participants will register concurrently for 6 credits in EdAd 5-128, Section 1, Parts I and II, and 4 credits in EdAd 5-139, Section 1, Parts I and II. (Section 1, 1-6 cr; limited to 60 students; II-VIII MTWThF; EntFW 490) Cross, Mazzoni

**5-139‡‡ (139) LABORATORY IN DECISION MAKING (Parts I and II)**

A component of the unique block-time program in leadership development. Each participant will assume the role of principal in a simulated school and will respond to many "real life" problems of school administrators focused on a school environment. Participants will become acquainted with the day-to-day problems of school administration and have opportunities to exchange views with practicing school administrators. Preapplication is required and inquiries concerning applications, requirements, and procedures should be addressed to Professor W. Ray Cross, Division of Educational Administration, 225 Health Services Building, University of Minnesota, St. Paul, Minnesota 55101. Participants will register concurrently for 6 credits in EdAd 5-128, Section 1, and 4 credits in EdAd 5-139, Section 1. (Section 1, 1-4 cr; limited to 60 students, I-VIII MTWThF; EntFW 490) Cross, Alkire

## **Educational Psychology**

### ***Counseling and Student Personnel Psychology (CSPP)***

**8-620† (EPsy 237) PRACTICUM IN GROUP COUNSELING (Parts I and II)**

Supervised practice in counseling several groups, preferably in the setting in which a student intends to work. Emphasis on systematic evaluation of progress through direct observations and tapes, and on developing skill in interpersonal perception, communication, and research. (3 cr total for both parts; limited to 20 students; prereq 8-320; II-V MWF; Bu 249) Anderson, Shaffer

### ***Psychological Foundations (PsyF)***

**5-140† (EPsy 192) INTRODUCTION TO LEARNING AND COGNITION (Parts I and II)**

History, models, and theories; research methods of educational psychology; conditioning, learning, and cognition; collection analysis of data in the laboratory setting. (5 cr total for both parts; limited to 60 students; III MWF; Arch 60) Jacob

‡‡ 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.

**8-112† (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 both parts; prereq 8-111; II MWF; J 4) MacEachern

**8-312† (EPsy 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 8-112. (2 cr total for both parts; limited to 22 students; prereq ¶8-112; III-IV MF; WuH 330) Ar

## Foreign Study (FS)

**5-960 (161, 162) SEMINAR FOR FOREIGN STUDY I AND II**

Directed field study (SPAN program) in Cyprus, East Germany, Honduras, and Ghana, 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 1970 by a faculty selection committee [grad students must also have approval of adviser]) Stavrou, administrative official, Hadjiyanis, Currier, Sigmund, Abraham

## Management Information Systems

**3-099† PROGRAMMING COMPUTERS USING FORTRAN**

Introduction to the FORTRAN programming language which is especially useful in writing programs for data analysis. Use of prewritten computer routines for statistical analysis. Problem-oriented approach to instruction with individual pacing. Problems will be run on University computers. (1 cr; each section limited to 30 students)

Sec 1, I M, BlegH 120

Sec 2, I T, BlegH 120

**3-100† (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, §8-208 [209A]; each section limited to 30 students; prereq QA 3-053 [53]; lect II MT; BlegH 145)

Lab 1, II W, BlegH 145

Lab 2, II Th, BlegH 145

**5-109† (Mgmt 109) INTRODUCTION TO COMPUTER-ASSISTED MANAGEMENT**

Provides an overview of the field of computer-assisted management (CAM) and for management information decision systems. The following topics are introduced: information systems, decision systems, interactive systems, communications systems, and the behavioral aspects of systems. Special emphasis is placed upon relating each of these topics to management practice and in drawing implications as to how this practice is likely to undergo modifications. (3 cr; limited to 30 students; prereq Econ 1-002 [2] or equiv; I MT; BlegH 145)

**8-208† (209A) INTRODUCTION TO HARDWARE AND SOFTWARE SYSTEMS**

Basic elements of computer hardware, software, and programming. Introduction to the use of FORTRAN algorithmic language. (3 cr, §3-100 [QA 62]; each section limited to 15 students; prereq QA 8-151 [151] or equiv or #; lect I-II MT, BlegH 145)

Lab 1, II W, BlegH 145

Lab 2, II Th, BlegH 145

## Mechanical Engineering (ME)

- 3-740†† (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
- 3-741†† (91) INDUSTRIAL ASSIGNMENT (Parts I and II)**  
See ME 3-740. (2 cr for both terms; prereq regis in engineering intern program; hrs ar) Lund
- 3-742†† (92) INDUSTRIAL ASSIGNMENT (Parts I and II)**  
See ME 3-740. (2 cr for both terms; prereq regis in engineering intern program; hrs ar) Lund
- 3-743†† (93) INDUSTRIAL ASSIGNMENT (Parts I and II)**  
See ME 3-740. (2 cr for both terms; prereq regis in engineering intern program; hrs ar) Lund

## Neurology (Neur)

- 5-120† (182A) SELECTED PROBLEMS**  
(Cr ar; prereq regis med) Baker and others
- 5-510† (181A) EXTERNSHIP: CLINICAL PRACTICE AT UNIVERSITY HOSPITALS**  
(Cr ar; prereq regis med) Baker
- 5-511† (181B) EXTERNSHIP: CLINICAL PRACTICE AT ST. PAUL-RAMSEY HOSPITAL**  
(Cr ar; prereq regis med) Gumnit and others
- 5-512† (181C) EXTERNSHIP: CLINICAL PRACTICE AT HENNEPIN COUNTY GENERAL HOSPITAL**  
(Cr ar; prereq regis med) Ettinger
- 5-513† (181D) EXTERNSHIP: CLINICAL PRACTICE AT VETERANS ADMINISTRATION HOSPITAL**  
(Cr ar; prereq regis med) Alter and others
- 5-541† (182E) PEDIATRIC NEUROLOGY: NEUROCHEMISTRY**  
(Cr ar; prereq regis med) Swaiman
- 5-544† (182C) CLINICAL ELECTROENCEPHALOGRAPHY**  
(Cr ar; prereq regis med) Ellington, Torres
- 5-560† (182D) GENETICS**  
(Cr ar; prereq regis med) Alter
- 8-200† (208) CLINICAL NEUROLOGY**  
(Cr ar) Baker and others
- 8-201† (211) CLINICAL PEDIATRIC NEUROLOGY**  
(Cr ar) Swaiman and others
- 8-202† (209) RESEARCH**  
(Cr ar) Baker and others
- 8-203† (231A) APPLIED ELECTROENCEPHALOGRAPHY**  
(Cr ar) Torres
- 8-204† (231B) APPLIED ELECTROMYOGRAPHY**  
(Cr ar) Kennedy
- 8-205† (233) APPLIED NEUROPATHOLOGY**  
(Cr ar) Sung
- 8-236† (228) RESEARCH: NEUROPATHOLOGY**  
(Cr ar) Sung
- 8-705† (226) NEUROLOGICAL-NEUROSURGICAL CONFERENCE**  
(1 cr, §Rad 5-163 [163], Surg 318) Baker, Peterson

## Pathology (Path)

- 5-106 (106) DISEASES OF THE HEART**  
(1 cr; prereq 5-102 [102]; hrs ar) Edwards
- 5-111 (111) CONFERENCE ON AUTOPSIES**  
(1 cr; prereq 5-102 [102]; hrs ar) Good
- 5-112 (112) DIAGNOSIS OF TUMORS**  
(5 cr; prereq 5-102 [102]; 8:00 MTThF; JacH 178) Hebbel
- 5-150 (150) PROBLEMS IN PATHOLOGY**  
(Cr and hrs ar; prereq 5-102 [102]) Dawson

## Physics (Phys)

- 1-220†† (22T) GENERAL PHYSICS**  
Electricity and magnetism. (4 cr for both terms; prereq 1-210 [21], ¶1-225 [22A], Math 1-230 [22H] or ¶Math 1-230 or Math 1-443 [43] or ¶Math 1-443; III MTWThF; Ph 133) Ar
- 1-225†† (22A) PHYSICS LABORATORY**  
Laboratory exercises in electricity and magnetism. (1 cr for both terms; P-N grading only; prereq 1-220 [22T] or ¶1-220; 2 lab hrs per wk; rm ar) Ar
- 1-230†† (23T) GENERAL PHYSICS**  
Mechanical and electrical waves; physical and geometrical optics; particle nature of light; wave nature of matter. (4 cr for both terms; prereq 1-220 [22T], ¶1-235 [23A]; II MTWThF; Ph 170) Ar
- 1-235†† (23A) PHYSICS LABORATORY**  
Laboratory exercises in waves and optics. (1 cr for both terms; P-N grading only; prereq 1-230 [23T] or ¶1-230; 2 lab hrs per wk; rm ar) Ar
- 3-500†† (50T) MODERN PHYSICS**  
Quantum mechanics, hydrogen atoms, atoms and molecules, quantum distribution, and topics in solid state, nuclear physics, and astrophysics. (4 cr for both terms; prereq 1-060 [6] or 1-290 [9] or 1-230 [23T]... Math 1-240 [31] or Math 1-444 [44]; III MTWThF; Ph 170) Ar
- 3-505†† (50A) PHYSICS LABORATORY**  
Parallel to Phys 3-500. (1 cr for both terms; prereq 3-500 [50T] or ¶3-500; 2 lab hrs per wk; rm ar) Ar

## Political Science (Pol)

- 8-501 (285) RESEARCH SEMINAR: JUDICIAL PROCESS AND ADMINISTRATIVE LAW**  
Supervised research and research training in selected topics or problems. (3 cr; prereq #; hrs and rm ar) Krislov

## Public Health (PubH)

- 5-068\*\*\*†† (190) FIELD PRACTICE IN PUBLIC HEALTH EDUCATION**  
Approximately 10 weeks of supervised community health education experience. (10 cr; prereq 5-050 [181A], 5-051 [181B], 5-052 [181C], 5-053 [181D], 5-061 [187B], 5-062 [187C], 5-063 [187D], and #) Craig, Veninga
- 8-246\*\*/8-247\*\*\*†† (231, 232) GROUNDWATER DEVELOPMENT/FIELD WORK**  
Theory and practice of aquifer exploration and evaluation; water well design, construction, and maintenance; special reference to public health aspects. (Cr ar; prereq grad engr, #) Bond, Singer, staff, and lecturers

## Sociology (Soc)

### 3-801 (80) SOCIOLOGICAL METHODS I: DESCRIPTIVE STATISTICS

Descriptive statistics as utilized in analysis of sociological data, measures of central tendency, deviation, correlation and regression graphs, simple treatment of three and four variables, probability. (3 cr; limited to 263 students; prereq some beginning algebra recommended; 2 hrs lect, two 1-hr labs required; labs assigned first day of class; lab limited to 20 students; lect II TTh; AndH 210) MacKinnon

### 3-802 (81) SOCIOLOGICAL METHODS II: STATISTICAL INFERENCE

Inferential statistics including a review of probability, tests of hypotheses about means and proportions for one and two samples, confidence limits, analysis of variance, nonparametric tests. Focus on utilizing statistical reasoning in reaching substantive conclusions in analysis of sociological data. (3 cr; limited to 263 students; prereq 3-801 [80]; 2 hrs lect, two 1-hr labs required; labs assigned first day of class; lab limited to 20 students; lect III TTh; AndH 210) McTavish

*B. To receive credit for the following courses, a student must complete both Biol 1-001 and 1-002.*

### 1-001/1-002 (1-2) GENERAL BIOLOGY

Study of plants, animals, and microbes. Includes an introduction to ecology, physiology, classification, cytology, energetics, genetics, development, and evolution. (5 cr each; lect V MTWTh, V-VI F; Aero 211, 317, 319, 327) Ar

Sec 1, limited to 96 students, lab I-III TTh, rec III MW, Chem-Ad S160, S168, S170, S177

Sec 2, limited to 96 students, lab VI-VIII TTh, rec VI MW, Chem-Ad S160, S168, S170, S177

*C. The following courses which carry a dagger (†) 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. Those language courses which do NOT carry a dagger are taught at a normal or semi-intensive rate.*

## East Asian Languages

### Chinese (Chin)

#### 1-101/1-102/1-103† (1-2-3) INTENSIVE FIRST-YEAR MANDARIN

5 hours with linguist, 15 hours with drillmasters, extra hours of assigned laboratory work. (15 qtr cr for both terms [10 sem cr]; I-IV MTWThF; TSF 153) Staff

**5-201/5-202/5-203‡‡ SURVEY OF CHINESE LITERATURE**

5 hours with instructor. (9 qtr cr for both terms [6 sem cr]; I MTWThF; FolH 204) Staff

**Japanese (Jpn)**

**1-101/1-102/1-103† (1-2-3) INTENSIVE FIRST-YEAR JAPANESE**

5 hours with linguist, 15 hours with drillmasters, extra hours of assigned laboratory work. (15 qtr cr for both terms [10 sem cr]; I-IV MTWThF; J 8) Staff

**5-201/5-202/5-203‡‡ SURVEY OF JAPANESE LITERATURE**

5 hours with instructor. (9 qtr cr for both terms [6 sem cr]; III MTWThF; J 9) Staff

**Italian (Ital)**

**1-001/1-002/1-003† (1-2-3) BEGINNING ITALIAN**

(15 cr for both terms; II-IV MTWThF; FolH 204)

**Portuguese (Port)**

**1-101/1-102/1-103† (1-2-3) BEGINNING PORTUGUESE**

(15 cr for both terms; II-III MTWThF; Aero 327) Hamilton

**Slavic and East European Languages**

**Russian (Russ)**

**1-101/1-102/1-103† (1-2-3) BEGINNING INTENSIVE RUSSIAN**

(See section on Special Programs) Covers the same material as the regular first-year sequence, Russ 1-101/1-102/1-103. (15 cr for both terms; I-III MTWThF; FolH 107) Donchenko

**1-104/1-105/1-106† (4-5-6) INTERMEDIATE INTENSIVE RUSSIAN**

(See section on Special Programs) Covers the same material as the regular first-year sequence, Russ 1-104/1-105/1-106. (12 cr for both terms; I-II MTWThF; FolH 205) Prokopov

**South Asian Languages**

**Bengali (Ben)**

**1-101/1-102/1-103† (1-2-3) INTENSIVE BEGINNING BENGALI**

(15 cr for both terms; I-IV MTWThF; BlegH 440) Majumdar and staff

**Swedish (Swed)**

**1-101/1-102/1-103† (1-2-3) INTENSIVE BEGINNING SWEDISH**

(15 qtr cr for both terms [10 sem cr]; I-IV MTWThF; FolH 209)

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‡‡ Course will be taught in English for Summer of 71 only.



**SCHOOLS,  
COLLEGES, and  
SPECIAL PROGRAMS**

# **INSTITUTE OF AGRICULTURE**

## **COLLEGE OF AGRICULTURE**

There are many courses, primarily for graduate students, in the College of Agriculture. 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, pages 60 and 172).

Included in the summer program are readings, seminars, special problems, and concentrated courses as well as regularly scheduled classes.

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.

### **Efficient Reading**

Adult reading needs are a matter of real concern. The course Efficient Reading (Rhet 1-147), designed for the average and above-average adult reader, provides a unique combination of activities for improving reading speed, comprehension, and vocabulary.

## **COLLEGE OF FORESTRY**

*Undergraduate forestry field clinic studies are provided for beginning juniors, both resident and transfers, at the Itasca Forestry and Biological Station, Itasca State Park, during the 4 weeks immediately preceding the opening of the fall quarter. This field clinic work is required of all forestry students majoring in Forest Resources Development and Forest Science. Required courses at Itasca are For 3-100, Important Forest Plants (2 credits); For 3-101, Forest Ecology (3 credits); and For 3-201, Field Forest Measurements (1 credit). This intensive field clinic provides all students entering professional forestry courses in the junior year with an introduction to forestry in an outstanding field setting and is timed to interfere as little as possible with summer employment.*

About one-half of the basic nonforestry courses required for graduation in all College of Forestry curricula are available during the Summer Session on the Twin Cities campus through various departments as shown elsewhere in this bulletin. Students with deficiencies or those desiring to speed up their graduation can effectively utilize the required Summer Session offerings in the biological and physical sciences, mathematics, social sciences, communications, etc.

Graduate course offerings are largely limited to the "research problem" area and are intended primarily for students majoring in some field of forestry.

## **COLLEGE OF HOME ECONOMICS**

Undergraduate, graduate, and summer special students will find that courses and workshops have been arranged to meet their specific needs. Transfers as well as presently enrolled students who wish to accelerate their programs should be able to plan a summer quarter. Teachers in service may register for the required number of consumer-oriented courses for certification purposes. These courses are in the several home economics fields.

It is possible in some areas to earn an advanced degree through attendance at Summer Session courses only. Those interested should apply for admission to Graduate School at least 1 month prior to the opening of Summer Session.

Several workshops have been planned for both beginning and advanced students. These include community nutrition, textile design, crafts design (jewelry), and enameling design.

See also Home Economics Education elsewhere in this bulletin.

## **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, Biology, Botany, Ecology and Behavioral Biology, Genetics and Cell Biology, and Zoology, as well as the Dight Institute of Human Genetics and the James Ford Bell Museum of Natural History. 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 section on the Biology Session and to the special bulletin available upon request from: 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 16-July 23 and July 25-August 30) 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 depart-

ments in the College of Agriculture 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 the 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.

Course work taken at the Itasca Biology Session may be considered for resident requirement at the University of Wisconsin 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: Chairman of Field Biology Program, 302 Bell Museum of Natural History, University of Minnesota, Minneapolis, Minnesota 55455. 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 16 or July 25.

### Fees and Expenses

The following fees are payable by each registrant on or before June 16 or July 25 and must be paid before registration is completed:

Tuition fee	
9 credits or less .....	\$14.00 per credit
10 credits or more .....	7.00 per credit
Student services fee .....	12.50
Laboratory fee .....	8.50

†† See section on Admission and Registration, page 13.

Graduate students may register for thesis-only upon payment of \$31 tuition per term and required student services 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 \$95 for the 5 weeks. A charge of \$20 per term is made for room in the cabins of the station and is to be paid to the chairman 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 \$255 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 16 and July 25. After June 16 or July 25 the late fee will be charged according to the following schedule:

June 17-19 or July 26-28 .....	\$ 6.00
June 20-22 or July 29-31 .....	10.00
Thereafter .....	20.00

No registration will be accepted after June 16 or July 25 without the approval of the chairman. Fee statements dated Wednesday, June 16, may be paid on Thursday, June 17, without penalty. However, fee statements dated Thursday, June 17, 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 the *School of Business Administration Bulletin*. However, it is suggested that admission be accomplished in the fall quarter because of sequence courses.

### Programs

See the *School of Business Administration Bulletin*.

## COLLEGE OF 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, curricula, and requirements for graduation, students should consult the *College of Education Bulletin*.

Courses listed under 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.

There will be no summer admissions to the following degree programs: English, speech, sociology, history, geography, economics, political science, and elementary education.

### **Counseling Services**

The staff of the Student Personnel Office of the College of Education will be available during both terms for consultation concerning admission, for information about requirements of the teaching profession, and for counseling. Appointments should be made in 206 Burton Hall.

### **Committee on Student Scholastic Standing**

Undergraduate and master of education 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.

### **Demonstration Facilities**

Summer students are welcome to observe programs at Tuttle Demonstration Elementary School, the Institute of Child Development, the Psycho-Educational Center, and Marshall-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 observed by students in elementary methods and by those registered in the laboratory course in elementary school practices. (See Elem 5-110; I, II, III, IV MTWThF; Tuttle School, Talmadge and 18th Avenues S.E., Minneapolis, Minnesota).

## **Summer Demonstration High School**

Inquiries about registration of secondary school students in Marshall-University High School should be addressed to Principal, Marshall-University High School, 14th Avenue and 5th Street S.E., Minneapolis, Minnesota 55414. The work of this school during First Term may be observed by summer students in secondary education.

## **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 summer sessions.

**Nursery School**—The Nursery School will be in session from 8:50 a.m. to 12 noon, beginning June 15 and closing July 16. Applications for the enrollment of children will be received at the office of the Nursery School. Tuition is \$42 for the term. Parents are responsible for the transportation of their children to and from the school.

## **Introduction to Teaching: Elementary and Secondary**

The introductory course for elementary education majors is not offered during the summer.

The basic professional courses for persons preparing to teach in the secondary schools are SeEd 3-150 and SeEd 155 (First Term) and SeEd 3-155 (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 10, 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.

## Art Education Workshop

A craft workshop combination of two courses (3-010 and 3-020) will incorporate intensive laboratory sessions of a minimum of 4 hours per day in 2½-week blocks. This schedule is planned to make most efficient use of student time and full utilization of equipment. It is expected that registration will be for the two courses covering the normal 5-week summer term. One additional course may be scheduled for first hour to total 9 credits. The workshop consists of these two courses:

- 3-010 INTRODUCTION TO WEAVING  
Equipment, design, setting up and operation of table and floor looms.
- 3-020 CONTEMPORARY CRAFTS  
Materials, equipment, design criteria, and techniques for textile, wood, metal, and ceramics.

## Workshops in Educational Administration

In response to the expressed needs of educational administrators, the summer offering includes two 3-credit workshops scheduled to meet 3 hours each day for 2½ weeks. EdAd 5-139 (Section 1), offered July 19 to August 4 in the Second Term, employs the technique of simulation and emphasizes the decision-making role of the administrator. Section 2 of EdAd 5-128 centers attention on the role of the educational planner in multifunctional planning. The workshop is designed to include basic principles and concepts of planning in addition to problem solving experiences. Both workshops are open to elementary, secondary, and central office practicing administrators or potential administrators.

**Leadership Development Seminar**—An innovation of special interest to prospective administrators is a 10-week, daylong seminar in educational administration. The components of this unique seminar include experience as a principal in a simulated school, student-planned and directed activities and experience in community opinion polling. Participants will receive 10 credits in the combined offering of EdAd 5-139 and 5-128. Applicants for degrees in educational administration are required to participate in this program. Preapplication is required. Inquiries concerning applications, requirements, and procedures may be addressed to Professor W. Ray Cross, Division of Educational Administration, 225 Health Services Building, University of Minnesota, St. Paul, Minnesota 55101.

**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 may be obtained upon request to: Division of Educational Administration, 225 Health Services Building, University of Minnesota, St. Paul, Minnesota 55101.

**Doctor of Education Programs**—The Division 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: Division of Educational Administration, 225 Health Services Building, University of Minnesota, St. Paul, Minnesota 55101.

### **Secondary Education for the Culturally Different**

A new series of courses focusing on characteristics of and responses to culturally different students is available through the Secondary Education Department during the Summer Session. The basic course, Secondary Education for the Culturally Different (SeEd 5-120) is taught both terms by a team of professors, and linked to a series of subject matter "trailers" which investigate improvement programs, curricula, methodologies, and materials for culturally different students. The series is designed for in-service teachers; however, seniors are permitted and encouraged to register. Trailer courses offered are in the areas of social studies education (SeEd 5-160), business education (BsEd 5-109), English education (SeEd 5-198), and modern foreign languages (SeEd 5-190) with each trailer section carrying 2 credits. Students desiring additional information should contact Professor Allen Sullivan, 345 Peik Hall, University of Minnesota, Minneapolis, Minnesota 55455.

### **Special Education Programs and Scholarships**

Summer offerings in special education include courses for teachers of children who are retarded, hearing handicapped, gifted, emotionally disturbed, disadvantaged, or having learning disabilities. Many State Departments of Education offer summer traineeships, and students should contact their State Department of Education for information.

### **Teaching Emotionally Disturbed Children**

An advanced course, Education of Emotionally Disturbed and Socially Maladjusted Children (SpEd 8-150), is available First Term.

### **Teaching Disadvantaged Children**

Education of the Disadvantaged (SpEd 5-180) is offered both First and Second Terms.

## Teaching Hearing-Impaired Children

Courses for teachers of hearing-impaired children are listed in schedules of both the Division of Speech Science, Pathology, and Audiology and the College of Education.

## Trainable Mentally Retarded Children

A Second Term workshop for teachers and prospective teachers of trainable mentally retarded children will include lectures, discussion, independent study, and committee work (SpEd 5-320). For information about application, requirements, and procedures, write to Professor John Rynders, 13 Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## Workshop in Counseling Psychology

In the First Term, three workshops have been designed for experienced counselors working in school settings—CSPP 8-301, sections 1, 2, and 3.

**Section 1**—Workshop participants will explore the concept of the counselor as a change agent in school or college. Counselors will be assigned to school settings as behavioral consultants to the school and will work with teachers, administrators, and students toward the construction of a developmental milieu. Other professional workers in the schools, such as psychologists, social workers, principals, and teachers, as well as counselors interested in this approach to counseling, are encouraged to attend the workshop.

**Section 2**—Institute: Career Development and the Elementary Curriculum. This institute is sponsored by the Departments of Counseling and Student Personnel Psychology and Distributive Education. Participants will spend their mornings studying career development theory and preparing curriculum materials. Afternoons will be spent in local business and industrial firms for the purpose of gaining occupational awareness. The institute is open to vocational education leaders and elementary school personnel. Preference in selection will be given to those educators who apply as part of a team from a given school system. For information write to Professor Lorraine Hansen, 139A Burton Hall, University of Minnesota, Minneapolis, Minnesota 55455 (Telephone [612] 373-0202).

**Section 3**—This workshop is designed for experienced elementary school counselors and persons with substantial work toward a Master's or Specialist degree in elementary school counseling. Trainees will enroll in both summer terms and participate in an intensive didactic practice and experiential sequence focused on developing initial mastery of roles in an experimental model for counseling in the elementary school. All participants, including the instructor, will be based in one public school educational center. Among the activities planned are course work

in techniques of elementary school counseling, practice components, communication and human relations training, a midwest conference of elementary school counselors and counselor educators, and directed learning field trips.

### **Workshop: Contemporary Practices in Psychoeducational Assessment and Intervention**

The School Psychology Training Program will offer two 5-credit courses (SchP 5-310 and SchP 5-311) as a special 6-week, full-time workshop for professional school psychologists and other eligible candidates for certification. The workshop is scheduled from June 28 to August 6, 1971.

Enrollment will be by special permission only, and will be limited to 18 students. Requests for information or applications to register should be sent to the Department of School Psychology, 226 Child Development Building, University of Minnesota, Minneapolis, Minnesota 55455, and must be completed before May 1, 1971.

### **Institute: Learning Disabled Children**

The University of Minnesota will offer the courses which constitute the methods and practicum core of the Special Learning Disability Resource (SLDR) or clinical teacher sequence (SpEd 5-110, 5-610, 5-111, 5-611) as a special 8-week, full-time institute for which 12 credits will be granted. The institute is scheduled from June 15 to August 6, 1971.

Enrollment will be limited to 24 students who have been formally admitted as candidates in the learning disability sequence and have completed all prerequisites for the courses listed. Priority will be given to persons who hold leadership positions, such as supervisors or teacher-educators. Applications for permission to register are available from the Department of Special Education, 101A Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455, and must be submitted by May 1, 1971.

### **Teaching the Mentally Retarded**

Several courses required for certification to teach children who are mentally retarded will be offered both terms—SpEd 5-101, SpEd 5-120, and CPsy 5-315, as well as related courses of value for such teachers. The curriculum and methods (elementary) course, SpEd 5-121, will be taught First Term, and SpEd 5-122, Education of the Mentally Retarded in the Secondary Schools, will be offered Second Term. Questions should be directed to the Department of Special Education, 101A Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455 (telephone [612] 373-5020).

## **Workshop: Curriculum Implementation in Elementary School Science**

In the first and second summer terms (June 15-30 and July 19-August 3) two workshops will focus on a single science program to be determined by communication with early registrants. The workshops (Elem 5-347) will meet mornings in an elementary school where program elements will be prepared, demonstrated, and taught. Afternoon sessions will be held on campus and will focus on teaching specific lessons in school observation and evaluation procedures and associated in-service programs. Full information may be had by writing Professor Alan Humphreys, 105 Burton Hall, or Professor Roger Johnson, 242 Burton Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Workshop: Outdoor Science Education**

Participants in the workshops scheduled from July 1-16 or August 4-20 will meet to consider procedures for introducing elementary school pupils to the natural, outdoor environment as a means of examining pressing ecological problems. The workshops (Elem 5-348) will meet one-third of the time in a forest setting in the Itasca area to establish basic skills and concepts of ecology, and the remainder of the time in the Twin Cities area to provide participants with skills necessary to establish local school outdoor education programs and experience in selecting and using appropriate supportive materials, equipment, media, and sites. For further information, write to Professor Roger Johnson, 242 Burton Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Workshop: Curriculum Implementation in Elementary School Social Studies**

During the first term, two workshops will focus on different aspects of curriculum implementation in elementary school social studies.

**Section 1 (Project Social Studies)** of Elem 5-363 will meet from June 15 to 30 and will acquaint teachers with innovative teaching and learning strategies in elementary school social studies. Using Project Social Studies as a focal point, the course develops such topics as the inquiry process, inductive-deductive teaching strategies, the use of original data sources, instructional sequences, and the procurement of materials. For further information, contact Professor Arthur Ellis, 250B Burton Hall, University of Minnesota, Minneapolis, Minnesota 55455.

**Section 2 (Instructional Leadership in Social Studies)** of Elem 5-363 will meet from July 1 to 16 and will acquaint elementary school principals, supervisors, and curriculum directors with new curriculum developments in the area of elementary school social studies. As instructional leaders, it is imperative that these personnel be well informed regarding new and innovative materials and procedures in the

social studies field. The workshop sessions will meet afternoons on the Minneapolis Campus and will focus on the development of the instructional leadership role of the elementary school principal, supervisor, and/or curriculum director in the elementary school social studies area. For further information, contact Professor John Cogan, 101 Burton Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Physical Education**

**Physical Examination**—It is recommended that all students take advantage of the opportunity offered by the University Health Service for a physical examination. Health Service approval must be secured for participation in activity courses.

**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 school sports programs. The latest training and rehabilitation techniques will be demonstrated and class members will have an opportunity to practice these techniques. The practicum (PE 5-620) will be held from 1:30 to 5 p.m. daily, June 21 to July 2.

**Coaching of Basketball and Field Hockey**—A special 2-week course will be offered for women on the techniques of coaching. Instruction will include analysis of skill, game strategy, specific techniques of coaching, methods of training, conditioning, and organization and structure of competition. The course (PE 5-140) will be held daily from 1:30 to 4:30 p.m. daily, June 14 through June 25, with enrollment limited to 60 students. Consult General Extension Division for complete information and registration procedures.

**Demonstration Teaching, Tuttle Elementary School**—Demonstration teaching in physical education, grades 1 through 6 is scheduled First Term on Tuesday and Thursday, 8:30 to 11:40 a.m. Instruction by a physical education specialist is designed to assist teachers in planning, organizing, and teaching physical education activities to children. Classes are open for observation.

## **School Health Education**

**Educational Aspects of Drug Use and Abuse**—The use and abuse of alcohol and other drugs are affecting increasingly large numbers of persons at all levels of society. Because much of this increase in use and abuse of a wide variety of drugs and chemicals is by school-age children, school personnel are being called upon to develop and provide current curricula on drug use, abuse, and dependency and to make appropriate referrals. In response to the critical need for basic background information and methodology, the School of Public Health and the School Health Program of the School of Physical Education are jointly offering a course for school personnel. It is specifically designed for

education seniors and those directly involved in and responsible for curriculum development and teaching in this area, and those providing nursing and referral services. The course aims to (1) disseminate accurate, up-to-date unbiased information on the nature, use, and effects of drugs and dependency, prevention, and treatment; (2) examine concepts, methods, and instructional materials appropriate for elementary and junior and senior high schools; and (3) familiarize participants with various referral procedures and community resources available for providing assistance to individuals and families. Course registration is limited to 80 students. Classes will meet June 21 through July 9. (See Hlth 5-400 and PubH 5-032 for course description.)

## **Industrial Education Workshops**

### ***Philosophy and Practices of Industrial Education***

Course work on the philosophy and practices of vocational education will be presented during the First Term by a nationally known visiting professor. Through lecture and discussion of present issues the historical and philosophical bases for vocational programs will be developed (Ind 5-325 and Ind 5-305). A study of the development of vocational laws will permit students electing this course to apply the credit toward the regular program or to meet vocational certification requirements.

### ***Instructional Materials Laboratory***

**Section 1: Management of Work Program**—An industrial education laboratory designed for teachers and coordinators planning programs utilizing work experience will be offered during the First Term under Ind 5-600, Section 1. It will include practice in conducting industry visitation and work program management planning and emphasize problems of industry and vocational school related experiences.

**Section 2: Health Occupation**—A special 6-credit instructional materials development laboratory will be offered for health occupations instructors during the First Term in Ind 5-600, Section 2. The instruction and laboratory activity will include the fundamental content in foundations of vocational education and course development. Each student will be required to develop a guide for teaching. Instructors from industrial education and practical nursing will conduct the laboratory. Course credit can be used to clear equivalent vocational teacher certification.

### **Materials Laboratory: Post-Secondary Distributive Education**

In the First Term, from July 1 to 17, the Distributive Education Department will offer a workshop (DE 5-116) on new methods of instruction and development of materials for distributive education programs in junior colleges and area vocational-technical schools. The course is designed primarily for in-service post-secondary distributive teachers and coordinators and will deal with such topics as business games, public relations activities, leadership development strategies,

motivational techniques, training plans, and specific instructional materials.

Also in the First Term, the Department of Distributive Education and the College of Home Economics will offer a coordinated course on fashion merchandising for vocational education teachers who have responsibilities for teaching in secondary and post-secondary vocational education programs. Topics and trends in fashion merchandising will be combined with new methods of instruction and the development of teaching materials and projects. Students will be expected to register concurrently for DE 5-311 and HE 5-641, to be offered June 15 to 30. Information and application forms may be obtained from the Department of Distributive Education, 270 Peik Hall, University of Minnesota, Minneapolis, Minnesota 55455.

### **Workshops in Home Economics Education**

By special request of teachers and administrators, three workshops will be offered during the summer. These include Foods and Nutrition (HEEd 5-410) from June 14 to 30; Child Development and Human Relations (HEEd 5-405) from June 30 to July 16; and Materials for Instruction (HEEd 5-415) from July 19 to August 4. In the first two workshops special attention will be directed to the teaching needed in preparation for entry-level occupations; in the third workshop, emphasis will be focused on materials for instruction relating to consumer and homemaking programs.

### **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) some students in special education. Application must be made by May 10 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*.

### **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.

## Higher Education

Regular graduate courses in higher education will be available in both summer terms: First Term, Effective College Teaching (Educ 8-252), Higher Education in the United States (Educ 8-250), and Administration in Higher Education (EdAd 8-253); Second Term, The Junior College (EdAd 8-274) and Junior College Administration (EdAd 8-275).

In First Term, qualified students in the Graduate School may register for individual research problems (Educ 8-228) with consent of the instructor.

## 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, to test his ability to succeed in college-level academic work, or (if his grades are acceptable) to prepare himself for advanced study at the University or in another college. He may combine general and liberal arts courses with instruction in such occupational education sequences as electronics technology, dental assisting, marketing, law enforcement, medical or legal secretarial training, landscape horticulture, and recreation for special groups. Credits earned in these occupational sequences, and in some cases through work experience, can be applied toward the requirements for the associate in arts (A.A.) degree.

Recently, the University Senate and the Board of Regents gave the General College faculty permission to accept candidates for work in programs extending beyond the first 2 years of college through a baccalaureate degree. Students wishing to discuss proposals for third- and fourth-year work at the University through the General College should make inquiry at the college office.

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 on relations in and among fields of knowledge, on practical applications, and on 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 they hope to do advanced study.

Students enrolling in the college for the first time as entering freshmen are required to register for General College courses only. After they have satisfactorily completed 1 quarter in the college, they may consult an adviser about the possibility of registering for a "combination program," in which some of their course work is taken in other colleges of the University. The combination program is especially valuable during summer sessions, when only a limited number of General College courses are available.

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.

## **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. Appli-

cations 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 17, 1971, for First Term; and Monday, June 21, 1971, for Second Term). Applications should be sent to: Graduate School, 322 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*, 1970-72, pages 8-17.

### **Deadline Dates for Summer Session Graduation**

Theses of all graduate degree 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; final oral examinations must be passed at least 5 weeks before the end of the term in which candidates take the degree.

*First Term:*

Thesis Registration—May 14, 1971  
Final Oral Examination—June 11, 1971

*Second Term:*

Thesis Registration—June 18, 1971  
Final Oral Examination—July 16, 1971  
Commencement—August 20, 1971

## HEALTH SCIENCES

### SCHOOL OF DENTISTRY

The School of Dentistry will not offer courses regularly scheduled in the undergraduate 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 \$114, nonresident \$258; less than a full program may be paid at the summer rate or academic year rate, whichever is higher. There will be a student services fee of \$20.50 per term.

### SCHOOL OF NURSING

**Courses and Fees**—Summer courses are available to any student who meets the prerequisites for the specific 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.

**Program 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.

**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.

## **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.

## **SCHOOL OF PUBLIC HEALTH**

Summer courses at the graduate level are designed for completion of Master's degree programs and for students beginning such programs in the fields of environmental health, veterinary public health, dental health, and public health nutrition. It is expected that all students in these 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.

### **Groundwater Development**

For the twelfth time since 1959, the School of Public Health will offer a special intensive program on development of groundwater supplies. This program 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 14 to August 20. 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 14 to July 16 and from July 19 to August 20. For detailed information write: School of Public Health, University of Minnesota, Minneapolis, Minnesota 55455.

### **Hospital Engineering Problems**

During the second summer term, the eighth course in Hospital Engineering Problems will be offered by the School of Public Health. The course is designed to help meet the informational needs of hos-

pital engineers and other supervisory personnel charged with proper operation and maintenance of the physical facilities of the modern hospital. The course is intended to provide an opportunity to obtain refresher instruction in application of engineering, management, sanitation, and maintenance techniques and their underlying principles, with special attention given to their relationships to effective planning, administration, and operation of hospitals. The course is not intended to cover the design and construction aspects of hospitals, except as these relate to the operational aspects. The course will be given from July 19 to August 20. For detailed information write: School of Public Health, University of Minnesota, Minneapolis, Minnesota 55455.

### **Educational Aspects of Drug Use and Abuse**

See School Health Education, page 179.

### **Epidemiology**

A special 3-week intensive program in epidemiology will be offered by the School of Public Health in collaboration with the University Department of Conferences and Institutes, Nolte Center, June 20-July 10. This program of study, which carries full graduate credit, is designed for but not limited to teachers of preventive medicine in medical schools and offers a wide variety of courses in basic as well as specialized fields of epidemiology. Registration is limited. Inquiries as well as applications should be addressed to the School of Public Health, 1325 Mayo Memorial Building, or to the Department of Conferences and Institutes, Nolte Center for Continuing Education, University of Minnesota, Minneapolis, Minnesota 55455.

## **COLLEGE OF LIBERAL ARTS**

College of Liberal Arts courses—though a considerable number are designed for specialized or professional interests—seek primarily to provide breadth of knowledge and understanding, the characteristics of liberal education. Thus they are of interest, and open, not only to CLA degree candidates but also to students enrolled in other colleges inside and outside the University, and to summer-only students. Summer Session students come with many purposes: progress toward graduate or undergraduate degrees, enrichment of personal or professional background, improvement of scholastic standing...many others.

Admission to Summer Session is described on pages . . . of this bulletin. Information about costs, housing, and recreational opportunities may be found in this bulletin and in the *General Information Bulletin*. Summer Session registration does not of itself constitute admission to CLA (or to the Graduate School); students wishing to work toward

degrees or to attend during the regular academic year must file standard admission applications.

CLA courses offered in summer are largely selections from the regular curriculum. Many courses in business, medical, scientific, agricultural, and other divisions of the University, however, are open to students with the necessary prerequisites. Credit values of summer courses sometimes differ from those of the regular year, and cancel-add and certain other procedures are modified.

College advisory offices, to which students are urged to bring questions or problems, are: Lower Division, 220 Johnston Hall; Upper Division, 225 Johnston Hall; Special Learning Opportunities, 105 Johnston Hall. On Monday, June 14, the CLA desk in the Union Main Ballroom will serve all comers.

Specialized services and learning opportunities through CLA are abundant during the Summer Session. Many of them are described in the sections that follow.

## **Language Study Opportunities**

### ***Modern Language Residence Houses***

Two "foreign language residence houses" will be available in the First Term, one in French and one in German. At the houses, which are near the campus, all activities are conducted in the appropriate language. The 5-week experience has proved excellent, for both graduate and undergraduate students, as a means of acquiring beginning facility in the spoken language and as an introduction to the culture it represents.

Mrs. Anne Russell will be director of the Deutsches Haus, Professor Peter Robinson of the Maison Française. Native assistants will reside in the houses. Specific courses are listed in this bulletin under their departmental headings.

**Programs**—Programs at the houses offer realistic conversation opportunities in the afternoons, and lectures, round-table discussions, plays, films, music, and dances in the evenings. Students have found the programs useful not only in learning to speak foreign languages but also in preparation for SPAN, Fulbright or other scholarships, for joining other foreign study groups, for teaching, to meet graduate degree requirements, and to prepare for work in governmental, business, or international organization occupations.

Advanced and graduate students earn 4 quarter credits, elementary students earn 5. It is recommended that students register for no more than 5 additional credits in language courses.

Students should enroll for Fren 5-000 or Ger 5-000.

### ***German***

Again this summer the German Department is offering an expanded program of courses to make it possible for in-service teachers to move toward an M.A. degree in about 3 summers.

### **Russian**

The Slavic and East European Languages Department will offer two intensive courses in Russian: A beginning course in spoken and written Russian (Russ 1-101/1-102/1-103, 15 credits) and an intermediate course (1-104/1-105/1-106, 12 credits). Students must enroll for both summer terms. Completion of each course prepares a student to continue at the next higher level.

A Soviet Union study tour (Russ 5-021, 12 credits) is open to students with 2 or more years of college Russian, upon satisfactory performance in oral and written examinations. Six weeks of intensive language study at the University of Leningrad and additional travel in the Soviet Union are included. Applications should go to the Department of Slavic and East European Languages, 101 TSF, University of Minnesota, Minneapolis, Minnesota 55455.

### **South Asian Languages**

The Department of South Asian Languages will offer intensive beginning courses in two major languages of India: Bengali and Hindi. These courses cover the same material as full-year beginning courses. Students completing the courses satisfactorily will be eligible to enroll for second-year work in the fall quarter. Classroom work will emphasize communication in the language.

The courses, open to all students, may be taken toward the fulfillment of B.A. language requirements.

The department will also offer courses on the Basic Texts of Hinduism and Indian Buddhism and an introduction to the civilization of India.

### **Swedish and Finnish**

The Department of Scandinavian offers two intensive language courses: Intensive Beginning Swedish annually, and Intensive Beginning Finnish in even years (not offered in 1971). The courses are intended for undergraduate and graduate students without previous formal knowledge of the languages. For information on Intensive Beginning Swedish, consult Lillemor Saether, 210 Folwell Hall, University of Minnesota, Minneapolis, Minnesota 55455.

## **Field Work Opportunities**

### **Archaeological Field Sessions**

Archaeological field methods and techniques, Anth 5-591 and Anth 8-508, will be given for undergraduate and graduate students in each summer term. Students with permission to enroll will participate in the excavation of prehistoric archaeological sites along the Snake River, in southwestern Minnesota, and at Lake Mille Lacs. Training in archaeological site survey will be offered in cooperation with the Minnesota Historical Society program in Highway Salvage archaeology. First Term groups will headquarter at Pine City and at Slayton (the latter group in

cooperation with the University of Nebraska). The Second Term group will work out of Mille Lacs—Kathio State Park. Undergraduate and graduate students without previous field training will register for Anth 5-591, advanced graduate students for Anth 8-508. Those seeking permission to register must apply in person or by mail, before March 15, 1971, to the Archaeology Laboratory, 210 Ford Hall, University of Minnesota, Minneapolis, Minnesota 55455.

### **Classics**

**Excavations in Southwest Greece**—The University Messenia Expedition will continue its June-through-August campaigns (begun in 1969) in the excavation of a Bronze Age habitation site. A limited number of traineeships is available for graduate students with primary interest in archaeology. For enrollment and credit, see below.

**Excavations in Northern Israel**—Under the sponsorship of the American Schools of Oriental Research Joint Expedition to Khirbet Shema ("Ruins of Rabbi Shammai"), students may gain practical experience in archaeological excavations in northern Israel. Materials derive from Hellenistic, Roman, and early Byzantine periods. On-the-site work in field techniques, recording, archaeological photography, pottery classification, numismatics, and architectural drawing and illustration. Principal investigators, including Dr. Thomas Kraabel of the University, will direct lectures, discussions, and written reports.

Credit may be arranged in either of these expeditions by enrollment in Clas 5-124 (see page 113). For application forms, write to Department of Classics, 310 Folwell Hall, University of Minnesota, Minneapolis, Minnesota 55455.

### **Geography Field Session**

The 1971 intensive field research seminar, Geog 8-330, will be given from July 28 to August 18 with field headquarters at Menomonie, Wisconsin. Research will be focused upon related problems in cultural and rural geography of the Upper Coulee Country. Reservations must be made no later than May 20. For information about costs, program details, and reservations, apply to Professor Cotton Mather, Department of Geography, 414 Social Sciences Building, University of Minnesota, Minneapolis, Minnesota 55455.

## **Travel Courses**

### **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 1971, SPAN students will study in Cyprus, East Germany, Honduras, and Ghana.

The SPAN program is divided into three phases: preparation, study abroad, and the writing of a research paper.

In the academic year preceding their summer abroad, the SPAN students meet with faculty advisers in "country groups" to study the language, history, current problems, and culture of the countries to be visited. They also pursue preliminary research on their independent research projects. The second phase of the program is a stay of 8 weeks or longer in the host country for individual work on projects. This includes interviews, visits to appropriate institutions, documentary investigation, and often living with local families—all conducted in the SPAN spirit of encouraging international understanding and friendship. The third phase of the program, after return to the United States, is 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.

SPAN students receive 12 quarter-credits from the University of Minnesota for the year of preparation and the SPAN paper. During their summer abroad, they are registered in Foreign Studies Seminar (FS 5-960). The faculty advisers, though chosen from various member colleges, are considered members of the University's Summer Session faculty.

Interested students should apply a year or more ahead of time for participation in the SPAN program. For further information, apply to Professor Theofanis Stavrou, History Department, 652 Social Sciences Building, University of Minnesota, Minneapolis, Minnesota 55455.

#### ***Soviet Union Study Tour***

See the description on page 189 under "Russian."

### **Acting Workshop**

The Department of Speech, Communication, and Theatre Arts will have an outstanding artist from the professional theatre as conductor of its annual 1-week theatre workshop open to Summer Session students. Conductors of this workshop, which began in 1961, have been Lee Strasberg, Peggy Wood, Harold Clurman, Sir Tyrone Guthrie, Robert Lewis, Morris Carnovsky, Dame Sybil Thorndike, Sir Lewis Casson, Alan Schneider, and Michael Langham.

### **Other Special Opportunities**

#### ***American Studies***

Visiting professors will offer courses in a variety of aspects of American culture, as will members of the University of Minnesota staff in the Departments of Anthropology, History, English, Sociology, Economics, Geography, Art History, Music, Philosophy, Political Science, the College of Education, and the School of Journalism and Mass Communication.

The American Studies summer program serves candidates for the B.A., the M.A., and the Ph.D. degrees. Candidates for these degrees

design programs in courses offered by the departments listed above and in "integrating" American Studies seminars. Knowledge of a foreign civilization is required of all Ph.D. candidates.

#### ***Communication Disorders***

During the First Term, the Department of Communication Disorders (formerly Speech Science, Pathology, and Audiology) will offer basic science and professional courses for undergraduate, graduate, and nondegree students who wish to continue their professional education. Those interested in exploring speech pathology and audiology as a career may enroll in introductory courses.

During the Second Term, advanced students may participate in clinical practice in audiology and in speech pathology, or pursue independent study and research.

Additional information may be obtained from Professor Clark D. Starr, Department of Communication Disorders, 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 offer a Forensics Workshop for high school students interested in competitive speech activities. College speech students who wish to observe the work of the high school students should apply to John Cragan (404 Folwell Hall).

Professor Bernard Brock will offer SeEd 5-117 for students who want instruction in teaching high school speech courses (see the Education and the Speech, Communication, and Theatre Arts sections of First Term course descriptions in this bulletin).

The workshop will be held in 406 Folwell Hall, I-IV hour, MTWThF.

#### ***High School Theatre Workshop***

An "enrichment program in theatre" for high school students will be offered by the Department of Speech, Communication, and Theatre Arts, in cooperation with the College of Education. Lectures in theatre history, classes in acting, stage movement, stagecraft, and participation in a series of plays are included. For further information, apply to Dale Huffington, 320 Wesbrook Hall, University of Minnesota, Minneapolis, Minnesota 55455.

#### ***Journalism and Mass Communication***

Two workshops, principally for high school journalism teachers but open to others, will be offered during the First Term. Jour 5-182, Publications Workshop (3 credits), offered annually for 12 years, will meet June 15 to June 25. Sessions are held in afternoons to permit students to enroll for other courses. Jour 5-184, Film: the Medium and the Classroom (6 credits), runs for the full First Term. A \$25 lab fee is charged.

School of Journalism and Mass Communication programs in both terms offer courses for both undergraduate and graduate students interested in professional training. Several of the courses are open to

majors in other fields who have not had other journalism courses but who wish to pursue studies in mass communication.

Murphy Hall, the School of Journalism and Mass Communication building, is the headquarters of both the National Scholastic Press Association and the Associated Collegiate Press. Students are invited to visit these organizations and to obtain counsel on publication problems from the staffs of NSPA and ACP.

### **University Gallery**

The University Gallery, on the upper floors of Northrop Auditorium, presents frequently changing exhibitions with a wide variety of original works of art from all periods and in all media.

Students who seek liberal education in the arts may supplement classroom, studio, and library experiences at the Gallery. Those seeking training in the arts will find research facilities and specialized materials.

The Gallery rents framed prints to students and staff, and provides original art works for public spaces on the campus. Gallery hours are from 11 a.m. to 4 p.m., Monday through Friday, and from 2 to 5 p.m. Sunday. The main office is in 316 Northrop Auditorium (telephone 373-3424).

### **University Theatre**

The University Theatre, known not only for the high quality of its campus offerings but also for the plays it has presented on regional and international tours and on the Minnesota Centennial Showboat, will present six plays during the 1971 Summer Session.

The Showboat will offer two plays at its Mississippi River location; the season will run from June 16 to August 21.

A play will be presented in the fourth week of each term, in newly air-conditioned Scott Hall on the Minneapolis Campus. The dates are July 8, 9, and 10 and August 12, 13, and 14.

The two traditional plays for children will be performed by the Peppermint Tent Players on the Mississippi River bank beside the Showboat. This year's selections will run for 8 weeks, June 21 to August 13.

## **INSTITUTE OF TECHNOLOGY**

Summer courses are offered in architecture; astronomy; chemistry; mechanics and materials; electrical, industrial, mechanical, and metallurgical engineering; engineering graphics; geology; mathematics; and physics.

### **Institute for Teachers of High School Physics**

An Institute for Teachers of High School Physics, supported by the National Science Foundation, will be held in Minneapolis for 8 weeks,

from June 21 to August 13. A limited number of stipends will be available. Teachers not receiving stipends may register by special permission of the institute director, Professor Russell K. Hobbie, 148 Tate Laboratory of Physics. Institute participants may come a week early or remain an extra week to take regular summer school courses at the regular rate. The following 8-week courses will be offered in the institute.

**CICS 5-000 FUNDAMENTALS OF COMPUTERS AND PROGRAMMING**

Programming in Basic and Fortran; elements of computer organization and machine language; time sharing. (5 cr for 8 wks; prereq admission to summer institute or consent of institute director; III MTWThF and 2 rec hrs ar; plus nonscheduled lab) Nicholson

**Phys 5-983 (107C) MODERN PHYSICS I**

Special relativity, energy quantization, particle nature of radiation, wave nature of matter, old quantum theory. Laboratory experiments in intermediate modern physics. (4 cr for 8 weeks; prereq admission to summer institute or consent of institute director; IV MTWThF plus 4 hrs lab per wk; Ph 133) Ar

**Phys 5-986 (123C) STATISTICAL PHYSICS**

Energy levels; states; ensembles and thermal equilibrium; absolute temperature; entropy; Maxwell Boltzmann distribution; equipartition; thermodynamics; kinetic theory. (3 cr for 8 wks; prereq admission to summer institute or consent of institute director; I MTWThF; Ph 131) Ar

**Phys 5-989 (180C) PHYSICS SEMINAR**

Seminar in selected topics of interest to high school physics teachers. (1 cr for 8 wks; prereq admission to summer institute or consent of institute director; VIII T; Ph 131) Ar

## **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 5-051, 5-052, 5-004, 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 efforts to satisfy the increasing demand for earth sciences in high school curricula.

The sequence of Geo 5-051, 5-052, and 5-004 can be accepted for the fulfillment of the minor requirements of the M.A. program of graduate students in education.

## **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 program of the undergraduate who finds none of the standard curricula of the other schools and colleges suited to his interests or particular objectives. Such a student, with the approval of the University College Inter-College Committee, may arrange a study program includ-

ing 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.

University College also makes available to students regularly enrolled in every undergraduate college in the University an opportunity for off-campus independent study. A student may earn from 3 to 15 degree credits by registering for independent study projects under UC 3-075. The student designs his own project and works with an appropriate faculty member who supervises and evaluates the project.

A second opportunity for involvement in interdisciplinary educational experiences is available through the new Living-Learning Center (1425 University Avenue S.E.). The center is a service unit of University College designed to assist students, faculty, and community persons, individually or as small groups, to develop and carry out off-campus field study projects.

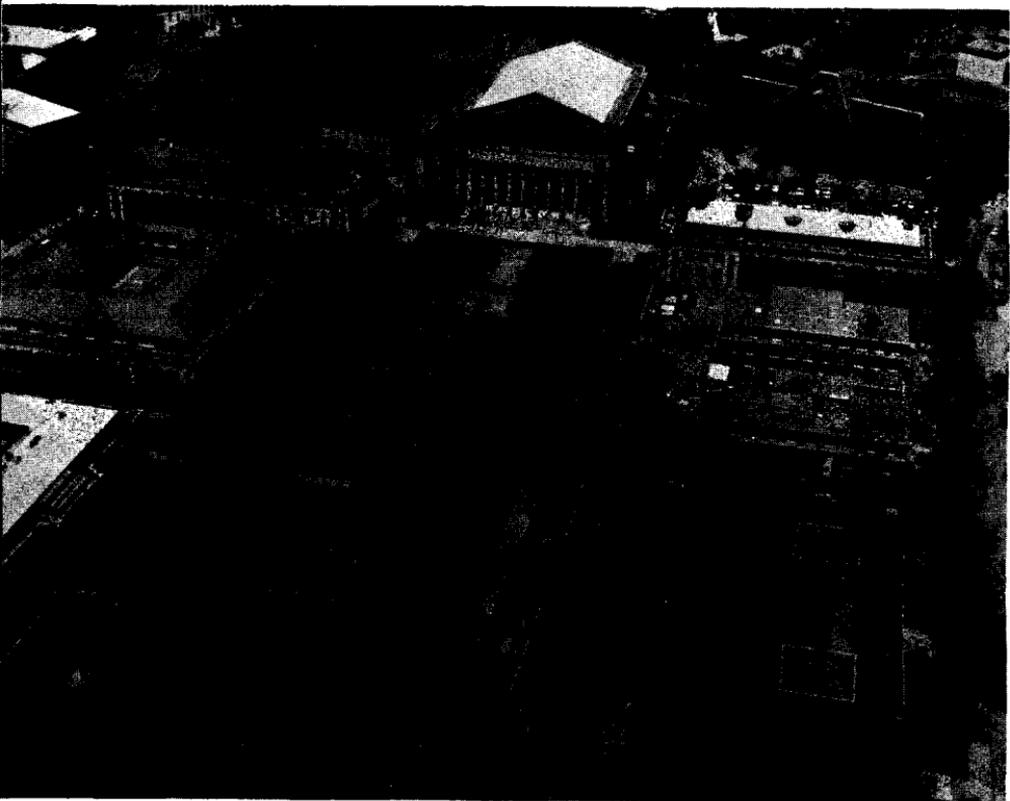
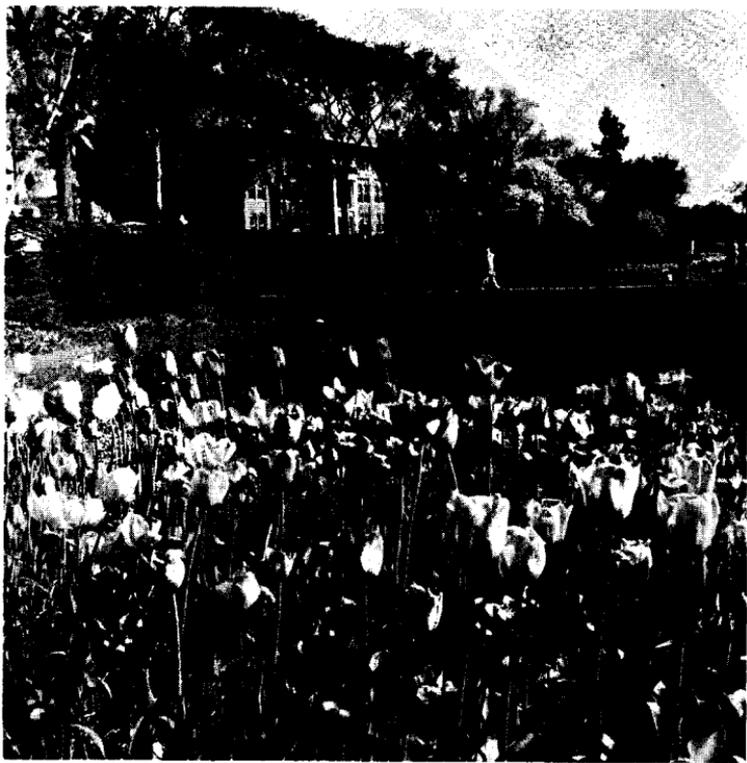
Information about University College and its independent study opportunities is available from: University College Office, 106 Nicholson Hall, University of Minnesota, Minneapolis, Minnesota 55455.



MINNESOTA  
CENTENNIAL SHOWBOAT











Course Descriptions

*Second Term*

# *Institute of Agriculture*

## COLLEGE OF AGRICULTURE

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

### **Agricultural and Applied Economics (AgEc)**

#### **8-201 (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)*

#### **5-031 (131B) PROBLEMS AND FIELD STUDIES IN ADVANCED AGRICULTURAL MECHANICS (AGRICULTURAL MACHINERY AND MECHANIZATION)**

Principles and practices pertaining to the implementation of instructional programs in agricultural mechanics. Selection, application, operation, service, and maintenance of equipment used in agricultural mechanics as pertaining to the specific instructional program. (3 cr per qtr [max 9 cr]; prereq 5-020 [130] or #; hrs and rm ar) Bear

### **Agronomy and Plant Genetics (Agro)**

#### *Agronomy*

#### **8-010\* (201) RESEARCH IN AGRONOMY**

Problems in physiology and production of crop plants. (Cr ar; prereq #) Staff

#### *Plant Breeding*

#### **8-310\* (244) LABORATORY METHODS IN PLANT BREEDING**

Field study of plant breeding programs and techniques. (1 cr; prereq 5-020 [132] or #) Lambert

#### **8-330\* (241) RESEARCH IN PLANT GENETICS**

(Cr ar) Staff

### **Animal Science (AnSc)**

#### **5-710 (180) SPECIAL PROBLEMS**

Research in an area of animal science under the supervision of a staff member. A written report of the research is required. (Cr ar; open to students who have completed pertinent prereq; prereq #) Staff

#### **8-810\* (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 and hrs ar; prereq #) Staff

**8-820\* (211) RESEARCH IN ANIMAL GENETICS**

Research in quantitative genetics, cytogenetics, and other areas related to animal breeding. (Cr and hrs ar; prereq #) Staff

**8-830\* (231) RESEARCH IN ANIMAL PHYSIOLOGY**

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 and hrs ar; prereq #) Staff

**8-840\* (212) RESEARCH IN ANIMAL NUTRITION**

Research in selected areas of animal nutrition. Research topics and animal species determined by consultation. (Cr and hrs ar; prereq #) Staff

**8-850\* (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 and hrs ar; prereq #) Staff

## **Entomology, Fisheries, and Wildlife‡‡**

*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.*

### **Entomology (Ent)**

**3-100 (55) ENTOMOLOGICAL TECHNIQUES**

Practical laboratory instruction in mounting, preservation of insect larvae; preparation of microscopic mounts of minute insects, labeling, classifying, and cataloging specimens of insects for scientific study. (1-3 cr; prereq 3-175 [74] or equiv, #) Cook

**8-503\* (243) RESEARCH IN ENTOMOLOGY**

(Cr ar) Hodson, Chiang, Cook, Cutkomp, Harein, Peterson, Price, Richards, Brooks, Furgala, Kulman, Radcliffe

### **Fisheries and Wildlife (FW)**

**8-367\* (267) RESEARCH IN FISHERY BIOLOGY**

(Cr ar) Smith, Underhill, Waters

**8-380\* (280) RESEARCH IN WILDLIFE BIOLOGY**

(Cr ar) Frenzel, Marshall, Tester, Beer, Peek

### **Plant Pathology (PIPa)**

**8-090\* (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, Calpouzou, MacDonald, Mirocha, Moore, Kennedy, Rowell, Banttari

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

**8-110\* (207) PROBLEMS IN MYCOLOGY**

Research along lines such as taxonomy of natural groups, fungus flora of particular regions, localities, or habitats; investigations of fungi involved in industrial or natural processes; morphology and physiology of special forms. (Cr ar; prereq 5-106 [106], 5-107 [107]) Christensen, French

**8-301\* (209) RESEARCH IN PLANT VIROLOGY**

Identification, transmission, purification, serological or histological studies involving viruses, their host plants and vectors. (Cr ar; prereq 5-300 [117] or ♯) Banttari

**8-401\* (205) RESEARCH IN PHYTOBACTERIOLOGY**

Special assignments on problems of current interest; investigations related to ecology and interaction among bacterial plant pathogens and their hosts. (Cr ar; prereq 5-400 [118] or ♯) Kennedy

**8-501\* (201) RESEARCH IN NEMATOLOGY**

Taxonomy or ecology of plant parasitic nematodes. (Cr ar; prereq 5-500 [101] or ♯) MacDonald

## Rhetoric (Rhet)

**1-222 (22) PUBLIC SPEAKING**

A practical course in the fundamentals of speechmaking. 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

**1-147 (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; each section limited to 30 students) Price, 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

**3-551 (51) EXPOSITION**

Essays and articles, technical writing, application letters, review of English usage. (3 cr; limited to 25 students; prereq jr; II MTWThF; AgEng 105) Savage

## Soil Science (Soil)

**5-114\* (130) SPECIAL PROBLEMS IN SOILS**

Research, readings, instruction. (1-5 cr per term [10 cr max]; prereq 1-122 or equiv) Martin, Blake, Arneman, Rust, Farnham, Grava, Caldwell, MacGregor, Schmidt, Adams, Baker, Ham

**8-124\* (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, Blake, Arneman, Rust, Farnham, Grava, Caldwell, MacGregor, Schmidt, Adams, Baker, Ham

## COLLEGE OF FORESTRY

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

### Forestry (For)

Offered on the St. Paul Campus

- 8-100\* (200) **RESEARCH PROBLEMS IN SILVICULTURE**  
(Cr ar) Bakuzis, B Brown, Hansen, Scholten, Tappeiner
- 8-101\* (215) **RESEARCH PROBLEMS IN FOREST-TREE PHYSIOLOGY**  
(Cr ar) Sucoff
- 8-102\* (220) **RESEARCH PROBLEMS IN FOREST-TREE GENETICS**  
(Cr ar) Mohn
- 8-103\* (221) **RESEARCH PROBLEMS IN FOREST HYDROLOGY**  
(Cr ar) Mace
- 8-200\* (203) **RESEARCH PROBLEMS IN FOREST MANAGEMENT**  
(Cr ar) B Brown, Hughes, Irving, Hallgren, Winsness
- 8-201\* (205) **RESEARCH PROBLEMS IN FOREST ECONOMICS**  
(Cr ar) Gregersen, Hughes, Skok
- 8-202\* (218) **RESEARCH PROBLEMS IN FOREST MEASUREMENTS**  
(Cr ar) Meyer, Gerrard, John
- 8-203\* (219) **RESEARCH PROBLEMS IN FOREST RECREATION**  
(Cr ar) Hansen, Hughes, Merriam
- 8-204\* (222) **RESEARCH PROBLEMS IN FOREST POLICY**  
(Cr ar) Hughes, Irving, Merriam, Skok, Winsness, Gregersen
- 8-205\* (217) **RESEARCH PROBLEMS IN REMOTE SENSING AND PHOTOGRAMMETRY**  
(Cr ar) Meyer, Gerrard, John
- 8-300\* (207) **RESEARCH PROBLEMS IN FOREST PRODUCTS ENGINEERING**  
(Cr ar) Haygreen, Hossfeld, Kaufert, Erickson, Gertjejansen
- 8-301\* (213) **RESEARCH PROBLEMS IN FOREST UTILIZATION**  
(Cr ar) Haygreen, Hossfeld, Kaufert, Erickson, Gertjejansen, Thompson

Offered at Lake Itasca Forestry and Biological Station

(Special Term for Forestry Students—August 31 to September 24)

Required of all Forest Resources Development and Forest Science majors. Must be completed between the sophomore and junior years. Course and other entrance requirements for the Itasca Forestry Session are given on page 15 of the 1969-71 *School of Forestry Bulletin*. Admission without these requirements requires the approval of the director of the Itasca Forestry Session. Transfer students must have been accepted for admission into the College of Forestry, and registration for Itasca is administered at the same time as the fall quarter registration in early August. The schedule is arranged to occupy the student's full time for 5½ days per week. Largely field or laboratory work. All students must register for the following courses.

- 3-100 (50) IMPORTANT FOREST PLANTS**  
Identification of forest plants as related to forest types. (2 cr) Scholten
- 3-101 (54) FOREST ECOLOGY**  
Ecological principles. Silvical characteristics of trees and shrub species. Forest communities and environmental factors. The ecology of recreational areas. (3 cr) Sucoff
- 3-201 (56) FIELD FOREST MEASUREMENTS**  
Introduction to and use of instruments in forest mensuration. (1 cr; prereq Math 1-008 [T]) Hallgren

## COLLEGE OF HOME ECONOMICS

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

### Home Economics (HE)

- 1-553 (24B) THE HOME: SELECTION AND FURNISHINGS EXPERIENCES 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, §GC 1-733; limited to 24 students; prereq soph; II-III MTWThF; McNH 433) Goacher
- 3-581 (58A) FIELD EXPERIENCES: RELATED ART**  
Supervised work-study program with professional firm, agency, or institution such as interior design studio, art museum, or housing authority. (3 cr; limited to 11 students; prereq completion of at least one half of professional sequence and #; Psy 1-002 [2]; hrs and rm ar) Ar
- 3-582 (58B) FIELD EXPERIENCES: RELATED ART**  
Supervised work-study program in display design and/or crafts. (3 cr; limited to 11 students; prereq completion of at least one half of the professional sequence and #; hrs and rm ar) Abell
- 5-584 (220) READINGS: RELATED ART**  
Independent study and review of books and periodicals. (1-3 cr; not open to srs; prereq #; hrs and rm ar) Esteros and others
- 5-585, 5-586, 5-587 PROBLEMS: RELATED ART**  
Independent study in related art under tutorial guidance. (3 cr each qtr [9 cr max]; prereq permission of chm; hrs and rm ar) Esteros and others
- 5-587 (126A) PROBLEMS IN RELATED ART: ENAMELING DESIGN (Workshop)**  
Independent study in related art under tutorial guidance. (3 cr each term [9 cr max]; limited to 20 students; prereq permission of chm; July 20-August 5; II-VIII MTWThF; hrs ar) Abell
- 8-251 (295) PROBLEMS: FAMILY SOCIAL SCIENCE**  
Independent study and written reports. (1-5 cr per term; prereq #; hrs ar) Hey and others
- 8-392 (295) PROBLEMS: FOODS**  
Independent study and written reports. (1-5 cr per term; prereq #; hrs ar) Gordon
- 8-396 (295) PROBLEMS: NUTRITION**  
Independent study and written reports. (1-5 cr per term; prereq #; hrs and rm ar) Sirny and others
- 8-661 (201) READINGS: CLOTHING**  
(1-3 cr; prereq 5-621 [102], 5-661 [115] or 5-662 [116], #; hrs ar) Grindereang
- 8-663 (295) PROBLEMS: TEXTILES AND CLOTHING**  
Independent study and written reports. (1-5 cr per term; prereq #; hrs ar) Grindereang

# College of Biological Sciences

## Biochemistry (BioC)

### 3-990 (99) UNDERGRADUATE RESEARCH

Research problems for B.S. thesis (optional). (1-3 cr; prereq sr biochemistry major) Staff

### 8-990 (299) GRADUATE RESEARCH

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

## Biology (Biol)

### 1-002 (2) GENERAL BIOLOGY

See section on 10-week courses, page 157.

### 3-013 (52) MICROBIOLOGY

(Same as MicB 5-105) 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 protists. (4 cr, §MicB 5-105; prereq 1-002 [2] or Δ, Chem 3-302 [62]; lect II MTWThF, Z 313; lab III-IV MTWTh, Mayo A-205) Klein

## Botany (Bot)††

### 8-990 (299) RESEARCH PROBLEMS

(Cr ar; prereq #) Staff

## Genetics and Cell Biology (GCB)

### 3-970 (97) INDEPENDENT STUDY

Individual study on selected topics or problems with emphasis on selected readings and use of scientific literature. (Cr ar; prereq #) Staff

### 3-990 (99) LABORATORY RESEARCH

Individual projects on selected topics and problems. (Cr ar; prereq #) Staff

### 8-990 (299) RESEARCH

(Cr ar) Staff

## Zoology (Zool)††

### 3-990 (99) INDIVIDUAL WORK IN SOME SPECIAL DISCIPLINE

(Cr ar; prereq Biol 1-002 [2] or 3-011 [50] and #) Staff

### 8-990 (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)

- 5-805 (112) **AQUATIC FLOWERING PLANTS**  
(5 cr; limited to 20 students; prereq course in taxonomy; WS) Beal
- 5-815 (157) **BRYOPHYTES**  
(5 cr; limited to 20 students; prereq 10 cr biology or #; MTh) Sharp
- 8-990 (299) **RESEARCH PROBLEMS**  
(Cr ar; prereq #) Staff

## Ecology and Behavioral Biology (Ecol)

- 5-018 (138) **WETLAND ECOLOGY**  
(5 cr; limited to 15 students; prereq 15 cr biology...introductory chemistry, or #...Biol 3-041 [80] recommended; TF) Hofstetter
- 5-019 (139) **PALEOECOLOGY**  
(5 cr; limited to 15 students; prereq 3-001 [50] or Biol 3-041 [80] and Bot 3-201 [52] or equiv; WS) Shay
- 5-812 (119) **AQUATIC ECOLOGY**  
(5 cr; limited to 20 students; prereq 15 cr biology; MTh) Brook
- 5-813 (120) **ADVANCED LIMNOLOGY**  
(5 cr; limited to 15 students; prereq 5-812 [119] or Bot 5-811 [155] or equiv; WS) Megard
- 5-817 (162) **VERTEBRATE ECOLOGY**  
(5 cr; limited to 15 students; prereq course in ecology; TF) Tester
- 5-890 (195) **PROBLEMS**  
(Cr ar; prereq #) Staff

## Entomology (Ent)

- 5-130 (129) **AQUATIC ENTOMOLOGY**  
(5 cr; limited to 15 students; prereq 5-020 [159] or equiv; MTh) Cook
- 5-904 (196) **SPECIAL PROBLEMS IN ENTOMOLOGY, FISHERIES, AND WILDLIFE**  
(Cr ar; prereq #) Staff

## **Plant Pathology (PIPa)**

**5-102 (156) INTRODUCTORY MYCOLOGY**  
(5 cr; limited to 15 students; prereq 9 cr botany; WS) Bandoni

**8-110 (207) PROBLEMS IN MYCOLOGY**  
(Cr ar; prereq #) Staff

## **Zoology (Zool)**

**5-819 (119) NATURAL HISTORY OF VERTEBRATES**  
(5 cr; limited to 20 students; prereq Biol 1-002 [2] or equiv; MTh) Underhill

**5-843 (143) ANIMAL PARASITES**  
(5 cr; limited to 15 students; prereq Biol 1-002 [2] or equiv; TF) Larson

**8-990 (299) GRADUATE RESEARCH**  
(Cr ar; prereq #) Staff

# School of Business Administration

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

## Accounting (Acct)

### 1-024 (24) PRINCIPLES OF ACCOUNTING

Recording, reporting, and interpreting business events. Use of accounting as a tool of business management. (3 cr, §3-050 [55A]; each section limited to 40 students; prereq 3rd qtr fr)

Sec 1, I-II MWF, BlegH 125  
Sec 2, III-IV MWF, BlegH 110

### 1-025 (25) PRINCIPLES OF ACCOUNTING

Continuation of Acct 1-024. (3 cr, §3-051 [55B]; each section limited to 40 students; prereq 1-024 [24])

Sec 1, I-II MWF, BlegH 205, Simmons  
Sec 2, I-II MWF, BlegH 225  
Sec 3, III-IV MWF, BlegH 255

### 1-026 (26) PRINCIPLES OF ACCOUNTING

Third quarter of Acct 1-024/1-025/1-026 (see Acct 1-024). (3 cr, §3-051 [55B]; each section limited to 35 students; prereq 1-024 [24])

Sec 1, I-II MWF, BlegH 255, Ar  
Sec 2, III-IV MWF, BlegH 105, Ar

### 3-102 (102) ACCOUNTING THEORY AND PRACTICE II

Managerial accounting considerations. (4 cr; limited to 40 students; prereq 3-101 [101]; III-IV MTWF; BlegH 135)

### 5-125 (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; limited to 40 students; prereq 3-201 [103] or §3-201; III-IV MTWF; BlegH 145)

### 5-136 (136) INCOME TAX ACCOUNTING II

Tax problems of individuals, partnerships, and corporations. Coverage includes tax compliance and research; relationship of income taxation to gift and estate taxation. (3 cr; limited to 40 students; prereq 5-135 [135]; I-II MWF; BlegH 135) White

## Finance (BFin)

### 3-000 (56) FINANCE FUNDAMENTALS

A comprehensive introduction to the main concepts in finance and some of their applications in forecasting; money and capital markets; cost of capital, leverage, and financial policy; risk and return on investments; portfolio choice and performance measurement; cost benefit analysis. (3 cr, §8-000 [156]; limited to 40 students; prereq Acct 1-026 [26]; III MTWThF; BlegH 230) Schreiner

### 3-100 (57) FINANCIAL MANAGEMENT

Seeks to develop capability in corporate financial management through use of cases and readings. Participants gain experience in problem definition, analysis, and presentation. Concepts introduced in BFin 3-000 are examined in greater depth. (3 cr, §8-100 [257]; limited to 20 students; prereq 3-000 [56]; IV MTWThF; BlegH 245) Schreiner

**3-300 (66) INVESTMENT FUNDAMENTALS**

An introduction to the management of investment funds. In addition to considering the instruments and institutional structure of the securities markets, this course focuses on analytical techniques of security selection and portfolio management. (3 cr; limited to 40 students; prereq 3-000 [56]; V MTWThF; BlegH 255) Jessup

**8-990 (296A) READINGS IN BUSINESS FINANCE**

Readings useful to student's individual program and objectives but not available in regular course offerings. (Cr ar; prereq consent of adviser and \$ in field covered) Ar

## **Industrial Relations (IR)**

**3-002 (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, \$5-022 [152]; limited to 50 students; prereq Econ 1-002 [2] or equiv; II MTWThF; BlegH 110) Bognanno

**3-012 (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, \$5-032 [172]; prereq Econ 1-002 [2] or \$; IV MTWThF; BlegH 150) Pinto

**3-017 (142) SETTLEMENT OF INDUSTRIAL RELATIONS DISPUTES**

Nature of industrial conflict in employment relations; stresses contributing to conflict and dispute situations; public and private approaches to the prevention, reduction, and resolution of conflicts. (3 cr; prereq 3-002 [52] or 5-022 [152]; III MTWThF; BlegH 440) Smythe

**5-022 (152) SYSTEMS OF INDUSTRIAL RELATIONS: LABOR MARKETING**

See IR 3-002. (3 cr, \$3-002; limited to 10 students; prereq Econ 1-002 [2] or equiv or \$; II MTWThF; BlegH 110) Bognanno

**5-032 (172) SYSTEMS OF INDUSTRIAL RELATIONS: MANPOWER MANAGEMENT**

See IR 3-012. (3 cr, \$3-012 [72]; prereq Econ 1-002 [2] or \$; IV MTWThF; BlegH 150) Pinto

**8-000 (272) GRADUATE TOPICS**

Selected topics in industrial relations. (3 cr; prereq 5-022 [152] or 5-032 [172] or \$; II MTWThF; BlegH 430) Weitzel

**8-007 (232) COLLECTIVE BARGAINING: THE PROCESS**

Examines the collective bargaining process in terms of its functions, variants, determinants, practices, and impacts. (3 cr; prereq 5-022 [152] or \$; IV MTWThF; BlegH 430) Bognanno

## **Insurance (Ins)**

**3-100 (53) RISK MANAGEMENT AND INSURANCE**

The nature and economic significance of risk. The recognition, measurement, and treatment of risk with particular emphasis on 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, \$8-100 [153]; prereq Econ 1-002 [2] or equiv; 7:30-8:55 TWTh; BlegH 110) Whitman

**8-100 (153) RISK MANAGEMENT AND INSURANCE**

See Ins 3-100. (3 cr, §3-100 [53]; prereq Econ 1-002 [2] or equiv; 7:30-8:55 TWTh; BlegH 110) Whitman

**8-990 (293A) READINGS IN RISK MANAGEMENT AND INSURANCE**

Readings useful to student's individual program and objectives but not available in regular course offerings. (3 cr; prereq consent of adviser and § in field covered) Ar

## Management (Mgmt)

**3-001 (70) FUNDAMENTALS OF MANAGEMENT**

Study of concepts, theory, research, and operational problems. Includes the principal functional areas of management. Examines provisions of necessary factors and relationships to achieve organizational objectives: establishment of goals, policies, procedures, organizational structure and behavior; leadership; control systems. (3 cr, §8-001 [150]; each section limited to 40 students)

Sec 1, I MTWThF, BlegH 425, Ar

Sec 2, II MTWThF, BlegH 415, Ar

**3-002 (80) PSYCHOLOGY IN MANAGEMENT**

Centers on behavior principles and methods which underlie managerial competence in preventing and solving problems within and between individuals and groups and which aid in effective utilization of human resources. Various lab methods are used to highlight concepts, methods, and skills. (3 cr, §8-006 [250E]; each section limited to 30 students)

Sec 1, II MTWThF, BlegH 330, Ar

Sec 2, III MTWThF, BlegH 330, Ar

## Marketing (Mktg)

**3-000 (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, §8-000 [157]; limited to 105 students; prereq Econ 1-002 [2] or equiv) Ar

Sec 1, I MTWThF, BlegH 415

Sec 2, III MTWThF, BlegH 120

**3-075 (75) SALES MANAGEMENT**

Sales policies and planning, sales organization, selection, training, and compensation of salesmen, control of sales performance, sales budgets, and cost control. Case materials. (3 cr; prereq 3-000 [57]; II MTWThF; BlegH 120) Ar

**3-077 (77) ADVERTISING**

A survey of economics and functions of advertising, budgets, agencies, media, copy layout, printing process, and research. (3 cr; prereq 3-000 [57]; IV MTWThF; BlegH 420) Ar

**3-098 (98) SOCIAL PSYCHOLOGY OF BEHAVIOR**

Presentation of the basic principles of social influence and research techniques used in the area. Particular emphasis is placed upon the experimental approach. (3 cr; prereq 3-000 [57]; III MTWThF; BlegH 415) Ar

**8-000 (157) PRINCIPLES OF MARKETING**

See Mktg 3-000. (3 cr, §3-000 [57]; limited to 15 students; prereq Econ 1-002 [2] or equiv; III MTWThF; BlegH 120) Ar

**8-075 (275) SALES MANAGEMENT**

See Mktg 3-075. (3 cr; prereq 3-000 [57]; II MTWThF; BlegH 120) Ar

**8-077 (277) ADVERTISING**

See Mktg 3-077. (3 cr; prereq 3-000 [57]; IV MTWThF; BlegH 420) Ar

**8-098 (298) SOCIAL PSYCHOLOGY OF BEHAVIOR**

See Mktg 3-098. (3 cr; prereq 3-000 [57]; III MTWThF; BlegH 415) Ar

## Quantitative Analysis (QA)

### 3-053 (53) **QUANTITATIVE METHODS FOR ADMINISTRATION II**

Introduction to decision problems; simple static models; static models dominated by constraints; dynamic models; and simulation. (3 cr; limited to 150 students; prereq 3-052 [52] and Econ 1-002 [2] or #; lect IV TTh; AndH 250)

Lab 1, IV-V MWF, BlegH 125

Lab 2, IV-V MWF, BlegH 205

Lab 3, IV-V MWF, BlegH 225

Lab 4, IV-V MWF, BlegH 240

### 8-158 (158) **QUANTITATIVE APPROACHES TO ADMINISTRATIVE PROBLEMS I**

Uses of probability, statistics, mathematics, economic analysis, and operations research in the solution of business problems at administrative levels. (3 cr, §3-054 [54]; prereq 8-150 [150], 8-151 [151], 2 qtrs economics; lect II TTh; Lab II-III MWF; BlegH 335)

## Transportation (Tran)

### 3-054 (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, §8-154 [154]; each section limited to 50 students; prereq Econ 1-002 [2] or equiv)

Sec 1, III MTWThF, BlegH 220, Ar

Sec 2, IV MTWThF, BlegH 220, Ar

# College of Education

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

## Art Education (ArEd)

### 1-207 (17C) EXPERIENCES WITH PICTORIAL EXPRESSION

Materials, techniques, and ideas important in art expression; relationship between adult expression, child expression, and art history. (3 cr; limited to 30 students; III-IV MTWThF; WuH 240) Leary

### 3-001 (10C) SURVEY OF ART ACTIVITIES

Introduction to pictorial expression, design, and the function of art in the social environment. (3 cr; limited to 30 students; I-II MTWThF; WuH 240) Leary

### 3-020 (80C) CONTEMPORARY CRAFTS

Materials, equipment, design criteria, and techniques for textile, wood, metal, and ceramics. (3 cr; each section limited to 25 students) Kain

Sec 1, I-II MTWThF, WuH 210

Sec 2, III-IV MTWThF, WuH 210

### 5-384 (184) IMPROVING ART PROGRAMS IN THE ELEMENTARY SCHOOL

Evaluating research findings; introducing new materials; developing co-operation between classroom teachers and art education specialists. (3 cr; limited to 30 students; prereq tchg exper or #; II MTWThF; WuH 110) Olson

### 5-900 (195) PROFESSIONAL PROBLEMS

Independent study for MEd candidates integrating learning from art education, art, and education. (3 cr; prereq MEd students; hrs ar) Olson

### 8-900\* (295) PROBLEMS: ART EDUCATION

Independent projects under staff guidance may include advanced studio practice or technical problems requiring experimental or library research. (Cr and hrs ar; prereq #) Olson

## Child Psychology (CPsy)

### 3-301 (80) CHILD PSYCHOLOGY

Introduction to science of child behavior; emphasis upon critical review of theories and research. (3 cr; prereq Psy 1-002 [2]; II MTWThF; SciCB 325) Siegel

### 5-303 (81) ADOLESCENT PSYCHOLOGY

Physical, cognitive, and social development during adolescence. (3 cr; prereq Psy 1-002 [2]; III MTWThF; SciCB 325) Knight

### 5-311 (140) BEHAVIOR PROBLEMS

Types, origin, development, and treatment of behavior difficulties in normal children. (3 cr; prereq 3-301 [80] or equiv; II MTWThF; Arch 5) Newirth

### 5-315 (143) PROBLEMS OF MENTAL DEFICIENCY

Diagnosis, care, training; social and vocational problems. (3 cr; prereq 3-301 [80] or equiv; III MTWThF; Arch 5) Peskay

### 5-317 (144) PSYCHOLOGY OF THE GIFTED CHILD

Psychology and development of high intellectual ability and of special talents. (3 cr; prereq 3-301 [80]; IV MTWThF; CD 218) Ar

**5-319 (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 child psychology, psychology, educational psychology, or sociology; I MTWThF; Bu 120) Gross

**5-331 (100) PROCESSES OF SOCIALIZATION OF CHILDREN**

Processes of social learning of children; identification, imitation, reward and punishment, internalization, and object choice. (3 cr; prereq 3-301 [80] or grad; IV MTWThF; Arch 5) Newirth

**5-970 (190) DIRECTED READINGS IN CHILD PSYCHOLOGY**

Independent reading. (Cr ar; prereq #) Templin

**5-990 (190) RESEARCH IN CHILD PSYCHOLOGY**

Independent research. (Cr ar; prereq #) Templin

## **Educational Administration (EdAd)**

**5-128†† (128) WORKSHOP: EDUCATIONAL ADMINISTRATION (Part II)**

See section on 10-week courses, page 157.

**5-139†† (139) LABORATORY IN DECISION MAKING**

Section 1: Part II

See section on 10-week courses, page 157.

Section 2: (July 19-August 4)

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; VI-

**8-201 (201) FOUNDATIONS OF EDUCATIONAL ADMINISTRATION**

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; EntFW 495) Hendrix

**8-221 (221) ANALYSIS OF ADMINISTRATIVE PROBLEMS**

Quantitative techniques for the analysis of problem and decision situations in the administration of educational organizations. (3 cr, 8-220/8-221†; prereq 8-220, educational administration major or Δ; V MTWThF; HrSci 310) Hendrix

**8-224 (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; IV MTWThF; HrSci 416) Hooker

**8-265 (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; I MTWThF; HrSci 416) Nickerson

**8-270\* (270A) PROBLEMS: ELEMENTARY SCHOOL ADMINISTRATION**

(Cr and hrs ar; prereq #) Lambert, Cross, Alkire

†† 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.

- 8-271\* (270B) PROBLEMS: SECONDARY SCHOOL ADMINISTRATION**  
(Cr and hrs ar; prereq #) Hooker, Hendrix, Morgan, Mueller, Nickerson, Sederberg, Mazzoni, Stark
- 8-272\* (228) PROBLEMS: EDUCATIONAL ADMINISTRATION**  
(1-3 cr; hrs ar) Hooker, Hendrix, Keller, Lambert, Cross, Morgan, Mueller, Nickerson, Sederberg, Alkire, Mazzoni, Stark
- 8-273 (236) FIELD STUDY**  
(0-10 cr; prereq #; hrs ar) Hooker, Keller, Lambert, Cross, Morgan, Mueller, Nickerson, Sederberg, Alkire, Mazzoni, Stark
- 8-274 (274) THE JUNIOR COLLEGE**  
Present status, development, functions, organization, curriculum, and trends. (3 cr; II MTWThF; HrSci 416) Morgan
- 8-275 (275) JUNIOR COLLEGE ADMINISTRATION**  
Selected topics and problems associated with administration and administrative positions. (3 cr; prereq 8-274 [274] or #; III MTWThF; HrSci 416) Morgan

## Educational Psychology

### *Counseling and Student Personnel Psychology (CSPP)*

- 5-101 (EdCI 124) FOUNDATIONS OF CAREER DEVELOPMENT**  
(3 cr; limited to 30 students; II MTWThF; NH 201) Borow
- 5-130 (EPsy 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 230) Tennyson
- 8-301 (EPsy 228) WORKSHOP: COUNSELING PSYCHOLOGY**  
For experienced counselors who want to design and test applications of counseling concepts to specific problems of practice in the field. (3-6 cr per qtr [max 12 cr]; limited to 20 students; prereq #: I-VII MTWThF; FoH 102) Briskin
- 8-540 (EPsy 252) SEMINAR: THE COLLEGE STUDENT**  
Psychology and sociology of college students; research concerning diversity of college student populations, vocational development of students, student society, culture, mental health, underachievement, drop-outs, values, and attitudes. Relevant research methods. (1-3 cr; limited to 12 students; prereq 6 cr psychology or educational psychology; I-II MWF; Bu 125) Parker
- 8-620 (EPsy 237) PRACTICUM IN GROUP COUNSELING (Part II)**  
See section on 10-week courses, page 157.
- 8-900\* (EPsy 233) PROBLEMS: GUIDANCE AND PERSONNEL WORK**  
Independent study. (1-9 cr; hrs and rm ar) Parker, Tennyson, A Anderson, Hummel, Shaffer

### *Psychological Foundations (PsyF)*

- 5-110 (EPsy 116) INTRODUCTORY STATISTICAL METHODS**  
Basic statistical techniques; comprehension of literature using elementary concepts and methods. This course is not equivalent to 8-110 (EPsy 216), 8-310 (EPsy 216A). (3 cr; each section limited to 45 students)  
Sec 1, III MTWThF, Bu 123, Hoyt  
Sec 2, IV MTWThF, WuH 230, Ar

- 5-120 (EPsy 110) EDUCATIONAL MEASUREMENT IN THE CLASSROOM**  
Principles and methods for construction, evaluation, and improvement of test materials and procedures for use in classroom instruction. (3 cr; each section limited to 35 students) Farland  
Sec 1, III MTWThF, WuH 130  
Sec 2, IV MTWThF, WuH 130
- 5-121 (EPsy 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 5-110 [EPsy 116] or 8-110 [EPsy 216], or Psy 3-801 [90] or equiv; I MTWThF; WuH 230) Ar
- 5-140 (EPsy 192) INTRODUCTION TO LEARNING AND COGNITION (Part II)**  
See section on 10-week courses, page 157.
- 5-141 (EPsy 193) PSYCHOLOGY OF SCHOOL LEARNING**  
A survey course devoted to an examination of psychological conceptions of the learner, the school process and the implications of these conceptions for education. (3 cr; II MTWThF; WuH 230) Ar
- 5-143 (EPsy 195) EXPERIMENTAL ANALYSIS OF INSTRUCTION II**  
Laboratory study of instruction; theoretical foundations; applications to programmed instruction and behavior modification. (3 cr; prereq 5-140 [EPsy 192] or Psy 5-017 [117] or #; IV MTWThF; Pt 110) Ar
- 5-160 (EPsy 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; III MTWThF; Ph 210) Borow
- 5-170 (EPsy 125) SOCIAL PSYCHOLOGY OF EDUCATION**  
Concepts and theories in areas of 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; II MTWThF; Pt 110) Ar
- 8-111 (EPsy 217) STATISTICAL METHODS**  
Foundations of statistical theory; practice in applying theories to solution of educational and psychological problems. (3 cr per qtr; prereq 8-110 [216]; I MTWThF; Ph 210) MacEachern
- 8-112 (EPsy 218) STATISTICAL METHODS (Part II)**  
See section on 10-week courses, page 157.
- 8-120\* (EPsy 208) METHODS IN EDUCATIONAL RESEARCH**  
Methods and techniques employed in investigation and report of educational problems. Suggested for all candidates for degrees. (3 cr; II MTWThF; Arch 140) Hoyt
- 8-311 (EPsy 217A) STATISTICAL METHODS LABORATORY**  
For students who wish more experience in solution of problems and use of machines than is obtained in 8-111. (2 cr per qtr; limited to 22 students; prereq #8-111 [217]; II-III TWTh; WuH 330) Ar
- 8-312 (EPsy 218A) STATISTICAL METHODS LABORATORY (Part II)**  
See section on 10-week courses, page 157.
- 8-900\* (EPsy 253) RESEARCH PROBLEMS**  
(Cr ar; prereq #) Hoyt, MacEachern
- 8-920\* (EPsy 240) PROBLEMS: MEASUREMENT**  
Intensive study and individual research. (3 cr per qtr) Ar

## School Psychology (SchP)

- 5-310 WORKSHOP: CONTEMPORARY PRACTICES IN PSYCHOEDUCATIONAL ASSESSMENT (June 28 to August 6)**  
(See section on Schools, Colleges, and Special Programs, page 167.) Methods other than traditional individual intelligence testing; didactic and practicum experiences in assessing the school as a social system, measuring patterns of classroom interaction, behavioral analysis, screening for early identification of psychoeducational problems, and techniques of assessing social and personality maladjustment. (5 cr; limited to 18 students; prereq #: II-IV MTWThF; CD 105) Hall, Scarr, Shrago, Weinberg
- 5-311 WORKSHOP: CONTEMPORARY PRACTICES IN PSYCHOEDUCATIONAL INTERVENTION (June 28 to August 6)**  
(See section on Schools, Colleges, and Special Programs, page 167.) Intervention methods specific to school settings; systems intervention, instructional intervention, behavior modification, program evaluation, early childhood intervention, group and family therapies. (5 cr, §§8-513, 8-514 [EPsy 214]; limited to 18 students; prereq 5-310 or ¶5-310 and #: VI-VII MTWThF; CD 105) Hall, Scarr, Shrago, Weinberg
- 8-610 (EPsy 287) PRACTICUM: SCHOOL PSYCHOLOGICAL SERVICES**  
Field experience under supervision; typical functions of school psychologists; assessment procedures, case studies, consultation with parents, school personnel, and community agencies; participation in seminar. (1-3 cr; prereq #: hrs and rm ar) Shrago
- 8-700 (EPsy 299) INTERNSHIP: SCHOOL PSYCHOLOGICAL SERVICES**  
Advanced field experience for doctoral candidates in school psychology. (5-15 cr; prereq 8-610 [EPsy 287] and #: hrs and rm ar) Weinberg

## Special Education (SpEd)

- 5-101 (EPsy 182) EDUCATION OF EXCEPTIONAL CHILDREN**  
Introduction to field of special education for classroom teachers and other school personnel. (3 cr; limited to 50 students; IV MTWThF; Pt 102) Munro
- 5-111 (EPsy 161) DIAGNOSIS AND REMEDIATION OF LEARNING DISABILITY II**  
Survey, demonstration, and evaluation of special techniques for amelioration of deficits in perceptive, integrative, and expressive processes. (3 cr; limited to 24 students; prereq 5-110 [EPsy 160], ¶5-611 [EPsy 161A] and #: V-VI MTWThF; Pt 214) Ar
- 5-112 (EPsy 165) EDUCATION OF LEARNING-DISABLED CHILDREN**  
Analysis of considerations in design and conduct of services for learning-disabled children; approaches to education of such children. (3 cr; VI MTWThF; Pt 215) Crump
- 5-120 (EPsy 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 5-101 [EPsy 182]; II MTWThF; Pt 214) Force
- 5-122 (EdCI 180) EDUCATION OF THE MENTALLY RETARDED IN THE SECONDARY SCHOOLS**  
Curriculum, materials, and methods of instruction for the educable mentally retarded students; philosophy, administration, vocational and personal guidance, parent consultation, and work programs. Field trips when possible. (3 cr; prereq 5-120 [EPsy 184]; III MTWThF; Pt 214) Ar
- 5-150 (EPsy 186) EDUCATION OF EMOTIONALLY DISTURBED AND SOCIALLY MALADJUSTED CHILDREN**  
Discussion and evaluation of curricula, materials, and methods for instruction of disturbed and delinquent children in hospital, training school, and public school settings. (3 cr; prereq #: I MTWThF; Pt 215) Munro

**5-180 (EPsy 188) EDUCATION OF THE DISADVANTAGED**

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; Pt 102) Sullivan

**5-190 (EPsy 183) OUTSTANDING ABILITIES AND THE EDUCATIONAL PROCESS**

Critical analysis of the origin and development of terms such as giftedness, creativity, genius, talent, and intelligence; implications for educational practice; current issues and trends. (3 cr; III MTWThF; Pt 102) Ar

**5-320 (EdCI 100A) WORKSHOP: EDUCATION OF TRAINABLE RETARDED CHILDREN**

Curriculum and materials for teaching trainable mentally retarded children. (6 cr; limited to 16 students; prereq #; II-VIII MTWThF; J 1) Miller

**5-611 (EPsy 161A) PRACTICUM: DIAGNOSIS AND REMEDIATION OF LEARNING DISABILITY II (June 15-August 6)**

Clinical practice in prescriptive teaching using a selected range of techniques presented in 5-111. (3 cr; limited to 24 students; prereq 5-610 [EPsy 160A], ¶5-111 [EPsy 161], and #; I MTWThF; Pt 111; II-IV MTWThF; CD 218) Crump

**8-900\* (EPsy 253) RESEARCH PROBLEMS**

(Cr and hrs ar; prereq #) Reynolds, Force, Crump, Munro, Sullivan

## Elementary Education (Elem)

**3-300 (EdCI 63) CHILDREN'S LITERATURE**

(3 cr; limited to 40 students; I MTWThF; Bu 123) Ar

**3-377 (EdCI 76) NURSERY SCHOOL-KINDERGARTEN CURRICULUM II**

(3 cr; limited to 25 students; prereq 3-376 [EdCI 56]; II MTWThF; CD 216) Vizenor

**3-391 (EdCI 62) TEACHING MATHEMATICS IN THE ELEMENTARY SCHOOL**

(3 cr; limited to 25 students; prereq 3-100 [Ed 75A], Math 1-005 [5A], 1-006 [5B]; III MTWThF; Pt 111) Kirkpatrick

**5-100 (EdCI 119) ELEMENTARY SCHOOL CURRICULUM**

(3 cr; limited to 40 students; prereq 3-101 [Ed 75B]; II MTWThF; Bu 120) Ar

**5-107 (EdCI 151) DIAGNOSIS AND TREATMENT OF LEARNING DIFFICULTIES**

(3 cr; limited to 40 students; II MTWThF; Pt 111) Ar

**5-300 (EdCI 121) LITERATURE FOR THE ELEMENTARY SCHOOL**

(3 cr; limited to 40 students; III MTWThF; Bu 120) Ar

**5-316 (EdCI 153) TEACHING AND SUPERVISION OF ENGLISH IN THE ELEMENTARY SCHOOLS**

(3 cr; limited to 30 students; prereq 3-316 [EdCI 64] or elem school tchg exper; II MTWThF; WuH 130) Dykstra

**5-317 (EdCI 153A) MATERIALS LABORATORY FOR TEACHING ENGLISH IN ELEMENTARY SCHOOLS**

Examination and evaluation of textbooks, programmed materials and audio-visual resources for elementary school language arts instruction. (3 cr; limited to 25 students; prereq 3-316 [EdCI 64] or elem tchg exper; IV MTWThF; Bu 123) Dykstra

**5-331 (EdCI 143A) TEACHING AND SUPERVISION OF READING IN THE ELEMENTARY SCHOOL**

The class is planned for graduate students and summer students who already hold a Bachelor's degree in elementary education. Undergraduate students should register for 3-331 in First Term. (3 cr; limited to 50 students; prereq 9 cr in education; I MTWThF; Bu 120) D Pearson

- 5-334 (EdCI 145) READING DIFFICULTIES**  
(3 cr; limited to 40 students; prereq 5-331 [EdCI 143A] or SeEd 5-344 [EdCI 144]; III MTWThF; Bu 125) D Pearson
- 5-335 (EPsy 148) CLINICAL DIAGNOSIS OF READING DIFFICULTIES**  
Relationship to psychological factors and clinical remedial correction. (3 cr; limited to 20 students; prereq 5-334 [EdCI 145]; IV MTWThF; Bu 125) Ar
- 5-336 (EPsy 150) CLINICAL PRACTICE IN REMEDIAL TEACHING**  
Remedial tutoring of individual children who have difficulty in school learning. (3 cr; each section limited to 23 students; prereq 5-334 [EdCI 145] or 5-107 [EdCI 151] and #)  
Sec 1, I-II MTWThF, rm ar  
Sec 2, I-II MTWThF, rm ar
- 5-347 (EdCI 120A) WORKSHOP: CURRICULUM IMPLEMENTATION IN ELEMENTARY SCHOOL SCIENCE (July 19-August 3)**  
Focuses on a single science program to be determined through early registrants. Conducted mornings in an elementary school where program elements will be prepared, demonstrated, and taught. Afternoon sessions will be held on campus, will focus on teaching specific lessons, inservice programs. (3-6 cr; limited to 25 students; prereq elem tchg exper; VI-VIII MTWThF; Pt 102) Humphreys
- 5-348 (EdCI 120B) WORKSHOP: OUTDOOR SCIENCE EDUCATION (August 4-20)**  
Classroom and field work activities dealing with models, materials, and methods in the outdoor setting; held mornings in Elm Creek Park Reserve and on campus in the afternoon. (3 cr; limited to 25 students; prereq elem tchg exper; VI-VIII MTWThF; Pt 102) R Johnson
- 5-361 (EdCI 102) TEACHING SOCIAL STUDIES IN THE ELEMENTARY SCHOOL**  
The class is planned for graduate students and for summer students who already hold a Bachelor's degree in elementary education. Undergraduate students should register for 3-361 in First Term. (3 cr; limited to 40 students; prereq 3-101 [Ed 75B] or equiv; I MTWThF; Pt 214) Cogan
- 5-362 (EdCI 155A) MATERIALS LABORATORY FOR ELEMENTARY SOCIAL STUDIES TEACHERS**  
(3 cr; limited to 25 students; prereq 3-361 [EdCI 61] or 5-361 [EdCI 102] or #; IV MTWThF; Pt 214) Cogan
- 8-916\* (EdCI 296) PROBLEMS: TEACHING ENGLISH**  
(Cr ar) Dykstra
- 8-931\* (EdCI 273) PROBLEMS: READING**  
(Cr ar) Dykstra, Odland, D Pearson
- 8-961\* (EdCI 201) PROBLEMS: TEACHING SOCIAL STUDIES**  
(Cr ar; prereq 5-361 [EdCI 102] or SeEd 5-155 [EdCI 155], 5-168 [EdCI 168], 8-104 [EdCI 204] or #) Cogan
- 8-991\* (EdCI 261) PROBLEMS: IMPROVEMENT OF INSTRUCTION**  
(Cr ar; prereq #) Lambert, Jackson, Dykstra, Odland, Humphreys, Ryan, Cogan, R Johnson, D Pearson

## History and Philosophy of Education (HEd)

- 3-090 (90) THE SCHOOL AND SOCIETY**  
Readings in social science and philosophy give the student opportunity to integrate points of view in thinking about the role of the school in present-day society. (3 cr; each section limited to 65 students; prereq sr)  
Sec 1, I MTWThF, Arch 130, Landsverk  
Sec 2, II MTWThF, Arch 60, Landsverk  
Sec 3, III MTWThF, Arch 130, Harkins
- 5-141 (141) CRITICAL ISSUES IN CONTEMPORARY EDUCATION**  
Introduces graduate students to ideas involved in current theory and practice. (3 cr; limited to 65 students; II MTWThF; Arch 15) Beck

**5-182 (182) COMPARATIVE PHILOSOPHIES OF EDUCATION**

Examination of competing philosophies of education. (3 cr; limited to 65 students; III MTWThF; Arch 15) Beck

**8-241\* (241) PROBLEMS: HISTORY AND PHILOSOPHY OF EDUCATION**

For graduate students interested in research and original work in these areas. (Cr ar; prereq ♯) Beck, Harkins

## Mathematics Education (MthE)

**5-321 (121) MATERIALS LABORATORY FOR ELEMENTARY SCHOOL MATHEMATICS INSTRUCTION**

Printed and programmed materials, audio-visual aids, community resources; laboratory projects and techniques of using mathematical devices and instruments. (3 cr; limited to 20 students; prereq 5-311 [111] or Elem 3-391 [EdCl 62] or ♯; V-VIII MTWThF; Pt 111) Kirkpatrick

**5-345 (145) MATHEMATICS FOR GIFTED CHILDREN**

Curriculum and materials of instruction for academically talented children; development of enrichment units; source material for teachers. (3 cr; limited to 40 students; prereq 5-311 [111] or Elem 3-391 [EdCl 62] or ♯; IV MTWThF; Pt 111) Jackson

**8-980\* (280) PROBLEMS: MATHEMATICS EDUCATION**

(Cr and hrs ar; prereq 8-500 [200] or 8-570 [270]) Jackson

## Music Education (MuEd)

**3-011 (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 1-001 [4] or exemption) Byrne

Sec 1, II MTWThF, ScH 4

Sec 2, III MTWThF, ScH 4

**3-303 (53) TEACHING MUSIC IN THE SENIOR HIGH SCHOOL**

Music in the general education of high school students; methods and materials for music courses in the modern high school. (3 cr; prereq Mus 1-506 [6T] or ♯; I MTWThF; ScH 4) Steen

**5-111 (113) BIBLIOGRAPHY**

Sources, materials, and techniques. (3 cr; V MTWThF; ScH 4) Turrentine

**5-115 (172) TESTS AND MEASUREMENTS**

Principles of music aptitude and achievement testing; current status of music testing; survey of existing published tests in music. (3 cr; prereq ♯; IV MTWThF; ScH 103) Turrentine

**5-211 (101) PHILOSOPHIES OF MUSIC EDUCATION**

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

**5-212 (147) COMPARATIVE MUSIC EDUCATION**

Study, performance, and analysis of music; unique methods of instruction; roles of creative and performing musicians in elementary and secondary school music teaching in selected countries. (3 cr; prereq ♯; IV MTWThF; ScH 103) Caswell

**5-221 (106) MUSIC AND THE HUMANITIES IN THE SECONDARY SCHOOL**

Teaching music as part of the humanities emphasis in high schools; methods and music materials appropriate to the humanities. (3 cr; prereq Mus 1-506 [6T] and 1-603 [36] or ♯; II MTWThF; ScH 2) Steen

**5-306 (112) TEACHING MUSIC LITERATURE**

Principles, methods, and materials for teaching music history (appreciation) in grades K-12. (3 cr; prereq 3-011 [56] or 3-302 [50B] or §; IV MTWThF; ScH 4) Borg

**8-990\* (224) RESEARCH PROBLEMS**

Individual projects. (3-9 cr; prereq knowledge of elementary statistics; hrs ar; ScH 104) Caswell, Turrentine, Borg

**Physical Education, Recreation, and School Health****Physical Education For Men and Women (PE)**

(For Special Fees, see page 26.)

**ACTIVITY CLASSES—NONPROFESSIONAL (PE)**

(Open to all students)

Health Service approval is needed for activity classes. Courses are designated as (co-ed); (women only); (men only).

**1-007 (5A) SWIMMING**

(1 cr; each section limited to 24 students)  
 Sec 1 (co-ed), II MTWTh, CH Pool, Walker  
 Sec 2 (co-ed), III MTWTh, CH Pool, Walker

**1-022 (14A) BALLROOM DANCE**

Elementary steps of the foxtrot, waltz, tango, samba, cha-cha, and swing. (1 cr; limited to 34 students; IV MTWTh; NGW 151) Jette

**1-024 (16A) MODERN DANCE**

Emphasis on elements of creative dance techniques. (1 cr; limited to 24 students; III MTWTh; NGW 151) Jette

**1-038 (36A) TENNIS**

(1 cr; each section limited to 24 students)  
 Sec 1 (women only), I MTWTh, NGW 151, Barneson  
 Sec 2 (co-ed), II MTWTh, NGW 151, Barneson  
 Sec 3 (co-ed), VI MTWTh, CH 206, Walker

**1-050 (29A) GOLF**

(1 cr; each section limited to 24 students)  
 Sec 1 (women only), I MTWTh, NGW 60, Lampe  
 Sec 2 (women only), II MTWTh, NGW 60, Lampe  
 Sec 3 (men only), 11:00-12:15 MW, CH 206, Willis

**1-058 (27A) PHYSICAL EDUCATION FOR FAMILY LIVING (co-ed)**

(1 cr; limited to 24 students; II MTWTh; CH 214) Willis

**1-107 (5B) SWIMMING (co-ed)**

(1 cr; limited to 24 students; prereq men, ability to swim 100 yards... women, 1-007 [5A] or equiv; IV MTWTh; CH Pool) Walker

**1-150 (29B) GOLF (men only)**

(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

**PROFESSIONAL COURSES (PE)****3-172 (82) FOOTBALL COACHING (men only)**

Techniques of offense and defense strategy. (2 cr; limited to 20 students; prereq 1-554 [11] or §; V MTWThF; CH 215) Crawford

- 3-327 TEACHING PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL**  
(3 cr, §1-560, §3-325 or §Hlth 3-325; limited to 35 students; prereq elementary education major; IV MTWThF; NGW 153, 201) Lampe
- 3-900 (99) INDEPENDENT STUDY (men only)**  
(1-9 cr; prereq  $\Delta$ ; hrs ar) Kundla
- 5-122 (171) APPLIED PHYSIOLOGY**  
Application of concepts in human physiology to exercise physiology, sports training, and physical activities with particular reference to respiratory and cardiovascular systems. (3 cr; prereq PubH 3-386 [92] or Phsl 3-051 [51] or equiv; V MTWThF; CH 420) Alexander
- 5-151 (102) CURRICULUM**  
(For students without previous experience in curriculum) Objectives, content, organization, evaluation, and trends. (3 cr; prereq sr; II MTWThF; NGW 3) Young
- 5-981 (118E) PROBLEMS**  
(Cr and hrs ar; prereq MEd candidate,  $\#$ ) Alexander, Young
- 5-982 (128E) INTEGRATING PAPER**  
(3 cr, §Hlth 5-982 [128E]; prereq MEd candidate; hrs ar) Alexander, Young
- 5-983 (137) READINGS: PHYSICAL EDUCATION**  
(1-3 cr; prereq sr honors, grad,  $\#$ ; hrs ar) Alexander, Young
- 8-980\* (224A) RESEARCH PROBLEMS**  
Designing, reporting on individual problems; required of all M.A. and Ph.D. candidates. (3 cr; prereq 5-980 [136], PsyF 5-110 [EPsy 116] or  $\#$ ; III MTWThF; CH 420) Alexander
- 8-981\* (224B) RESEARCH PROBLEMS**  
(Cr and hrs ar; prereq 8-980 [224A] or  $\#$ ) Alexander

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

- 3-700 (90) FIELD EXPERIENCE**  
(1-9 cr; prereq sr, recreation major or minor; I T and ar; CH 214) Ostrander
- 5-200 (151) SCHOOL RECREATION**  
Principles of organizing and conducting school-sponsored recreation programs. (3 cr; IV MTWThF; CH 214) Anderson
- 5-330 (113) METHODS IN RECREATION AND PARK LEADERSHIP**  
Leadership methodology in all aspects of recreation. (2 cr; prereq 1-520 [20] or  $\#$ ; III MTWTh; CH 214) Anderson
- 5-981 (118E) PROBLEMS**  
Focus on conduct of recreation programs. (Cr ar; prereq MEd candidate,  $\#$ ; hrs ar) Ostrander
- 5-983 (137) READINGS: RECREATION**  
Independent study under tutorial guidance. (1-3 cr; prereq sr honors, grad, MEd or  $\#$ ; hrs ar) Anderson
- 8-620 (250) PRACTICUM: COLLEGE UNIONS**  
Supervised experiences in program operation; administrative and supervisory duties. (3-9 cr; prereq 12 grad cr in recreation; hrs ar) Anderson
- 8-630 (251) PRACTICUM: THERAPEUTIC RECREATION**  
Supervised experiences in program operation; administrative and supervisory duties. (3-9 cr; prereq 12 grad cr in recreation; hrs ar) Ostrander
- 8-640 (252) PRACTICUM: PUBLIC RECREATION AND PARKS**  
Supervised experiences in program operation; administrative and supervisory duties. (3-9 cr; prereq 12 grad cr in recreation; hrs ar) Anderson

**8-980\* (224A) RESEARCH PROBLEMS**

Designing, reporting on individual problems; required of all M.A. and Ph.D. candidates. (3 cr; prereq 5-980 [136], PsyF 5-110 [EPsy 116] or #; III MTWThF; CH 420) Alexander

**8-981\* (224B) RESEARCH PROBLEMS**

Individual problems. (Cr ar; prereq 8-980 [224A] or #; hrs ar) Anderson

## School Health Education (Hlth)

**3-330 TEACHING HEALTH IN THE ELEMENTARY SCHOOL**

Content and methods of instruction. (3 cr, §3-325, §PE 3-325; limited to 35 students; prereq elementary education major; II MTWThF; NGW 201) Slocum

**5-101 (EdCI 101) DRIVER EDUCATION II**

(4 cr; limited to 32 students; prereq 5-100 [SeEd 101A] and Δ; 1:00-2:20 MTWThF; NGW 3) Thissen

**5-300 (117B) CONTEMPORARY PROBLEMS IN SCHOOL HEALTH EDUCATION**

Instructional and individual problems. (3 cr; prereq 3-320 [83] or #; IV MTWThF; NGW 3) Slocum

**5-981 (118E) PROBLEMS**

Focus on teaching of school health education. (Cr and hrs ar; prereq MED candidate, #) Slocum

**5-982 (128E) INTEGRATING PAPER**

Independent paper integrating learning from a course or courses in education with learnings in school health education. (3 cr, §PE 5-982 [128E]; hrs ar) Slocum

**5-983 (137) READINGS: HEALTH EDUCATION**

Independent study under tutorial guidance. (1-3 cr; prereq sr honor, grad, and #; hrs ar) Slocum

**8-981\* (224B) RESEARCH PROBLEMS**

Individual problems. (Cr and hrs ar; prereq 8-980 [224A] or #) Slocum

## Secondary Education (SeEd)

**3-100 (EdCI 52) OFFICE OCCUPATIONAL EXPERIENCE**

Observation and practice in business offices; weekly seminars on application to teaching and guidance of high school and post-high school students. (3-9 cr; prereq jr, business education major, and #; hrs ar) Halvas

**3-155 (Ed 55B) INTRODUCTION TO SECONDARY SCHOOL TEACHING**

Open only to students accepted for a regular degree program in College of Education. (5 cr; each section limited to 30 students; prereq Psy 1-002 [2]) Ar

Sec 1, I-II MTWThF, Aero 317 (CCTV)

Sec 2, III-IV MTWThF, Aero 317 (CCTV)

Sec 3, III-IV MTWThF, Aero 319 (CCTV)

**5-105 (EdCI 105) AUDIO-VISUAL MATERIALS IN EDUCATION**

(3 cr; prereq sr; I MTWThF; WeH 202) Pearson

**5-106 (EdCI 106) COORDINATING AN AUDIO-VISUAL EDUCATION PROGRAM**

(3 cr; prereq 5-105 [EdCI 105] or #; III MTWThF; WeH 202) Pearson

**5-108 (EdCI 108) NONPROJECTED AUDIO-VISUAL MATERIALS AND EQUIPMENT LABORATORY**

(3 cr; each section limited to 15 students; prereq 5-105 [EdCI 105] or ¶5-105; lect IV MTWThF; WeH 202) Newren

Sec 1, VI MW, WeH 206

Sec 2, VI TTh, WeH 206

**5-110 (EdCI 105A) APPLIED INSTRUCTIONAL MEDIA EVALUATION AND SELECTION**

Analysis of traditional and newer types of audio-visual materials; emphasis on selection applied to content, learning situations, and technical quality; opportunity for students to follow subject area and grade-level interests. (3 cr; prereq 5-105 [EdCI 105]; II MTWThF; WeH 202) Newren

**5-113 (EdCI 113) PRINCIPLES OF SECONDARY SCHOOL CURRICULUM**

Concepts and basic principles; forces influencing curricular objectives, organization, and construction; evaluation and trends. (3 cr; prereq 3-155 [Ed 55B] or equiv; II MTWThF; PeikH 315) Kimpston

**5-120 SECONDARY EDUCATION FOR THE CULTURALLY DIFFERENT**

Characteristics and problems of culturally different and economically deprived secondary students using a multidisciplinary approach; traditional school and teacher responses; alternate solutions. (3 cr, \$Bsed 5-120; prereq sr; I MTWThF; PeikH 225) Sullivan

**5-129 (EdCI 129) TRENDS AND ISSUES IN SECONDARY CURRICULUM**

Research findings and analysis of current proposals at the national, state and local levels. (3 cr; prereq 5-113 [EdCI 113] or equiv; IV MTWThF; PeikH 315) Kimpston

**5-152 TECHNIQUES OF INSTRUCTION IN SOCIAL STUDIES**

Analysis of teaching strategies and contemporary materials in the social studies; techniques of instruction useful in inquiry strategies of analysis, classroom behavior, and evaluation; required of M.A., M.Ed., and Ph.D. candidates. (3 cr; prereq 5-150; II MTWThF; PeikH 385) Mackey

**5-189 (EdCI 190) 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 5-385 [EdCI 185] and \$; III MTWThF; PeikH 225) Lange

**5-194 (EdCI 195A) CURRICULUM DEVELOPMENT IN SECONDARY ENGLISH AND SPEECH**

Analysis and evaluation of curricula and trends; emphasis on articulation. (3 cr; prereq 3-326 [EdT 76A] or equiv; III MTWThF; PeikH 315) Shroyer

**5-322 (EdCI 122B) TEACHING RHETORIC AND COMPOSITION IN SECONDARY SCHOOLS**

Contemporary direction in rhetorical theory and analysis of recent curriculum developments bearing on the teaching of oral and written composition. (3 cr; II MTWThF; PeikH 325) Piché

**5-390 (EdCI 190) CURRENT DEVELOPMENTS IN SECONDARY SCHOOL SCIENCE**

Curricula, methods, materials of instruction, evaluation. (3 cr; prereq 3-356 [EdT 68A], 3-357 [EdT 68B], 3-358 [EdT 68C], or 3-352 [EdT 68M] or equiv undergrad courses or science tchg exper; II MTWThF; PeikH 385) Gennaro

**5-392 (EdCI 193B) METHODS AND MATERIALS FOR TEACHING BIOLOGICAL SCIENCES**

Individualized instruction in laboratory techniques and equipment with application to classroom use. (3 cr; prereq 3-356 [EdT 68A], 3-357 [EdT 68B], 3-358 [EdT 68C], or 3-352 [EdT 68M] or equiv; III MTWThF; PeikH 385) Gennaro

**8-801\* (EdCI 201) PROBLEMS: TEACHING SOCIAL STUDIES**

Individual research. (3-9 cr; prereq 5-150, 5-152, 5-156, 8-104 [EdCI 204] or \$; hrs ar) Mackey

**8-805\* (EdCI 205) PROBLEMS: AUDIO-VISUAL EDUCATION**

(Cr and hrs ar; prereq \$) Pearson

**8-807\* (EdCI 207) PROBLEMS: RADIO-TELEVISION EDUCATION**

For students whose work in SeEd 5-107 has indicated an aptitude or interest in the field. (1-3 cr per qtr; prereq 5-107 [EdCI 107]; hrs ar) Pearson

- 8-871\* (EdCI 271) PROBLEMS: CURRICULUM CONSTRUCTION**  
Individual research. (Cr and hrs ar; prereq #) Gennaro, Kimpston, Lange
- 8-895 (EdCI 295) READINGS IN ENGLISH AND MODERN LANGUAGE EDUCATION**  
Readings in high school English or modern language instruction. (1-3 cr; hrs ar) Lange, Shroyer
- 8-896\* (EdCI 296) PROBLEMS: TEACHING ENGLISH**  
For those qualified to undertake individual research. (Cr and hrs ar) Shroyer

## *Business Education (BsEd)*

- 5-100 (130) INSTRUCTION IN BUSINESS DATA PROCESSING**  
Teaching electronic data processing in the business education program. (3 cr; I MTWThF; PeikH 265) Hopkins
- 5-104 (139) OFFICE COORDINATION TECHNIQUES**  
Problems in the cooperative program; guidance and selection; placing students in offices; job adjustments; developing and evaluating the training program. (3 cr, \$DE 5-105 [139]; IV MTWThF; PeikH 255) Halvas
- 5-110 BUSINESS EDUCATION PROGRAMS BEYOND HIGH SCHOOL**  
Determining objectives and curricular for junior/community college, vocational-technical school, adult education, and collegiate business programs. (3 cr; III MTWThF; PeikH 265) Hopkins
- 8-600 INTERNSHIP: BUSINESS EDUCATION**  
In-service experience in a business education specialist role, supervised experience in communication, planning, decision making, materials, curriculum development, and supervising and working with people. (3-12 cr; hrs ar) Hopkins
- 8-900\* (239) PROBLEMS: BUSINESS EDUCATION**  
Investigations in field of student's interest. (Cr and hrs ar; prereq #) Hopkins

## **Vocational Education**

### *Agricultural Education (AgEd)*

- 3-030 (81) TEACHING AGRICULTURE IN THE SECONDARY SCHOOL**  
Fundamentals of teaching agriculture to high school students; use of the home, farm, and community in structuring courses of study; Future Farmers of America; Vo-Ag Planning and Summary Book; building and utilizing teaching units. Open only to students seeking special certification. (4 cr; prereq SeEd 3-155 [Ed 55B] and #; I-II MTWThF; Hr 301) Kitts
- 5-090 (170) INDEPENDENT STUDY**  
Topics may be chosen to permit study of areas within education or to supplement areas of inquiry not provided in the regular course structure. (1-3 cr; prereq sr; hrs and rm ar) Marvin, Bear, Kitts, Peterson, Swanson, McMillion, Persons
- 5-095 (195E) INDEPENDENT STUDY**  
Preparation of a paper dealing with learnings in agricultural education applied to professional responsibilities. (3 cr; prereq MEd student in agricultural education; hrs ar) Marvin, Bear, Kitts, Peterson, Swanson, McMillion, Persons
- 8-001\* (232) RESEARCH IN AGRICULTURAL EDUCATION**  
Selecting problems, preparing bibliographies, analyzing and interpreting data, and preparing manuscripts. (Cr and hrs ar; prereq 15 cr in education) Marvin, Bear, Kitts, Peterson, Swanson, McMillion, Persons

**8-091 (221) FIELD PROBLEMS**

Making investigations, gathering data, and formulating plans regarding agricultural education. (3 cr; hrs ar) Marvin, Bear, Kitts, Peterson, Swanson, McMillion, Persons

## Distributive Education (DE)

**5-105 (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; limited to 30 students; I MTWThF; PeikH 275) Ashmun

**5-110 (141) COOPERATIVE VOCATIONAL EDUCATION PROGRAMS**

Planning and organizing curriculum building, plant and equipment; promoting and evaluating cooperative part-time distributive, office, miscellaneous trades and diversified occupations programs. (3 cr; limited to 30 students; III MTWThF; PeikH 275) Ashmun

**8-300 (237) SEMINAR: RESEARCH IN BUSINESS, DISTRIBUTIVE, AND ECONOMIC EDUCATION**

Primarily for Master's degree candidates; planning and evaluation of research and of individual projects. (No cr; prereq #; hrs and rm ar) Price, Ashmun

**8-600 (239) INTERNSHIP: DISTRIBUTIVE EDUCATION**

Practical participation in supervisory or teaching positions; in-service experience in leadership role; includes a seminar-related project; required for Specialist in Distributive Education Certificate. (3-9 cr; prereq grad and #; hrs ar) Ashmun

**8-900\* (238) PROBLEMS: DISTRIBUTIVE EDUCATION**

Individual research. (Cr and hrs ar; prereq #) Ashmun

## Home Economics Education (HEEd)

**3-300 (60) CURRICULUM IN HOME ECONOMICS EDUCATION**

Selection and organization of content of curriculum at secondary level. (3 cr; limited to 25 students; prereq 1-500 [49], Soc 1-001 [1], SeEd 3-150 [Ed 55A] and 3-155 [Ed 55B] or either of these with ¶ in the other; VII MTWThF; McNH 144) Wantoch

**5-300 (160A) HOME ECONOMICS CURRICULUM (July 19-August 4)**

Examination of research and literature; development of units of study and programs at elementary and secondary level; production and evaluation of materials. (3 cr; prereq 3-600 [63], #; IV-V MTWThF; McNH 103) Ar

**5-415†† (196D) WORKSHOP: MATERIALS FOR INSTRUCTION (July 19-August 4)**

Problems in selection and use of new materials for instruction in home economics. (1-4 cr; prereq grad or tchr in service; 8:30-11:30 am MTWThF, afternoon ar; McNH 102) Burklund

**5-900 (190) READINGS IN HOME ECONOMICS EDUCATION**

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

**8-900\* (201) PROBLEMS: HOME ECONOMICS EDUCATION**

Independent study of current educational problems. (1-9 cr; prereq 8-300 [200A], #; hrs and rm ar) Brown, Ford, Whiteford

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

## ***Industrial Education (Ind)***

### **5-309 (109) CONFERENCE LEADING FOR INDUSTRY**

Purposes, advantages, and limitations of method; technique of procedure; experience in planning, leading, and evaluating conferences, and in writing summaries. (3 cr; prereq #; I MTWThF; PeikH 65) Miletich

### **5-310 (107) COORDINATION**

Duties and responsibilities of coordinators in trade schools, part-time programs, and comprehensive high schools. (3 cr; prereq 3-330 [35] or 5-325 [125] or #; III MTWThF; PeikH 65) Miletich

### **5-314 (105) ADMINISTRATION OF INDUSTRIAL EDUCATION**

General and vocational phases; objectives, programs, and practices; laws, rulings, and standards for aid; significant literature. (3 cr; prereq 3-330 [35] or #; V MTWThF; PeikH 65)

### **5-320 (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 SeEd 3-155 [Ed 55B]; II MTWThF; PeikH 155) Kavanaugh

### **8-900\* (200) RESEARCH PROBLEMS**

Individual conferences. (3-6-9 cr per term; prereq approval of candidacy; hrs ar) Kavanaugh, Nelson, Pucel, Smith

# General College (GC)

## 1-132 (10B) BIOLOGICAL SCIENCE: THE HUMAN BODY

Problems of physical, mental, and social health are related to the anatomy, physiology, and needs of the human organism. In studying the heart, for example, the instructor shows what it is, how it works, its importance to the overall functioning of the body, what can go wrong with it, and what is known about keeping it on the job. Films, televised dissections, and demonstrations supplement the lectures. (5 cr; limited to 60 students; III-IV MTWThF; SciCB 125) Jefferson

## 1-252 (46D) PROBLEMS OF INTERNATIONAL RELATIONS

Some of the basic problems of international relations—war, conflict of ideologies, developing nations, international trade, and international law and organizations—are considered. Since authorities on international relations often differ in their systems of analysis, the student learns about several of the more important analytical systems, applies them to problems, and thus develops a more mature approach of his own. (3 cr; limited to 45 students; IV MTWThF; NH 213) Jones

## 1-291 (38A) SOCIAL SCIENCE: 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; limited to 45 students; I-II MTWThF; NH 213) Steinhäuser

## 1-311 (21) ART: GENERAL ARTS

The student is given opportunities to formulate and evaluate his attitudes and ideas relating to the arts through an examination of the basic similarities which underlie all art forms and through an investigation of the development of these art forms in terms of human needs. The course concentrates upon painting, sculpture, music, architecture, and literature. (3 cr; limited to 40 students; II MTWThF; NH 122) Gates

## 1-357 (5D) PHILOSOPHY: MAN'S RELIGIOUS BELIEFS

Through his reading from the literature of the world's religions, the student becomes familiar with five major beliefs. His study includes a brief historical account of each religious belief and its development in the world today. (3 cr; limited to 45 students; I MTWThF; NH 216) Zanoni

## 1-371 (29E) LITERATURE: READING SHORT STORIES

To enhance his appreciation of a popular form of leisure reading, the student reads representative short stories by 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; limited to 45 students; III MTWThF; NH 213) Kurak

## 1-402 (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 magazines to that of the college textbook. (3 cr; limited to 30 students; I MTWThF; NH 201) Kivits

## 1-422 (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 materials 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; each section limited to 30 students; prereq 1-421 [31A])

Sec 1, I-II MTWThF, NH 209, Warren

Sec 2, III-IV MTWThF, NH 209, Koch

**1-445 (9D) MATHEMATICS: INTERMEDIATE ALGEBRA**

To provide the student with the fundamental algebraic skills and mathematical concepts necessary for him to compete in college algebra is the primary aim of this course. The topics to be covered will be selected from the real number system, special products and factoring, logarithms, functions and graphs, exponents and radicals, linear and quadratic equations, inequalities, and analytic geometry. The basic prerequisite for this course is the satisfactory completion of high school elementary algebra and high school geometry. (5 cr; limited to 35 students; I-II MTWThF; NH 207) Schwabacher

**1-461 (32A) ORAL COMMUNICATION: BASIC PRINCIPLES**

The student is introduced to the basic principles of speech. By means of such assignments as an introduction, a demonstration, an argument, and a group discussion, he is given an opportunity to apply these principles. Through these classroom projects the student is helped to develop confidence in himself, to express his ideas clearly and effectively, and to listen critically. (3 cr; limited to 25 students; IV MTWThF; NH 107) Hagen

**1-511 (15) INTRODUCTION TO MODERN BUSINESS**

Intended for both business and general education, this course provides an overview of the economic environment in which business operates. The major functions of a business organization are surveyed, including production, finance, personnel, and marketing. It is a useful introductory course for students planning to do more work in business, but it also is recommended for those who want to survey the field without studying it in detail. (3 cr; limited to 35 students; II MTWThF; NH 216) Ruth Larson

**1-534 (20A) BUSINESS LAW**

Topics include a study of courts and court procedures; contracts, their formation, operation, and discharge; torts and criminal law; bailments; nature and classification of real estate; deeds and conveyances; Torrens titles; joint tenancy and tenancy in common; wills; life, property, and automobile insurance. (3 cr; limited to 45 students; IV MTWThF; NH 216) Hower

**1-721 (3A) HOME LIFE: MARRIAGE AND FAMILY LIVING**

To emphasize the particular values of family life for the individual and for society, this course begins with a study of the biological, psychological, and sociological foundations of the family. Much time is devoted to a study 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, and problems of parenthood are considered. (3 cr; limited to 45 students; III MTWThF; NH 216) W Anderson

# Health Sciences

## MEDICAL SCHOOL

### Anatomy (Anat)

#### **ELECTIVE COURSES**

**8-156 (156) ADVANCED ANATOMY**

Individual problems in gross anatomy, embryology, histology, or neuroanatomy. (Cr and hrs ar; prereq #) Staff

**8-204 (204) RESEARCH IN ANATOMY**

Gross anatomy, cytochemistry, histology, endocrinology, embryology, hematology, or neuroanatomy. (Cr and hrs ar; prereq #) Staff

### Anesthesiology (Anes)

All anesthesiology courses are listed in the section on 10-week courses, page 157.

### Biochemistry (MdBc)

#### **ELECTIVE COURSES**

**5-053 (153) PROBLEMS IN BIOCHEMISTRY**

Special work arranged with qualified students. (Cr and hrs ar; may be taken one or both terms; prereq 5-743 [143] or 5-101 [101]) Staff

**8-300 (205) RESEARCH IN BIOCHEMISTRY**

(Cr and hrs ar) Staff

### Laboratory Medicine

#### *Laboratory Medicine (LMed)*

**5-181 (181) LABORATORY AND CLINICAL HEMATOLOGY**

(Cr and hrs ar; prereq #) Sundberg

**5-182 (181) MEDICAL GENETICS**

(Cr and hrs ar; prereq #) J Yunis

**5-183 (181) CLINICAL AND LABORATORY IMMUNOLOGY**

(Cr and hrs ar; prereq #) E Yunis

**5-184 (184) IMMUNOHEMATOLOGY IN BLOOD BANKING**

(Cr and hrs ar; prereq #) E Yunis

**5-185 (181G) LABORATORY PROBLEMS IN BLOOD COAGULATION**

(Cr and hrs ar; prereq #) Edson

**5-186 (186) CLINICAL PATHOLOGY EXTERNSHIP (Hennepin County General Hospital)**

(Cr and hrs ar; prereq #) Strom

- 5-187 (187) **CLINICAL PATHOLOGY EXTERNSHIP (Mt. Sinai Hospital)**  
(Cr and hrs ar; prereq ♯) Ward
- 5-189 (189) **CLINICAL BLOOD BANK IMMUNOLOGY (Minneapolis War Memorial Blood Bank)**  
(Cr and hrs ar; prereq ♯) Polesky
- 5-190 **COMPUTER APPLICATIONS IN LABORATORY MEDICINE**  
(Cr and hrs ar; prereq ♯) Rosenberg, Blume
- 5-191 **GENERAL CLINICAL MICROBIOLOGY**  
(Cr and hrs ar; prereq ♯) Matsen
- 5-192 (192) **ANTIBIOTIC TEACHING UNIT**  
(Cr and hrs ar; prereq ♯) Matsen
- 5-193 (181) **CLINICAL PATHOLOGY EXTERNSHIP (Hibbing General Hospital)**  
(Cr and hrs ar; prereq ♯) Alexander
- 5-194 **COMPUTER APPLICATIONS IN MEDICINE**  
(Cr and hrs ar; prereq ♯) Ackerman
- 5-195 **COMPUTER APPLICATIONS IN MEDICAL RESEARCH**  
(Cr and hrs ar; prereq ♯) Ackerman, Rosevear
- 5-196 **COMPUTER AND BIOCHEMICAL PATIENT MONITORING**  
(Cr and hrs ar; prereq ♯) Rosevear
- 5-197 **CLINICAL PATHOLOGY BIOCHEMISTRY (St. Paul-Ramsey Hospital)**  
(Cr and hrs ar; prereq ♯) Lakatua, Haus
- 5-198 **CLINICAL PATHOLOGY HEMATOLOGY (St. Paul-Ramsey Hospital)**  
(Cr and hrs ar; prereq ♯) Schrader
- 5-199 **CLINICAL GENETICS**  
(Cr and hrs ar; prereq ♯) J Yunis
- 5-261 (182) **TOPICS IN HEMATOLOGY**  
(Cr ar; prereq 5-166 [166]) Brunning
- 5-262 (183) **TOPICS IN IMMUNOLOGY**  
(Cr ar; prereq 5-172 [172]) Bridges, E Yunis
- 5-267 **MUSCLE CELL STRUCTURE AND FUNCTION**  
(1 cr; hrs ar) Benson and staff
- 5-268 **TOPICS IN CLINICAL MICROBIOLOGY**  
(1 cr; prereq ♯) Matsen
- 5-269 **SEMINAR: IMMUNOHEMATOLOGY**  
(1 cr; prereq ♯) Azar and staff
- 8-235 (235) **ADVANCED CLINICAL LABORATORY MEDICINE**  
(Cr ar) Benson and staff
- 8-236 (236) **RESEARCH ON CLINICAL LABORATORY PROBLEMS**  
(Cr ar) Benson and staff
- 8-251 **RESEARCH IN HUMAN GENETICS**  
(Cr ar) J Yunis

### *Medical Technology (MedT)*

- 5-082 (82) **APPLIED CLINICAL CHEMISTRY**  
Application of basic methods and techniques in chemistry in the clinical laboratory. (4 cr; prereq Δ; hrs ar) Freier and staff
- 5-086 (86) **APPLIED CLINICAL HEMATOLOGY AND IMMUNOHEMATOLOGY**  
Application and use of laboratory methods in hematology. Morphology of blood and blood grouping and cross matching for transfusions. (4 cr; prereq Δ; hrs ar) Bordewich, Carter

- 5-088 (88) APPLIED DIAGNOSTIC MICROBIOLOGY**  
Identification of bacteria by microbiologic techniques. Correlation with clinical cases. Identification of parasites and fungi. (4 cr; prereq  $\Delta$ ; hrs ar) Blazevic, Ederer
- 5-090 (90) SPECIAL LABORATORY METHODS**  
Special assignment on an individual basis in one of a wide variety of special areas of experience within the clinical laboratory; field experience. (4 cr; prereq  $\Delta$ ; hrs ar) Staff
- 5-092 (92) HONORS PROGRAM IN LABORATORY METHODS**  
Individual assignment on special projects or research with more intensive treatment in theory in one of the clinical areas of chemistry, hematology, immunohematology, or microbiology. (9 cr; prereq  $\Delta$ ; hrs ar) Staff
- 5-111 (111) ADVANCED CLINICAL LABORATORY TECHNIQUES**  
Assignment on individual basis for observation, study, and practice in special problems; techniques and methodology in the units of the clinical laboratories (bacteriology, chemistry, hematology, or immunology). (5 cr; prereq  $\Delta$ ; hrs ar) Staff

## Medicine (Med)

### REQUIRED COURSES

- 5-104 (104) INTRODUCTION TO INTERNAL MEDICINE**  
Combined with pediatrics and laboratory medicine. (2 cr per qtr for 4 qtrs; prereq 5-101 [101], LMed 5-102 [102]; 4:15-5:00 W; Hosp Todd Amph) Ebert and staff
- 5-112 (112) CLERKSHIP: INTERNAL MEDICINE**  
(16 cr; prereq regis med; 8:00-5:00 MTWThFS) Murray and staff

### ELECTIVE COURSES\*\*

- 5-501 (180) MEDICAL ONCOLOGY EXTERNSHIP IN MEDICINE (University Hospitals)**  
Provides training in internal medicine with emphasis on the total care of patients with cancer by assuming direct patient responsibilities as an intern. (9 cr per period; offered all periods; hrs ar) Kennedy, Fortuny, Theologides
- 5-502 (180) MEDICAL EXTERNSHIP (Veterans Administration Hospital)**  
The practical problems of patient care at a high level with primary assignment to a medical ward under the direction and supervision of a medical resident. (9 cr per period; offered all periods; hrs ar) Brown
- 5-503 (180) MEDICAL EXTERNSHIP (St. Paul-Ramsey Hospital)**  
The student functions as an acting intern on one of the in-patient services. Meals, uniforms, and on-call quarters furnished. (9 cr per period; offered all periods; hrs ar) Frost and staff
- 5-504 (180) MEDICAL EXTERNSHIP (Northwestern Hospital)**  
The student functions as an acting intern on one of the in-patient services. Uniforms, on-call quarters, and some meals furnished. Night duty every fifth night. (9 cr per period; offered all periods; hrs ar) Watson and staff
- 5-505 (180) MEDICAL EXTERNSHIP (Mt. Sinai Hospital)**  
The student functions as an acting intern on either the private or ward teaching service under supervision of residents and attending physicians. (9 cr per period; offered all periods; hrs ar) Lewis and staff
- 5-511 (181) RESEARCH IN GASTROENTEROLOGY (University Hospitals)**  
Arrangements with Dr. Dodd Wilson and Dr. Michael Levitt. (Cr and hrs ar; offered all periods)

- 5-512 (181) RESEARCH TOPICS IN HEMATOLOGY (University Hospitals)**  
Students specifically interested in research are acquainted with a problem or problems under investigation in hematology. (18 cr; offered all periods; hrs ar) Jacob, McArthur
- 5-521 (184) PROBLEMS IN CLINICAL MEDICINE (University Hospitals)**  
Cases with interesting, classical, or problematic aspects for observation, examination, and discussion. (9 cr per period; offered all periods; hrs ar; Hosp Eustis Amph) Murray
- 5-522 (184) GASTROENTEROLOGY (University Hospitals)**  
Ward rounds, Gastroenterology Clinic, Endoscopy Clinic, teaching rounds, and consultations throughout University Hospitals with the medical fellow and staff assigned to gastroenterology. (9 cr per period; offered all periods; hrs ar) Wilson, Levitt
- 5-523 (184) METABOLISM AND CLINICAL PHARMACOLOGY (University Hospitals)**  
Centers largely on the Metabolism and Diabetes Clinics with special emphasis on pharmacological problems in the area of metabolic disease. (9 cr per period; offered all periods; hrs ar) Goetz, Hunninghake, and staff
- 5-524 (184) IMMUNOLOGY, ALLERGY, AND INFECTIOUS DISEASES (University Hospitals)**  
Outpatient experience relates primarily to allergy. Experience with infectious disease includes clinical rounds, consultation, and conferences. (9 cr per period; offered all periods; hrs ar) Spink
- 5-525 (184) CARDIOVASCULAR DISEASE (University Hospitals)**  
Emphasis will be on outpatient clinic material including new and return patients. (9 cr per period; offered all periods; hrs ar) Winchell
- 5-526 (184) ELECTROCARDIOGRAPHY (University Hospitals)**  
Full-time instruction in clinical electrocardiography. (4½ cr per 3-wk period; offered periods 1, 3, 5, and 7; hrs ar) Tuna
- 5-527 (184) RENAL (University Hospitals)**  
Medical management of renal failure; experiences with dialysis, kidney transplant, acute renal shutdown, etc. (4½ cr; offered first 3 wks of period 2; hrs ar) Tobian, Kjellstrand
- 5-528 (184) CLINICAL HEMATOLOGY (University Hospitals)**  
Clinical and research aspects of hematology. Student given responsibility for diagnosis and treatment of basic hematologic diseases. (9 cr per period; offered all periods; hrs ar) Jacob, McArthur
- 5-529 (184) CLINICAL HEMATOLOGY (CONDENSED) (University Hospitals)**  
Same as Med 5-528. (4½ cr per 3-wk period; offered all periods; prereq LMed 5-185 [181G]; hrs ar) Jacob, McArthur
- 5-530 (184) SEMINAR IN ONCOLOGY (University Hospitals)**  
The broad aspects of neoplastic diseases designated to orient the student to cancer problems. (9 cr per period; offered period 3; prereq 5-528; 11:00-12:00 MWF; MasonH 407) Fortuny
- 5-531 (184) CLINICAL RHEUMATOLOGY (University Hospitals)**  
Clinical aspects of diseases of rheumatic and immunologic nature including the broad areas of collagen disease, autoimmune disease, and all types of arthritic and musculoskeletal disease. (9 cr per period; offered all periods; hrs ar) Caperton
- 5-532 (184) PULMONARY DISEASE (University Hospitals)**  
Emphasizes clinical chest disease. Exposure to clinical problems will be obtained by participating with the consultation service, outpatient chest department, and the intensive care unit. (9 cr per period; offered all periods; hrs ar) Drage, Kronenberg
- 5-533 (184) CLINICAL ALLERGY (University Hospitals)**  
Up-to-date survey of clinical allergy, including all immunologic diseases. (9 cr per period; offered all periods; hrs ar) Blumenthal

- 5-542 (184) HEMATOLOGY (St. Paul-Ramsey Hospital)**  
 Student given responsibility for initial evaluation and follow-up of patients with hematological diseases in the Department of Medicine. (9 cr per period; offered all periods; hrs ar) Taddeini and staff
- 5-543 (184) CARDIOLOGY (St. Paul-Ramsey Hospital)**  
 Student given opportunity to see cardiac consultations. Under close supervision, student will assist in right heart catheterizations including calculation of data and presentation of data at weekly cardiac catheterization conferences. (9 cr per period; offered all periods; hrs ar) Lee
- 5-544 (184) PULMONARY DISEASE (St. Paul-Ramsey Hospital)**  
 The Medical Chest Service at St. Paul-Ramsey Hospital is a consultative service embracing the disciplines of chest disease, pulmonary physiology, and inhalation therapy. (9 cr per period; offered all periods; hrs ar) Greene
- 5-545 (184) CLINICAL ENDOCRINOLOGY (St. Paul-Ramsey Hospital)**  
 Clinical experience with the broad range of endocrine problems including diabetes. (9 cr per period; offered all periods; hrs ar) Gold
- 5-546 (184) INFECTIOUS DISEASE AND IMMUNOLOGY (St. Paul-Ramsey Hospital)**  
 Experience and responsibility essentially inpatient. (9 cr per period; offered all periods; hrs ar) Gruninger and Roth
- 5-547 (184) RESEARCH IN CLINICAL INFECTIOUS DISEASE AND IMMUNOLOGY (St. Paul-Ramsey Hospital)**  
 Working with immunology staff on infectious disease problems. (9 cr per period; offered all periods; hrs ar) Gruninger, Woolfrey
- 5-551 (184) CARDIOLOGY (EKG) (Veterans Administration Hospital)**  
 Weekly lectures on introduction to ECG and VCG given by staff members. (9 cr per period; offered spring, winter, fall qtrs; hrs ar) Alexander, Richman and staff
- 5-552 (184) CLINICAL HEMATOLOGY (Veterans Administration Hospital)**  
 Arranged to meet the individual needs of student through inpatient and outpatient (Hematology Clinic) experience. Each student assigned an individual tutor. (9 cr per period; offered all periods; hrs ar) Windschitl, Doscherholmen, Kaplan
- 5-553 (184) PULMONARY DISEASE (Veterans Administration Hospital)**  
 Equivalent to an internship on one of the services of the Pulmonary Disease Service which has 84 beds. (9 cr per period; offered all periods; hrs ar) MacDonald, Jenne, R Johnson
- 5-554 (184) LABORATORY MEDICINE (Veterans Administration Hospital)**  
 Inpatient case studies, seminars, outpatient clinic experience, and individual tutorials provide basis for the study of the prevention, recognition, and therapy of acid-base and electrolyte abnormalities. (9 cr per period; offered all periods; hrs ar) Mulhausen, Brown, Doe
- 5-555 (184) ELECTROCARDIOGRAPHY (Veterans Administration Hospital)**  
 Given in conjunction with radiology. (9 cr per period; offered spring, winter, fall qtrs; hrs ar) Alexander and staff
- 5-561 (184) CARDIOLOGY SERVICE (Hennepin County General Hospital)**  
 Student participates in management of patients in Coronary Care Service. (9 cr per period; offered all periods; hrs ar) Richards
- 5-562 (184) RENAL SERVICE (Hennepin County General Hospital)**  
 Student responsible for patients on 8-bed Renal Service. Participates in management of patients on Chronic Dialysis Service and in weekly Renal and Hypertension Clinics. (9 cr per period; offered all periods; hrs ar) Shapiro, Smith
- 5-563 (184) PULMONARY DISEASE (Hennepin County General Hospital)**  
 Student responsible for patients on 20-bed Chest-Isolation Service. Participates in activities of Pulmonary Function Laboratory. (9 cr per period; offered all periods; hrs ar) Mulrooney

- 5-564 (184) INFECTIOUS DISEASE (Hennepin County General Hospital)**  
 Student participates in management of patients with a wide variety of infectious diseases on the Infectious Service and participates in consultations on patients with infectious disease problems. (9 cr per period; offered all periods; hrs ar) Payson
- 5-565 (184) GASTROENTEROLOGY (Hennepin County General Hospital)**  
 Emphasizes clinical evaluation of patients with a wide variety of G.I. problems. Student acts as consultant on selected cases under direct supervision of several of permanent staff. (9 cr per period; offered all periods; hrs ar) Onstad, Kitzmiller
- 5-573 (185) MEDICAL OUTPATIENT CLINICS (Hennepin County General Hospital)**  
 Student assigned to Medical Specialty Clinics each morning (MTWThF) and to New Patient Medicine Clinic each afternoon (MT). (9 cr per period; offered all periods; hrs ar MTWThF) Schultz
- 5-581 INTERNAL MEDICINE (St. Mary's Hospital)**  
 Training in clinical practices and special problems in medicine. (9 cr per period; offered all periods; hrs ar) LaBree

## Microbiology (MicB)

- 5-105 (153) BIOLOGY OF MICROORGANISMS**  
 (Same as Biol 3-013) Lectures, demonstrations, and laboratory exercises in taxonomy, anatomy, physiology, biochemistry, and ecology of microbes. Fundamental properties of bacteria. (4 cr, §3-103 [53]; prereq 5 cr in biological sciences, Chem 3-301 [61], 3-302 [62] or #) Klein
- 5-970 (152) SPECIAL PROBLEMS**  
 (Cr ar; prereq #)
- 8-990 (201) RESEARCH IN MICROBIOLOGY**  
 Graduate students with the requisite preliminary training may elect research, either as majors or minors. (Cr and hrs ar)

## Neurology (Neur)

*All neurology courses are listed in the section on 10-week courses, page 157.*

## Neurosurgery

### REQUIRED COURSES FOR UNDERGRADUATE STUDENTS

- 5-127 (127) CLINICAL LECTURES IN NEUROSURGERY**  
 (1 cr per yr; prereq regis med) Staff

### ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS

- 5-500 (188) NEUROSURGERY EXTERNSHIP (University Hospitals)**  
 (Cr ar; prereq regis med; MTWThF) Staff
- 5-510 (189) NEUROSURGERY EXTERNSHIP (Veterans Administration Hospital)**  
 (Cr ar; prereq regis med; MTWThF) Staff
- 5-520 (190) NEUROSURGERY INVESTIGATION**  
 (Cr ar; prereq regis med; MTWThF) Staff

## REQUIRED COURSES FOR GRADUATE STUDENTS

- 8-305 (305) NEUROSURGICAL DIAGNOSIS**  
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, Long
- 8-308 (308) STUDY OF NEUROSURGICAL PROBLEMS**  
Neurosurgical fellow acts as house surgeon at University Hospitals. (4 cr; MTWThF) French, Chou, Long
- 8-311 (311) OPERATIVE NEUROSURGERY**  
Neurosurgical fellow acts as first assistant at operations in University Hospitals, and later may be permitted to operate. (4 cr; MTWThF) French, Chou, Long
- 8-316 (316) NEUROSURGICAL RESEARCH**  
Problems in experimental or clinical surgery. (3 cr; MTWThF) French, Chou, Long, Bloedel
- 8-318 (318) NEUROSURGICAL CONFERENCE**  
A review of X-ray films and case histories on neurosurgical services. (1 cr; F) French, Chou, Long

## Obstetrics and Gynecology (Obst)

### REQUIRED COURSES

- 5-135 (135) CLINICAL CLERKSHIP IN OBSTETRICS AND GYNECOLOGY**  
Includes clinics in obstetrics and gynecology. (12 cr; prereq regis med) Sciarra and staff

### ELECTIVE COURSES

- 5-500 (184) EXTERNSHIP IN OBSTETRICS**  
A clinical experience which includes total care of inpatients and outpatients on obstetrics and gynecology at University Hospitals with emphasis on the medical aspects of obstetrics. (1½-12 cr; limited to 12 students; prereq sr med students only) Sciarra
- 5-505 (184) EXTERNSHIP IN GYNECOLOGY**  
A clinical experience which includes total care of obstetrical and gynecological inpatients and outpatients at University Hospitals with emphasis on the surgical aspects of gynecology. (1½-12 cr; limited to 12 students; prereq sr med students only) Prem
- 5-510 (184) EXTERNSHIP IN OBSTETRICS AND GYNECOLOGY**  
Similar to Obst 5-500 and 5-505 but with time divided equally between obstetrics and gynecology and with emphasis on clinical practice. (1½-12 cr; limited to 12 students; prereq sr med students only) Bendel
- 5-515 (184) OBSTETRICS AND GYNECOLOGY EXTERNSHIP IN CLINICAL PRACTICE**  
A practical community experience in obstetrics and gynecology under the preceptorship of one or more practicing members of the clinical staff. Both office and hospital practice will be included. (1½-12 cr; limited to 12 students; prereq sr med students only...also a hospital-based externship) Sciarra
- 5-520 (190) PROBLEMS IN OBSTETRICS AND GYNECOLOGY**  
A clinical experience at University Hospitals with new private patients referred to a staff member for evaluation and treatment of selected obstetrical or gynecological problems. (1½-12 cr; limited to 6 students; prereq sr med students only...also a hospital-based externship) Sciarra, Prem
- 5-530 SEMINAR: POPULATION STUDIES**  
National and world population problems. (1½-12 cr; limited to 3 students; prereq sr med students only) Sciarra, Foreman
- 5-540 (190) PSYCHIATRIC ASPECTS OF OBSTETRICS AND GYNECOLOGY**  
(Clinical course) Psychiatric problems relating to the reproductive system. (1½-12 cr; limited to 2 students; prereq sr med students only) Bernstein

**5-550 INTERNSHIP IN OBSTETRICS AND GYNECOLOGY**

Full-time clinical experience as an *acting intern* on the obstetrical and gynecological service at University Hospitals. (1½-12 cr; limited to 4 students; prereq sr med students only; 12 wks full rotation or, if places available, 6-wk rotation may be taken on obstetrics alone) Sciarra

**5-560 RESEARCH IN REPRODUCTION**

Topics selected for each student. (1½-12 cr; limited to 2 students; prereq sr med students only) Sciarra

**5-570 FELLOWSHIPS IN REPRODUCTION**

Limited opportunities for study at other institutions, some of which provide a travel stipend. Applications should be prepared prior to mid-April. (1½-12 cr; prereq sr med students only; enrollment is individual) Sciarra

**COURSES FOR GRADUATE STUDENTS**

**8-201 (201) ADVANCED OBSTETRICS AND GYNECOLOGY, PART I**

(Cr ar) Sciarra and staff

**8-205 (205) ADVANCED OBSTETRICS AND GYNECOLOGY, PART II**

(Cr ar) Sciarra and staff

**8-209 (209) ADVANCED OBSTETRICS AND GYNECOLOGY, PART III**

(Cr ar) Sciarra and staff

**8-210 (210) ADVANCED OBSTETRICS AND GYNECOLOGY, PART IV**

(Cr ar) Sciarra and staff

**8-213 (213) ADVANCED SEMINAR**

(Cr ar) Sciarra and staff

**8-221 (221) CLINICAL OBSTETRICS AND GYNECOLOGY**

(Cr ar) Sciarra and staff

**8-222 (222) GYNECOLOGICAL ONCOLOGY**

(Cr ar) Sciarra and staff

**8-223 (223) GYNECOLOGICAL ENDOCRINOLOGY**

(Cr ar) Sciarra and staff

**8-230 (216) RESEARCH IN REPRODUCTION**

(Cr ar) Sciarra and staff

**Ophthalmology (Oph)**

**8-101 (200) CLINICAL OPHTHALMOLOGY**

(6 cr; 8:00-6:00 MTWThF; O-P Clin) Harris and staff

**8-106 (217) STRABISMUS MANAGEMENT**

(Cr ar; 8:00-9:00 F; Mayo A-675) Letson

**8-107 ANATOMY OF ORBIT**

(1 cr; 8:00-12:00 S; JacH 390) Letson

**8-131 (201) PRACTICAL OCULAR SURGERY**

(3 cr; 7:30-12:00 MTWThF; Oper Rm) Harris and staff

**Orthopedic Surgery (OrSu)**

**REQUIRED COURSES FOR UNDERGRADUATE STUDENTS**

**5-140 (140) CLINICAL LECTURES IN ORTHOPEDIC SURGERY**

(1 cr; prereq regis med)

## **ELECTIVE COURSES FOR UNDERGRADUATE STUDENTS**

- 5-185 (185) EXTERNSHIP IN ORTHOPEDIC SURGERY AND FRACTURES**  
(Cr ar; prereq regis med)
- 5-185 (185) EXTERNSHIP IN ORTHOPEDIC SURGERY AND FRACTURES**  
At St. Paul-Ramsey Hospital. (Cr ar) prereq regis med)
- 5-185 (185) EXTERNSHIP IN ORTHOPEDIC SURGERY AND FRACTURES**  
At Gillette State Hospital for Crippled Children, St. Paul. (Cr ar; prereq regis med)
- 5-185 (185) EXTERNSHIP IN ORTHOPEDIC SURGERY AND FRACTURES**  
At Fairview-St. Mary's Hospitals. (Cr ar; prereq regis med)
- 5-186 (186) RESEARCH PROBLEMS**  
(Cr ar; prereq regis med)

## **REQUIRED COURSES FOR GRADUATE STUDENTS**

- 8-401 (401) ORTHOPEDIC CONFERENCE**  
Review of X-ray films and case histories of patients on the orthopedic inpatient or outpatient service. (3 cr) Moe, House, Bradford, Lai
- 8-403 (403) FRACTURES**  
Orthopedic fellow acts as house surgeon on the fracture service at Hennepin County General Hospital. (5 cr) Gustilo and staff  
Orthopedic fellow acts as house surgeon on the fracture service at St. Paul-Ramsey Hospital. (5 cr) Comfort and staff
- 8-405 (405) ORTHOPEDIC DIAGNOSIS**  
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, House, Bradford, Lai
- 8-407 (407) PEDIATRIC ORTHOPEDICS**  
Orthopedic fellow acts as house surgeon at Gillette State Hospital for Crippled Children. (5 cr) Moe and staff
- 8-408 (408) STUDY OF ORTHOPEDIC SURGERY PROBLEMS**  
Orthopedic fellow acts as house surgeon at University Hospitals and Fairview-St. Mary's. (5 cr) Moe, House, Bradford, Lai
- 8-410 (410) ORTHOPEDIC PATHOLOGY**  
Seminar for systematic review of pathology of ossified tissue and soft tissues of the extremities. (2 cr) Moe, House, Bradford, Lai
- 8-411 (411) ORTHOPEDIC OPERATIVE SURGERY**  
Orthopedic fellow acts as first assistant at operations at University Hospitals and Fairview-St. Mary's and later may be permitted to operate. (5 cr) Moe, House, Bradford, Lai, and staff
- 8-412 (412) ORTHOPEDIC ANATOMY**  
Orthopedic fellow dissects upper and lower extremities and aids in instruction of medical students in anatomy of the extremities. (2 cr) Moe, House, Bradford, Lai
- 8-416 (416) ORTHOPEDIC RESEARCH**  
Problems in experimental or clinical surgery. University Hospitals. (5 cr) Moe, House, Bradford, Lai

## **Otolaryngology (Otol)**

### **COURSES FOR GRADUATE STUDENTS**

- 8-230 (230) CLINICAL OTOLGY**  
(3 cr; 1:00-4:00 MTWThF; O-P Clin) Paparella and staff
- 8-231 (231) CLINICAL RHINOLOGY AND LARYNGOLOGY**  
(3 cr; 1:00-4:00 MTWThF; O-P Clin) Paparella and staff

- 8-232 (232) SURGERY OF EAR, NOSE, AND THROAT**  
(3 cr; 9:00-12:00 MTWThF; Oper Rm) Paparella and staff
- 8-241 (241) SEMINAR: CURRENT LITERATURE**  
(1 cr; 9:00-11:00 S; Mayo A-675) Staff
- 8-248 (248) RESEARCH**  
(Cr and hrs ar) Staff

## Pathology (Path)

- 5-104 (104) AUTOPSIES**  
(Cr and hrs ar; prereq 102) Good, Hebbel
- 5-106 (106) DISEASES OF THE HEART**  
See section on 10-week courses, page 157.
- 5-111 (111) CONFERENCE ON AUTOPSIES**  
See section on 10-week courses, page 157.
- 5-112 (112) DIAGNOSIS OF TUMORS**  
See section on 10-week courses, page 157.
- 5-113 (113) SURGICAL PATHOLOGY**  
(Cr and hrs ar; prereq 5-102 [102]) Hebbel
- 5-121 (121) DISEASES OF THE ALIMENTARY TRACT**  
(1 cr; prereq 5-102 [102]; hrs ar) Hebbel
- 5-140 (140) SEMINAR: EXPERIMENTAL PATHOLOGY**  
(1 cr; prereq #; hrs ar) Halberg
- 5-141 (141) PROBLEMS: EXPERIMENTAL PATHOLOGY**  
(Cr and hrs ar; prereq #) Halberg
- 5-150 (150) PROBLEMS IN PATHOLOGY**  
See section on 10-week courses, page 157.
- 8-201 (201) RESEARCH**  
Students with the necessary preliminary training may elect research either as a major or minor in pathology. (Cr and hrs ar; prereq #) Good, Hebbel
- 8-207 (207) RESEARCH IN EXPERIMENTAL PATHOLOGY**  
(Cr and hrs ar; prereq #) Halberg

## Pediatrics (Ped)

### REQUIRED COURSES

- 5-120 (120) CLINICAL LECTURES IN PEDIATRICS**  
Physical growth and development. Psychological development. Physiology and metabolism. (2 cr; prereq regis med; 1:00-2:00 W; Eustis Amph) Anderson and staff
- 5-135 (135) CLINICAL CLERKSHIP IN PEDIATRICS**  
Patients on wards assigned to individual students for examination, treatment, and follow-up observation under supervision including demonstration clinics on contagious and noncontagious diseases. (12 cr; prereq regis med) Anderson and staff

### ELECTIVE COURSES

- 5-501 (181) INPATIENT EXTERNSHIP (Hennepin County General Hospital)**  
(Cr ar)

- 5-502 (181) **INPATIENT AND OUTPATIENT EXTERNSHIP (Children's Hospital)**  
(Cr ar)
- 5-503 (181) **INPATIENT EXTERNSHIP (St. Paul-Ramsey Hospital)**  
(Cr ar)
- 5-511 (181) **OUTPATIENT EXTERNSHIP (University Hospitals)**  
(Cr ar)
- 5-512 (181) **OUTPATIENT EXTERNSHIP (Hennepin County General Hospital)**  
(Cr ar)
- 5-513 (181) **CLINICAL EXPERIENCE (Community-University Health Care Center)**  
(Cr ar)
- 5-515 (181) **OUTPATIENT HEALTH CARE (St. Paul-Ramsey Hospital)**  
(Cr ar)
- 5-516 (181) **CLINICAL PEDIATRICS (Mayo Clinic)**  
(Cr ar) Anderson and staff
- 5-517 (181) **PRECEPTORSHIP IN CLINICAL PEDIATRICS**  
(Cr ar) Anderson and staff
- 5-518 (181) **CHILD DEVELOPMENT INCLUDING MENTAL RETARDATION, NEUROLOGICAL HANDICAPS, AND LEARNING DISABILITIES**  
(Cr ar) Anderson and staff
- 5-531 (182) **NEO-INFANT PROGRAM**  
(Cr ar) Anderson and staff
- 5-532 (182) **CLINICAL IMMUNOLOGY (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-533 (182) **PEDIATRIC CARDIOLOGY (Mayo Clinic)**  
(Cr ar) Anderson and staff
- 5-534 (182) **PEDIATRIC CARDIOLOGY (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-535 (182) **INFECTIOUS DISEASE**  
(Cr ar) Anderson and staff
- 5-536 (182) **PEDIATRIC HEMATOLOGY-ONCOLOGY (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-537 (182) **PEDIATRIC ENDOCRINOLOGY AND METABOLISM (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-539 (182) **INTRODUCTION TO NEONATOLOGY**  
(Cr ar) Anderson and staff
- 5-540 (182) **PEDIATRIC NEUROLOGY (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-541 (182) **PEDIATRIC NEUROLOGY (Mayo Clinic)**  
(Cr ar) Anderson and staff
- 5-542 (182) **CLINICAL PHARMACOLOGY**  
(Cr ar) Anderson and staff
- 5-543 (182) **NEPHROLOGY (University Hospitals)**  
(Cr ar) Anderson and staff
- 5-544 (182) **PEDIATRIC PULMONARY DISEASE**  
(Cr ar) Anderson and staff
- 5-545 (182) **CHILD PSYCHIATRY (Mayo Clinic)**  
(Cr ar) Anderson and staff
- 5-546 (182) **PEDIATRIC PATHOLOGY**  
(Cr ar) Anderson and staff

**5-570 (183) PEDIATRIC RESEARCH**  
(Cr ar) Anderson and staff

**5-573 (183) RESEARCH IN IMMUNOCYTOLOGY**  
(Cr ar) Anderson and staff

### **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.

**8-200 (200) GRADUATE SEMINAR: PEDIATRICS**  
(1½ cr; VIII T; Mayo 1450) Anderson and staff

**8-202 (202) PEDIATRIC CLINIC**  
(5 cr; II-IV MTWThF; O-P depts of Hennepin County General Hospital or University Hospitals) Anderson and staff

**8-204 (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) Anderson and staff

**8-206 (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 ‡) Anderson and staff

**8-208 (208) PEDIATRIC RESEARCH**  
Special problems. Students may collaborate with members of the staff or with other students. (Cr and hrs ar; peds labs) Anderson and staff

## **Pharmacology (Phcl)**

**5-109 (109) PHARMACOLOGICAL PROBLEMS**  
(Cr and hrs ar) Shideman and staff

**8-203 (203) RESEARCH IN PHARMACOLOGY**  
(Cr and hrs ar) Shideman and staff

## **Physical Medicine and Rehabilitation (PMed)**

**5-430 (190) PROBLEMS IN PHYSICAL MEDICINE AND REHABILITATION**  
(Cr ar; prereq regis med) Staff

**8-200 (200) PHYSICAL MEDICINE SERVICE**  
(Cr and hrs ar) Staff

**8-205 (205) READINGS**  
(1 cr; I M) Kottke

- 8-206 (206) **CONFERENCE**  
(Cr and hrs ar) Staff
- 8-210 (210) **RESEARCH IN PHYSICAL MEDICINE**  
(Cr and hrs ar) Staff
- 8-212 (212) **ELECTROMYOGRAPHY**  
(Cr and hrs ar) Awad

## *Occupational Therapy*

- 5-342 (73) **THEORY AND PRACTICE**  
Psychosocial dysfunction. Treatment of psychiatric patients. Application of theory through problem solving and clinical experience. (6 cr; prereq regis OT) Eliason, Wolfe
- 5-396, 5-397 (94, 95) **CLINICAL EDUCATION**  
A total of 8 months of supervised training in affiliated hospitals. (18 cr per qtr; for sr OT students) Eliason

## *Physical Therapy*

- 5-255 (88) **CLINICAL TRAINING**  
Five weeks of supervised practice at affiliating hospitals. (3 cr; limited to physical therapy students in the professional program; hrs ar at affiliating hospitals) Purtilo
- 8-130 (130) **SEMINAR: CURRENT LITERATURE**  
(1 cr; prereq \$) Graduate faculty
- 8-170 (170) **PROBLEMS IN PHYSICAL THERAPY**  
(Cr ar; prereq physical therapy) Staff
- 8-195 (199) **RESEARCH IN PHYSICAL THERAPY**  
(Cr ar; prereq \$) Kottke, Skowlund, and staff

### **ELECTIVE COURSES**

- 5-410 (181) **ADULT REHABILITATION MEDICINE**  
(Cr ar; prereq regis med)
- 5-411 (181) **PEDIATRIC REHABILITATION MEDICINE**  
(Cr ar; prereq regis med)
- 5-414 (181) **PHYSICAL MEDICINE AND REHABILITATION FOR THE FAMILY PHYSICIAN**  
(Cr ar; prereq regis med)
- 5-420 (181) **HISTOPATHOLOGY, ELECTRODIAGNOSIS, AND KINESIOLOGY**  
(Cr ar; prereq regis med)
- 5-430 (190) **RESEARCH IN PHYSICAL MEDICINE AND REHABILITATION**  
(Cr ar; prereq regis med)

## *Physiology (Phsl)*

- 5-113, 8-113 (113) **PROBLEMS IN PHYSIOLOGY**  
Topics assigned for laboratory study; conferences and readings. (Cr and hrs ar) Staff
- 5-552, 8-202 (202) **READINGS IN PHYSIOLOGY**  
Topics selected for each student; written reviews prepared and discussed. (Cr and hrs ar) Staff
- 5-553, 8-203 (203) **RESEARCH IN PHYSIOLOGY**  
(Cr and hrs ar) Staff

## Psychiatry

### Adult Psychiatry (AdPy)

*"Phase D" offerings have not been finalized in time to appear in this bulletin. A listing will be mailed to Phase D medical students at a later date.*

- 8-201 (251) **CLINICAL INPATIENT PSYCHIATRY**  
(Cr ar) Staff
- 8-202 (252) **CLINICAL OUTPATIENT PSYCHIATRY**  
(Cr ar) Anderson and staff
- 8-203 (254) **ADVANCED CLINICAL INPATIENT PSYCHIATRY**  
(Cr ar) Staff
- 8-204 (255) **ADVANCED CLINICAL OUTPATIENT PSYCHIATRY**  
(Cr ar) Anderson and staff
- 8-205 (257) **SPECIAL ASSIGNMENTS**  
(1 cr) Staff
- 8-206 (258) **RESEARCH IN PSYCHIATRY**  
(Cr ar) Staff
- 8-207 (260) **ORIENTATION TO CLINICAL PSYCHIATRY**  
(1 cr) Staff
- 8-221 (291) **SEMINAR: CURRENT LITERATURE**  
(1 cr) Simon
- 8-222 (292) **SPECIAL SUPERVISION IN PSYCHIATRY**  
(1 cr) Staff

### Child Psychiatry (ChPy)

*"Phase D" offerings have not been finalized in time to appear in this bulletin. A listing will be mailed to Phase D medical students at a later date.*

- 8-201 (253) **CLINICAL CHILD PSYCHIATRY**  
(Cr ar) Staff
- 8-202 (256) **ADVANCED CLINICAL CHILD PSYCHIATRY**  
(Cr ar) Staff

### Clinical Psychology (ClPy)

- 8-202 (202) **SPECIAL RESEARCH TOPICS**  
(Cr ar; prereq #) Staff
- 8-203 (203) **PSYCHOMETRIC CLERKSHIP**  
(Cr ar) Staff
- 8-204 (204) **INTERNSHIP IN CLINICAL PSYCHOLOGY**  
(2 or 4 cr; prereq PhD candidate in clinical psychology with #) Staff
- 8-206 (206) **MEDICAL PSYCHOLOGY I**  
(3 cr; prereq grad) Briggs, Hafner

# Radiology (Rad)

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

- 5-100 (180) **EXTERNSHIP: NUCLEAR MEDICINE**  
(Cr and hrs ar; prereq regis med) Loken and others
- 5-101 (181) **EXTERNSHIP: DIAGNOSTIC RADIOLOGY (University Hospitals)**  
(Cr and hrs ar; prereq regis med) Gedgaudas and others
- 5-102 (181) **EXTERNSHIP: DIAGNOSTIC RADIOLOGY (Veterans Administration Hospital)**  
(Cr and hrs ar; prereq regis med) Kieffer
- 5-103 (181) **EXTERNSHIP: DIAGNOSTIC RADIOLOGY (Hennepin County General Hospital)**  
(Cr and hrs ar; prereq regis med) Tsai
- 5-140 (184) **SPECIAL PROBLEMS: ROENTGENOLOGY**  
(Cr and hrs ar; prereq regis med) Gedgaudas and others
- 5-240 (183) **SPECIAL PROBLEMS: NUCLEAR MEDICINE**  
(Cr and hrs ar; prereq regis med) Loken and others

## **REQUIRED COURSES FOR GRADUATE STUDENTS**

- 0-121 (111) **MEDICAL ROENTGENOLOGIC CONFERENCE**  
Weekly meetings with the medical staff at which all the important medical cases which have had X-ray diagnostic procedures are reviewed from both the clinical and roentgenological points of view. (No cr; 10:00-11:00 T; Hosp Todd Amph) Gedgaudas and others
- 0-122 (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. (No cr; 4:00-5:00 M; Rigler Library) Eklof
- 0-123 (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 points of view. (No cr; II S; Hosp Todd Amph) Amplatz, Gedgaudas
- 0-124 (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 roentgenologic points of view. (No cr; VI F; Hosp Todd Amph) Peterson
- 0-125 (202) **CARDIOVASCULAR ROENTGENOLOGIC CONFERENCE**  
(No cr; 12:00-1:00 T; Rigler Library) Amplatz
- 0-127 (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. (No cr; 4:00-5:00 Th; Hosp Todd Amph) Gedgaudas and others
- 8-100 (209) **GASTROINTESTINAL ROENTGENOLOGY**  
(Cr ar; prereq #) Gedgaudas and others
- 8-101 (209) **UROLOGIC ROENTGENOLOGY**  
(Cr ar; prereq #) Gedgaudas and others
- 8-102 (209) **NEUROLOGICAL ROENTGENOLOGY**  
(Cr ar; prereq #) Peterson and others
- 8-103 (209) **CARDIOVASCULAR ROENTGENOLOGY**  
(Cr ar; prereq #) Gedgaudas and others

- 8-105 (209) PULMONARY ROENTGENOLOGY**  
(Cr ar; prereq #) Gedgaudas and others
- 8-150 (200) RESEARCH: ROENTGENOLOGY**  
Problems in roentgen diagnosis. (Cr ar) Gedgaudas and others
- 8-450 (205) RESEARCH: RADIATION BIOLOGY, NUCLEAR MEDICINE**  
(Cr ar) Staff

## *Therapeutic Radiology (Rad)*

- 3-450 (205) RESEARCH IN RADIATION BIOLOGY**  
(Cr ar) Song and staff
- 5-440 (205) SPECIAL PROBLEMS IN RADIATION BIOLOGY**  
(Cr ar)
- 5-510 (103) BASIC PRINCIPLES OF RADIOLOGICAL PHYSICS**  
Lectures and demonstrations of basic principles in radiology. (1 cr per session) Khan, Moore
- 5-512 (211) DOSIMETRY OF INTERNAL AND EXTERNAL RADIATION EMITTERS**  
Basic principles of radiation dosimetry discussed in detail; clinical applications considered. (1 cr per qtr) Moore, Khan
- 5-540 (211) SPECIAL PROBLEMS IN RADIOLOGICAL PHYSICS**  
(Cr ar) Khan, Moore
- 8-300 (204) RADIATION THERAPY**  
In-service training in the treatment and management of patients with malignant disease. (Cr ar) Staff
- 8-350 (205) RESEARCH IN RADIATION THERAPY**  
(Cr ar) Staff
- 8-410 (212) SEMINAR: RADIATION BIOLOGY**  
Approaches to problems in radiation biophysics. Recent advances reviewed. (1 cr per qtr; prereq #) Staff
- 8-550 (205) RESEARCH IN RADIOLOGICAL PHYSICS**  
(Cr ar) Khan, Moore

## **Surgery (Surg)**

### *General Surgery*

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

- 5-135 (135) CLINICAL CLERKSHIP**  
(16 cr; prereq regis med) Najarian and staff

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

- 5-501 (181) CARDIOVASCULAR SURGERY**  
Clinical problems and participation in surgery. (Cr and hrs ar; for srs only) Varco, Castaneda
- 5-520 (182) PROBLEMS IN CLINICAL INVESTIGATIONS AND PROBLEMS IN EXPERIMENTAL SURGERY**  
Opportunities for exposure to and participation in research in transplantation, cardiovascular, gastrointestinal, cancer immunology, or pediatric surgery problems. (Cr and hrs ar; University and affiliated hosps)

- 5-500 (190) **EXTERNSHIP IN SURGERY—TRANSPLANTATION AND GENERAL SURGERY (University Hospitals)**  
(Cr and hrs ar; prereq regis med) Najarian, Simmons, Goodale
- 5-502 (191) **EXTERNSHIP IN SURGERY—WHITE SURGERY (University Hospitals)**  
(Cr and hrs ar; prereq regis med) McKhann, Sullivan, Grage, Gilbertsen, Sosin
- 5-503 (192) **EXTERNSHIP IN SURGERY—PEDIATRIC SURGERY (University Hospitals)**  
(Cr and hrs ar; prereq regis med) Leonard
- 5-504 (193) **EXTERNSHIP IN SURGERY—RED SURGERY (University Hospitals)**  
(Cr and hrs ar; prereq regis med) Lillehei, Delaney, Buchwald
- 5-510 (194) **EXTERNSHIP IN SURGERY (Veterans Administration Hospital)**  
(Cr and hrs ar; prereq regis med) Humphrey and staff
- 5-511 (195) **EXTERNSHIP IN SURGERY (St. Paul-Ramsey Hospital)**  
(Cr and hrs ar; prereq regis med) Perry, Mowlem
- 5-512 (196) **EXTERNSHIP IN SURGERY (Hennepin County General Hospital)**  
(Cr and hrs ar; prereq regis med) Hitchcock
- 5-513 (197) **EXTERNSHIP IN SURGERY (Mount Sinai Hospital)**  
(Cr and hrs ar; prereq regis med) Eisenberg
- 5-514 **EXPERIMENTAL SURGERY—TUMOR IMMUNOLOGY**  
(Cr and hrs ar; prereq regis med) McKhann
- 5-515 **SURGICAL ONCOLOGY**  
(Cr and hrs ar; prereq regis med) McKhann, Grage

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

- 8-200 **CLINICAL SURGICAL PROBLEMS AND MANAGEMENT**  
Graduate students act as house surgeons and are required to study all phases of patient care, including their diagnosis, pre- and postoperative management, and operative therapy. (5 cr) Najarian and staff
- 8-201 (215) **SURGERY-ROENTGENOLOGY-PATHOLOGY CONFERENCE**  
Weekly reviews of selected surgical patients. (1 cr) Radiology, Pathology and Surgery staffs
- 8-202 (216) **SURGICAL RESEARCH**  
Problems in experimental surgery. (5 cr; hrs ar) Najarian and staff
- 8-203 (221, 222) **SURGERY COMPLICATIONS AND RESEARCH SEMINAR**  
Evaluation of selected surgical patients including postoperative courses. Current research problems are presented for discussion and critical evaluation. (1 cr) Najarian and staff
- 8-207 (290) **TRANSPLANTATION AND BONE MARROW CONFERENCE**  
Current clinical and research problems are presented for interdepartmental discussion and evaluation. (1 cr) Najarian, Good

## **Urology**

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

- 5-180 (180) **EXTERNSHIP IN UROLOGY**  
(Cr and hrs ar) Staff

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

- 8-250 (250) **UROLOGICAL SURGERY**  
Urological fellow first assists at operations at University Hospitals and later is permitted to operate under supervision of the staff. (4 cr; hrs ar) Staff

**8-251 (251) CYSTOSCOPY AND UROLOGICAL DIAGNOSIS**

Urological fellow performs cystoscopies and other diagnostic procedures. (4 cr; hrs ar) Staff

**8-252 (252) UROLOGICAL CONFERENCE**

Problems in diagnosis and treatment are discussed. (4 cr; hrs ar) Staff

**8-253 (253) RESEARCH IN UROLOGY**

Problems in experimental and clinical surgery. (4 cr; hrs ar) Staff

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

**5-636 COMMUNITY HEALTH NURSING**

Instruction and supervised experience in community health nursing. Family oriented, with focus on nursing assessment and intervention, community health care and health promotion. (3 cr; prereq 5-635)

## **COLLEGE OF PHARMACY**

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

### **Pharmaceutics (Phm)**

**5-620 (54) FUNDAMENTAL PRINCIPLES, PROCESSES**

Selected topics in physical chemistry of application to pharmacy. (4 cr; prereq 5-610 [53], or #; lect I MTWThF, AH 350; lab II-IV MW, AH 125) Rippe

**5-660 (59) DISPENSING PHARMACY**

(3 cr; prereq 5-650 [58], or #; lect I MTWTh, AH 350; lab II-IV MW, AH 104) McRae

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

**3-776 ADMINISTRATIVE AND PROFESSIONAL RELATIONSHIPS WITHIN THE HEALTH CARE FACILITY**

A 12-month's program of on-campus residential (3 weeks) and off-campus independent study which includes periodic seminars and monthly classes under program preceptors; board of trustees, medical staff, nursing, hospital law, medical records, planning, community health systems, continuing health education. (15 cr; prereq 3-775 [160A] or #) Weckwerth, Phin, and staff

**5-068\*\* (190) FIELD PRACTICE IN PUBLIC HEALTH EDUCATION**

See section on 10-week courses, page 157.

### **Biometry (PubH)**

**5-405 (180) BIOMETRIC METHODS IN ENVIRONMENTAL HEALTH I**

Variation; frequency distribution; demographic techniques; probability; introduction to data analysis. (3 cr; prereq environmental health students only, others #; I MWF, Owre 111; lab II-III MWF, Mayo 1220) Kjelsberg

**5-406 (180A) BIOMETRIC METHODS IN ENVIRONMENTAL HEALTH II**

Estimation; tests of significance, Poisson distribution; serial dilutions and most probable number; elements of bioassay; radiologic statistics. (3 cr; prereq 5-405 [180]) Bearman

**5-452 (110B) BIOMETRY II**

Further consideration of testing statistical hypotheses and interval estimation;  $\chi^2$  applied to frequency data; regression analysis; correlation; analysis of variance; contrasts and multiple comparison techniques. (3 cr; prereq 5-450 [110A] and 5-453 [111B]; IV MTWThF; ForH 150) Jeffries

**5-453 (111B) BIOMETRY LABORATORY II**

Application of concepts of testing and estimation of the parameters of the basic probability models; application of  $\chi^2$  to goodness of fit and heterogeneity tests; application of regression to bioassay; application of analysis of variance to bioassay. (2 cr; prereq 5-452 [110B]; III TThF, ForH 150, and 7 morning hrs per wk ar...afternoon hrs by special ar only; ForH 80) Jeffries

**5-600 (189) FIELD COURSE IN PUBLIC HEALTH NUTRITION**

Placement in an approved agency with opportunity for experience in nutritional aspects of public health programs. (Cr ar; prereq #) Stief and associates

**5-601 (196) SEMINAR: PUBLIC HEALTH NUTRITION**

(Cr ar; prereq #) Stief

**5-610 (107) MATERNAL AND CHILD HEALTH**

Health needs and services for mothers and children in public health programs. (3 cr; prereq #; hrs ar) Bridge

**5-653 (184) DENTAL HEALTH PROGRAMS**

Dental health activities and problems in a community situation; observation visits and participation in public and voluntary facilities; preventive, curative, rehabilitative, and research activities of local, state, and federal agencies' problems of dental manpower. (Cr ar; prereq #) Meskin, Martens, Gordon, Canalichio

**5-456 BIOMETRY CONSULTING SEMINAR**

Consultant and consultee interaction; communication and formulation of the biometric problem. Role and responsibility of the biometrician. Robustness and relevance of frequently used analytical techniques. Biometry student internship experiences. (3 cr; prereq biometry major) Boen

**5-470 (123) TOPICS IN BIOMETRY**

Selected readings with discussion based on these readings. (Cr ar; prereq #) Staff

## *Environmental Health (PubH)*

**5-150 (123) TOPICS IN ENVIRONMENTAL HEALTH**

Selected readings and discussions of problems in environmental health. (Cr ar; prereq #) Staff

**5-151 (102) ENVIRONMENTAL HEALTH**

Methods for promoting man's health and comfort by controlling the environment. (3 cr; prereq #) Bond and staff

**5-170 (123) TOPICS IN ENVIRONMENTAL BIOLOGY**

Selected readings in environmental biology with discussion of control techniques. (Cr ar; prereq #) Staff

**5-180 (123) TOPICS IN AIR POLLUTION**

Selected readings in air pollution with discussion based on these readings. (Cr ar; prereq #) Staff

**5-183 (186) PROBLEMS OF AIR POLLUTION CONTROL**

Special supervised studies involving laboratory and field investigation procedures; pertinent literature review. (Cr ar; prereq 5-181 [155], #) Paulus

**5-200 (123) TOPICS IN RADIOLOGICAL HEALTH**

Selected readings in radiological health with discussion based on these readings. (Cr ar; prereq #) Staff

- 5-210 (123) TOPICS IN OCCUPATIONAL HEALTH**  
Selected readings in occupational health with discussion based on these readings. (Cr ar; prereq #) Staff
- 5-220 (123) TOPICS IN FOOD SANITATION**  
Review of literature and practice to identify association of food sanitation problems to public health. (Cr ar; prereq #) Staff
- 5-230 (123) TOPICS IN INSTITUTIONAL ENVIRONMENTAL HEALTH**  
Review of literature and practice to identify institutional environmental health problems. (Cr ar; prereq #) Staff
- 5-239 (138) HOSPITAL ENGINEERING PROBLEMS**  
Application of environmental engineering, sanitation, and maintenance principles to planning, administration, and operation of hospitals. (Cr ar; prereq #; 8:00-5:00 MTWThF; BlegH 225) Michaelsen, Teske, and visiting lecturers
- 8-002 (230) FIELD OBSERVATION OF SELECTED PUBLIC HEALTH PRACTICES**  
(Cr ar; prereq #) Staff
- 8-150 (200) RESEARCH: ENVIRONMENTAL HEALTH**  
Opportunities will be offered for qualified students to pursue research in the public health importance of environmental stresses on the health of man. (Cr ar) Staff
- 8-170 (200) RESEARCH: ENVIRONMENTAL BIOLOGY**  
(Cr ar; prereq #) Olson, Greene
- 8-180 (200) RESEARCH: AIR POLLUTION**  
(Cr ar; prereq #) Paulus
- 8-200 (200) RESEARCH: RADIOLOGICAL HEALTH**  
(Cr ar; prereq #) Barber
- 8-208 FIELD PRACTICE IN RADIOLOGICAL HEALTH**  
(Cr ar; prereq #) Barber
- 8-210 (200) RESEARCH: OCCUPATIONAL HEALTH**  
(Cr ar; prereq #) Michaelsen
- 8-220 (200) RESEARCH: FOOD SANITATION**  
(Cr ar; prereq #) Pflug
- 8-247 (232) FIELD WORK IN GROUNDWATER DEVELOPMENT**  
See section on 10-week courses, page 157.
- 8-248 (233) WATER QUALITY INVESTIGATION AND RESEARCH TECHNIQUES**  
Field techniques and special research methods for establishing pollution base-lines; recognition and appraisal of advancing eutrophication. (6 cr; prereq #) Olson, Odlaug, Ruschmeyer
- 8-249 (234) WATER QUALITY RESEARCH**  
Design and implementation of independent short-term research activity. Literature review, statistical design, and data processing. (6 cr; prereq #) Olson, Odlaug, Ruschmeyer

# College of Liberal Arts

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

## American Studies (AmSt)

### 1-102 (Hum 23) AMERICAN LIFE III

The rise of American intellectual and cultural nationalism and its place in the modern world. (3 cr; limited to 49 students; I MTWThF; E 203) Rubin

### 8-970 (251) INDEPENDENT READINGS IN AMERICAN CIVILIZATION

(Cr ar; prereq consent of program chairman) Staff

## Anthropology (Anth)

### 5-101 (100) PRINCIPLES OF CULTURAL ANTHROPOLOGY

Intensive introduction to elements of cultural anthropology. Analysis of range and variability of human behavior. Principles of cultural dynamics. (3 cr, §1-002 [2A]; may be taken in lieu of 1-002; limited to 100 students; V MTWThF; ForH 155) Kiste

### 5-215 (128) ANTHROPOLOGICAL PERSPECTIVES ON AMERICAN CULTURE

Anthropological perspectives on contemporary American culture and society with emphasis on the study of values, family organization, socialization and kinship, education, and community integration. (3 cr; limited to 100 students; prereq 1-002 [2A] or 5-101 [100] or #; II MTWThF; ForH 155) Rowe

### 5-381 (150) CULTURE CHANGE AND DEVELOPMENT

Processes of cultural change; invention, diffusion, and acculturation. Effects of colonialism, urbanization, and modernization. Analysis of developing societies. (3 cr; limited to 50 students; prereq 1-002 [2A] or 5-101 [100]; III MTWThF; ForH 285) Kiste

### 5-385 (152) URBAN ANTHROPOLOGY

Structure and process in non-western urban centers; emphasis on the role of rural migrants, relationship of urbanism to political and economic development, role of voluntary associations, adjustment of kinship groups to urban life. (3 cr; limited to 50 students; prereq 1-002 [2A] or 5-101 [100] or #; IV MTWThF; ForH 285) Rowe

### 5-591 (140) FIELD RESEARCH IN ARCHAEOLOGY

(8 cr [may be taken for cr only once]; limited to 20 students; prereq #) Johnson

### 5-970 (190) DIRECTED RESEARCH

(Cr and hrs ar; prereq sr, #) Staff

### 8-508 (237) ADVANCED FIELD TECHNIQUES IN ARCHAEOLOGY

(8 cr; prereq #) Johnson

### 8-950 (295) ADVANCED RESEARCH

(Cr and hrs ar; prereq sr, #) Staff

## Applied Statistics††

### Stat 5-911 (181A) TOPICS IN STATISTICS (Part II)

See section on 10-week courses, page 157.

†† See Theoretical Statistics offerings on page 275.

## Art History (Arth)

- 1-001 (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, §3-001 [50]; limited to 50 students; IV MTWThF; J 207A) Staff
- 1-009 (10) HISTORY OF SCULPTURE, PAINTING, AND ARCHITECTURE: MEDIEVAL ART**  
Medieval architecture, sculpture, and painting, including early Christian, Byzantine, Romanesque, and Gothic periods. (4 cr, §3, §57; limited to 60 students; III MTWThF; J 207B) Steyaert
- 1-011 (11) HISTORY OF SCULPTURE, PAINTING, AND ARCHITECTURE: RENAISSANCE AND BAROQUE**  
A survey from the Italian Renaissance of the fifteenth century through the Rococo period of the eighteenth century. (3 cr, §4, §58; limited to 60 students; II MTWThF; J 207B) Canedy
- 5-307 (107) FIFTEENTH-CENTURY ART IN ITALY**  
Survey of early Renaissance architecture, sculpture, and painting in central and northern Italy. (3 cr, §108; limited to 60 students; prereq 3 cr art history or §; IV MTWThF; J 207B) Canedy
- 5-326 (116A) ART OF NORTHERN EUROPE: 16TH CENTURY**  
Final manifestations of Gothic and the emergence of new forms in architecture. Tudor England, Italian influence in France, and the conflict between Italianism and indigenous traditions in Germany. (3 cr, §157; limited to 60 students; prereq 3 cr art history or §; V MTWThF; J 207B) Steyaert
- 5-432 (132) EUROPEAN PAINTING AND SCULPTURE OF THE 19TH CENTURY**  
Realism, Impressionism and Post-Impressionism as both French and European styles during the second half of the century. (3 cr, §157; limited to 50 students; prereq 3 cr art history or §; II MTWThF; J 207A) Staff
- 8-994 (295) MUSEOLOGY I**  
An intensive course involving observation and experience in most areas of museum work. Much class time will be spent in Twin Cities museums. (5 cr; limited to 5 students; required of candidates for MA in museology; prereq Δ; VI-VII MTWThF; J 202) Staff

## Studio Arts (Arts)

- 1-101 (20) BASIC DRAWING**  
Introduction to studio work; exploration of contemporary and traditional methods. Work from nature, various drawing mediums. (3 cr; limited to 25 students; I-II MTWThF; ArtB 150) Roode
- 1-102 (23) DRAWING**  
Work from life and nature; introduction to color and pictorial structure. (3 cr; limited to 25 students; prereq 1-101 [20]; III-IV MTWThF; ArtB 150) Roode
- 1-301/1-302 (40, 41) SCULPTURE**  
(Sequence limited to 20 students) Baldwin
- 1-301 (40) Beginning course.** Intensive study of structure with emphasis on form and space. Construction in metal and plaster. (3 cr; I-II MTWThF; ArtB bsmt)
- 1-302 (41) Integrates basic principles examined in 1-301.** Natural form studied for sculptural concepts. Imaginative approach to form is encouraged. (3 cr; prereq 1-301 [40]; I-II MTWThF; ArtB bsmt)
- 1-503/1-504/1-505 (34-35-36) LITHOGRAPHY**  
Introduction to methods of lithography-planography. (3 cr; limited to 20 students; prereq 1-101 [20] or §; I-II MTWThF; ArtB 170) Priede

**1-701 (10) PHOTOGRAPHY**

Introduction to photographic medium, its background and meaning today. Lectures in contemporary and historical use of photography. Problems in use of camera, printing, and enlarging. (3 cr; limited to 20 students)

Sec 1, I-II MTWThF, ArtB 131, Warkov

Sec 2, III-IV MTWThF, ArtB 131, Warkov

**3-101/3-102/3-103 (53-54-55) DRAWING**

From model, still life, and nature. Principles of anatomy. (3 cr; limited to 25 students; I-II MTWThF; ArtB 160) Hendler

**3-111/3-112/3-113 (60B-61B-62B) WATERCOLOR**

Introduction to transparent watercolors, 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 1-101 [20], or equiv with §; III-IV MTWThF; ArtB 160) Hendler

**3-301/3-304/3-305 (80A, 81A, 82A) SCULPTURE**

(Sequence limited to 20 students) Baldwin

**3-301 (80A) Direct Metal Sculpture.** Attention given to 20th-century tools and equipment. (3 cr; III-IV MTWThF; ArtB bsmt)

**3-304 (81A) Direct Metal Problems of Sculptural Expression and Organization.** (3 cr; prereq 3-301, 3-302, 3-303 [80A, 80B, 80C]; III-IV MTWThF; ArtB bsmt)

**3-305 (82A) Experimental Work in Direct Metal.** Assigned class problems. (3 cr; prereq 3-304 [81A]; III-IV MTWThF; ArtB bsmt)

**5-504/5-505/5-506/5-507/5-508/5-509 (133-134-135-136-137-138) ADVANCED LITHOGRAPHY**

Specialized work in color printing and planographic techniques. (3 cr; sequence limited to 20 students; prereq 1-503 [34]; III-IV MTWThF; ArtB 170) Priede

## Classics

### Classics (Clas)††

**1-045 (45) GREEK AND ROMAN MYTHOLOGY**

Classical myths which acquaint the student with the stories of the gods, demigods, and heroes which are a basic component of the European cultural heritage, with attention to their artistic, religious, psychological, and anthropological interpretations. (3 cr, §1-042 [42], §1-142 [42A], §5-145 [145]; V MTWThF; FolH 308) Rochefort

**5-124 (124) FIELD RESEARCH IN ARCHAEOLOGY**

Field excavation, survey, and research in archaeological sites in Greece, Turkey, Italy, Israel, or the Mediterranean area. Intensive training in techniques of excavation and exploration as well as analysis and interpretation of archaeological materials. (3-6 cr; prereq 9 cr from 5-101 [100] through 5-105 [120] or equiv and Δ) McDonald, Kraabel

**5-145 (145) GREEK AND ROMAN MYTHOLOGY**

Same classwork as Clas 1-045 but with special independent reading and research assignments in consultation with the instructor. (3 cr, §1-042 [42], §1-045 [45], §1-142 [42A]; V MTWThF; FolH 308) Rochefort

### Latin (Lat)

**3-464 (64) CICERO: ORATORY**

(4 cr; prereq 1-103 [3] or Δ; III MTWThF; FolH 302) Rochefort

†† No knowledge of Greek or Latin is required.

**8-120 (121-126) LATIN TEXT COURSE**

For graduate students in departments other than Classics who wish text work in Latin for a minor or related field. Students will attend Lat 3-464 if they meet the prerequisites for this course. Supplementary work at the discretion of the instructor. (3 cr; prereq  $\Delta$ ; III MTWThF; FoIH 302) Rochefort

*Note*—Graduate students majoring in Classics may undertake Independent Study courses by contacting Professor Rochefort about arrangements before the term begins.

## Communication Disorders (CDIs)

**3-101 (99) INTRODUCTION TO SPEECH SCIENCE, PATHOLOGY, AND AUDIOLOGY**

Survey of concepts basic to understanding normal and abnormal speech and hearing function. Introduction to causes, characteristics, and modifications of communication problems. (3 cr; II MTWThF; FoIH 303) Starr

**5-202 (169) SYMPOSIUM IN SPEECH SCIENCE, PATHOLOGY, AND AUDIOLOGY**

(3 cr; prereq grad major or professional paid experience beyond undergrad major or  $\$$ ; VI MTWThF; FoIH 303) Lingwall

**5-970 (101-102-103) READINGS**

Directed readings and preparation of reports on selected subjects. (Cr and hrs ar; prereq  $\$$ ) Chaiklin, Henrikson, Speaks

**8-511 (249) SEMINAR: CURRENT ISSUES IN SPEECH PATHOLOGY**

Significant problem areas in speech pathology; relation to other rehabilitation programs and personnel. Class projects involving in-depth exploration of a specific problem. (3 cr; prereq grad major in speech pathology or  $\$$ ; VII MTWThF; FoIH 303) Lingwall

**8-520 (266) CLINICAL METHODS AND PRACTICE IN SPEECH PATHOLOGY: SPECIALIZED PRACTICA**

Specialized practica may be taken in one or more of the following areas: cleft palate, voice, articulation, stuttering, neuromuscular disorders, aphasia, laryngectomy, hearing impaired. (1-3 cr [may be repeated]; prereq  $\$$ ; hrs ar) Starr

**8-990 (204-205-206) RESEARCH**

(Cr ar; open to grad students engaged in research on special problems; prereq  $\$$ ) Chaiklin, Speaks

## East Asian Languages

### Chinese (Chin)

*For complete course listings in Chinese, see section on 10-week courses, page 157.*

### Japanese (Jpn)

*For complete course listings in Japanese, see section on 10-week courses, page 157.*

## Economics (Econ)

- 1-001 (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. (3 cr, §1-004 [1T], §1-015 [C], §3-001 [50A]; limited to 40 students; prereq 3rd qtr fr)  
Sec 1, I MTWThF, BlegH 240, Staff  
Sec 2, III MTWThF, BlegH 130, Staff
- 1-002 (2) PRINCIPLES OF ECONOMICS**  
(Continuation of Econ 1-001) Demand and supply, competition and monopoly, and the distribution of income. (3 cr, †1-001/1-002 [1-2], §1-005 [2T], §1-015, §3-002 [50B]; each section limited to 40 students; prereq 1-001 [1] or equiv)  
Sec 1, I MTWThF, BlegH 435, Staff  
Sec 2, II MTWThF, BlegH 420, Staff  
Sec 3, III MTWThF, BlegH 425, Staff  
Sec 4, IV MTWThF, BlegH 230, Staff
- 3-101 (65) MICROECONOMIC THEORY**  
Behavior of firms and industries under competitive and monopolistic conditions; factors influencing production, price, and advertising decisions. (3 cr, §3-104 [65T], §5-151 [165]; limited to 40 students; prereq 1-001/1-002 [1-2] or §; IV MTWThF; BlegH 120) Staff
- 3-102 (66) MACROECONOMIC THEORY**  
Determinants of national income, employment, and price level; attention given to aggregate consumption and investment. (3 cr; each section limited to 40 students; prereq 3-101 [65] or §)  
Sec 1, III MTWThF, BlegH 420, Staff  
Sec 2, IV MTWThF, BlegH 425, Staff
- 3-131 (75) WELFARE ECONOMICS**  
Introduction to welfare economics. Economic efficiency and the conditions necessary to sustain it. Conflicts between the efficiency and income distribution goals. How market structure and public policies increase or decrease efficiency. (3 cr; limited to 45 students; prereq 3-101 [65] or 3-101H [65H] or equiv; II MTWThF; BlegH 230) Staff
- 3-751 (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; limited to 45 students; prereq 3-102 [66] or equiv; IV MTWThF; BlegH 130) Staff
- 3-851 (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; limited to 37 students; prereq 3-101 [65], 3-102 [66] or equiv; I MTWThF; BlegH 335) Staff
- 3-970 (60) READINGS**  
(Cr ar; prereq 1-002 [2], consent of adviser, §)
- 5-131 (115) SYSTEMS AND PROGRAM ANALYSIS**  
Application of economic analysis to projects, systems, and subsystems. Criteria for optimization, scope of analysis, measurement of benefits and costs, time discounting, and sensitivity analysis under uncertainty. Role and usefulness of analysis in decision making. Case studies from private and public sectors. (3 cr; prereq 3-131 [75] or equiv; III MTWThF; BlegH 155) Staff
- 5-151 (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, §3-101 [65]; prereq grad or §; IV MTWThF; BlegH 155) Staff
- 5-152 (166) ELEMENTS OF ECONOMIC ANALYSIS: INCOME AND EMPLOYMENT**  
Determinants of national income, employment, and price level; aggregate consumption, investment, and asset holding. (3 cr, §3-102 [66]; prereq grad or §; III MTWThF; BlegH 235) Staff

**5-162 (185B) ADVANCED MICROECONOMICS**

Price and output policies under conditions of imperfect competition. Problems of choice under conditions of uncertainty. (3 cr; prereq 5-161 [185A] or ‡; III MTWThF; BlegH 340) Staff

**5-165 (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 5-164 [176A] or equiv or ‡; II MTWThF; BlegH 105) Staff

**5-307 (160) COMPARATIVE ECONOMIC SYSTEMS**

Functions of all economic systems; the market economy, liberal socialism, centrally planned economy. Analysis of American and Soviet economies. (3 cr, §5-337 [160A]; not available to economics majors; limited to 25 students; prereq 1-002 [2] or equiv; II MTWThF; BlegH 240) Staff

**5-337 (160A) COMPARATIVE ECONOMIC SYSTEMS**

Functions of all economic systems; the market economy, liberal socialism, centrally planned economy. Analysis of American and Soviet economies. (3 cr, §5-307 [160]; limited to 25 students; prereq 3-102 [66] or equiv or ‡; II MTWThF; BlegH 240) Staff

**5-401 (104) INTERNATIONAL ECONOMICS**

The case for free trade. Effects of tariffs; protection of infant industries; common markets. Balancing international receipts and payments, the role of exchange rate changes, international monetary reform. (3 cr, §5-431 [104A]; not open to economics majors; limited to 25 students; prereq 1-002 [2] or equiv; III MTWThF; BlegH 250) Staff

**5-431 (104A) INTERNATIONAL ECONOMICS**

The case for free trade. Effects of tariffs; protection of infant industries; common markets. Balancing international receipts and payments, the role of exchange rate changes, international monetary reform. (3 cr, §5-401 [104]; limited to 25 students; prereq 3-101 [65], 3-102 [66] or equiv or ‡; III MTWThF; BlegH 250) Staff

**5-970 (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

**8-312 (213B) ECONOMIC GROWTH AND NATIONAL PLANNING**

Models of the process of economic growth; exogenous factors to which growth is attributed. Techniques useful in planning, e.g., input-output, national income accounting programming. Questions of policy. (3 cr; prereq 8-311 [213A]; IV MTWThF; BlegH 250) Staff

**8-990 (290) INDIVIDUAL GRADUATE RESEARCH**

(Cr ar) Staff

**English (Engl)§§****1-001 (1) FRESHMAN ENGLISH**

(3 cr, §A or §1A or §1B or §1-311H [10H] or §Comm 1-001 [1]; each section limited to 28 students; prereq assignment to category I or 1A or 2)  
Sec 1, I MTWThF, E 4  
Sec 2, II MTWThF, E 4

**1-002 (2) FRESHMAN ENGLISH**

(3 cr, §B or §2A or §2B or §1-312H [11H] or §Comm 1-002 [2]; each section limited to 28 students; prereq 1-001)  
Sec 1, I MTWThF, E 320  
Sec 2, II MTWThF, E 320  
Sec 3, IV MTWThF, E 4

**1-822 (22) INTRODUCTION TO LITERATURE**

Milton, Restoration, 18th century. (4 cr; limited to 60 students; prereq ‡‡; II MTWThF; E 305) Lightner

§§ Credit in English will be allowed for certain classics courses numbered between 1-042 [40] and 3-083 [82]. Consult English Department for approval.

‡‡ Completion of or exemption from Freshman English requirement.

**3-155 (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. (4 cr; limited to 35 students; may not be taken concurrently with 3-156 [56]; III MTWThF; E 203) Mitchell

**3-156 (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. (4 cr; each section limited to 35 students; prereq 3-155 [55]; may not be taken concurrently with 3-155 [55])

Sec 1, III MTWThF, E 215, O'Brien

Sec 2, IV MTWThF, E 203, Scoggins

**3-723 (74) AMERICAN LITERATURE**

Crane to present. (4 cr; limited to 60 students; prereq 3-722 [73]; I MTWThF; E 305) Ross

**3-829 (54) ENGLISH NOVEL**

Late 19th and early 20th century. (4 cr; limited to 45 students; IV MTWThF; E 302) Lightner

**3-875 (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, §5-875 [175]; I-II MTWThF; E 217) McNally

**3-878 (78) TWENTIETH-CENTURY BRITISH LITERATURE**

Critical survey of major figures. (4 cr; II MTWThF; E 305) Wright

**5-631 (125) LANGUAGE AND LITERATURE**

The place of linguistic analysis in a theory of literary criticism; stylistic analysis in Europe and America since 1920; an examination of theories of linguistic description relevant to critical analysis; application to texts in prose and poetry. (4 cr; prereq 5-645 [165] or 8-604 [205]; IV MTWThF; E 229) MacLeish

**5-646 (166) HISTORY OF ENGLISH LANGUAGE**

Historical influences upon, and changes within, language as both popular and literary medium of communication. (4 cr; III MTWThF; E 302) MacLeish

**5-706 (106) WHITMAN AND MARK TWAIN**

(4 cr; II MTWThF; E 203) Geffen

**5-757 (157) AMERICAN POETRY**

Critical survey of American Poetry from Anne Bradstreet through Emily Dickinson; some attention to historical and intellectual backgrounds; emphasis upon major figures. (4 cr; III MTWThF; E 217) Geffen

**5-812 (109) ROMANTIC POETRY AND PROSE**

Blake's and Wordsworth's narrative poetry; essays of Lamb and DeQuincey. (4 cr; III MTWThF; E 229) Scoggins

**5-875 (175) CHAUCER‡‡**

Reading of *The Canterbury Tales* with introduction dealing with grammar and literary forms of 14th-century English. (6 cr, §3-875 [75]; prereq 5-801 [100]; I-II MTWThF; E 217) McNally

**5-893 (193) POETRY OF W. B. YEATS**

(4 cr; III MTWThF; E 203) Wright

## Family Studies (FamS)

**1-001 (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,

†† Taught concurrently with Engl 5-875.

‡‡ Taught concurrently with Engl 3-875.

interaction of marital spouses; and marital stability. (3 cr; limited to 40 students)

Sec 1, I MTWThF, J 2, Wahlstrom  
Sec 2, II MTWThF, BlegH 340, Campbell

- 1-002 (1A) DYNAMICS OF DATING, COURTSHIP, AND MARRIAGE**  
(See FamS 1-001) Designed for engaged or married students or #. (3 cr, §1-001 [1]; limited to 40 students; III MTWThF; J 2) Corrales

## Foreign Study (FS)

- 5-960 (162) SEMINAR FOR FOREIGN STUDY II**  
See section on 10-week courses, page 157.

## French and Italian

### French (*Fren*)

- 1-005 (26) INTERMEDIATE FRENCH**  
(Continuation of Fren 1-004) Development of vocabulary and ability to write and discuss short summaries based on readings in contemporary culture. (3 cr; prereq 1-004 [25]; II MTWThF; Arch 135)
- 1-102 (2) BEGINNING FRENCH**  
(5 cr; prereq 1-101 [1] or 1-001 [1] or 1 yr high school French; I-II MTWThF; ME 202)
- 3-012 (57) ADVANCED FRENCH COMPOSITION**  
(3 cr; prereq 3-011 [54]; II MTWThF; FolH 207)
- 3-021 (55) FRENCH CONVERSATION AND PRONUNCIATION**  
In addition to regular conversation course, an hour each week is devoted to practical phonetics and pronunciation drill. (3 cr; prereq 1-004H [25H] or 1-005 [26]; III MTWThF; FolH 205)
- 3-022 (58) ADVANCED FRENCH CONVERSATION**  
(3 cr; prereq 3-021 [55] or #; II MTWThF; FolH 203)
- 3-104 (53) INTRODUCTION TO FRENCH LITERARY TEXTS**  
Variety of literary works representing principal genres are examined through stylistic analyses and literary explications. Students learn critical terminology and discuss literary problems and techniques. (3 cr; prereq 1-004H [25H] or 1-005 [26] or 4 yrs high school French or #; III MTWThF; FolH 203)
- 3-289 (85) TOPICS IN 20TH CENTURY FRENCH LITERATURE**  
Reading and discussion of selected texts. Taught in French. (3 cr; prereq 3-201 [64]; IV MTWThF; FolH 203)
- 5-368 (157) SHORT STORIES OF THE 19TH CENTURY**  
From Charles Nodier to Anatole France with particular attention to Daudet and Villiers de l'Isle-Adam. (3 cr; prereq 3-209 [80] or above; II-III TTh; FolH 208)
- 5-384 (149) DRAMATISTS OF THE 20TH CENTURY**  
Concentrates on Anouilh, Sartre, Camus, Genet, Ionesco, Beckett, Audiberti; also examines less well-recognized dramatists of the last decade. (3 cr; prereq 3-209 [80] or above; II-III MW; FolH 208)
- 5-970 (189) INDEPENDENT READINGS FOR UPPER DIVISION STUDENTS**  
(1-3 cr; prereq # and consent of dept chm; hrs ar) Staff
- 8-970 (260) DIRECTED READINGS FOR GRADUATE STUDENTS**  
(1-3 cr; prereq #; hrs ar) Staff

### Italian (*Ital*)

- 1-001, 1-002, 1-003 (1, 2, 3) BEGINNING ITALIAN**  
See section on 10-week courses page 157.

- 1-004 (25) INTERMEDIATE ITALIAN**  
(4 cr; prereq 1-003 [3] or 3 yrs high school Italian; III MTWThF; addtl lab work required; FolH 103)

## Geography (Geog)

- 1-301 (4) HUMAN GEOGRAPHY**  
Geography of population and principal ways of life; capacity of earth for future population. (5 cr; I-II MTWThF; AndH 250) Rice
- 3-970 (70) DIRECTED READINGS**  
Course devised for independent study program and designed to permit student to pursue interests in special reading and/or study. (1-15 cr) Francaviglia
- 5-101 (130) HISTORICAL GEOGRAPHY OF NORTH AMERICA**  
Sequential analysis of settlement and economy in the changing environment and resource pattern of North America. Aboriginal North America through initial phase of frontier settlement. (3 cr; III MTWThF; BlegH 435) Francaviglia
- 5-181 (106) REGIONS OF U.S.S.R.**  
Regionalization, production specialization and interchange within U.S.S.R.; effects of policies of centralization and regional autonomy; present trends, prognosis, and comparisons with United States. (3 cr; prereq 3-181 [63] or #; V MTWThF; BlegH 435) R Adams
- 5-383 (172) TRANSPORTATION GEOGRAPHY**  
Principles and theory of spatial development of transport systems; interaction of resource exploitation and network growth; model characteristics by commodity and passenger flow analysis; case studies at national, regional, and local levels. (3 cr; prereq 1-311 [41] or #; II MTWThF; BlegH 425) R Adams
- 5-711 (131A) HISTORICAL GEOGRAPHY OF NORTH AMERICA—FIELD COURSE**  
Sequential analysis of settlement and economy in changing environment and resource patterns of Minnesota and contiguous states. (2 cr; prereq 5-101 [130] or 5-102 [131] or #; 2:00-5:00 MW; BlegH 445) Francaviglia
- 8-330 (276, 277) SEMINAR: AGRICULTURAL GEOGRAPHY**  
An intensive field research seminar, Geog 8-330, will be given from July 28-August 18. Field headquarters will be at Menomonie, Wisconsin. Research will be focused upon related problems in cultural and rural geography of the Upper Coulee Country. Reservations must be made no later than May 20. For costs, detailed information, and reservations, contact Professor Cotton Mather, Department of Geography, 414 Social Sciences Building, University of Minnesota, Minneapolis, Minnesota 55455. (6 cr; prereq #) Mather
- 8-970 (200) DIRECTED READINGS**  
(1-5 cr) Rice

## German (Ger)

- 1-102 (2A) BEGINNING GERMAN**  
(5 cr; each section limited to 30 students; prereq 1-101 [1A] or 1 yr high school German) Staff  
Sec 1, I-II MTWThF, FolH 201  
Sec 2, I-II MTWThF, FolH 104
- 1-301 (4) INTERMEDIATE GERMAN**  
(3 cr; limited to 30 students; prereq 1-003 [3] or 1-103 [3A] or 1-203 [3B] or 3 yrs high school German; II MTWThF; FolH 109) Lowry
- 1-302 (5) INTERMEDIATE GERMAN**  
(3 cr; limited to 30 students; prereq 1-301 [4] or 4 yrs high school German; III MTWThF; FolH 109) Staff

**3-104 (56A) READING AND ANALYSIS OF LITERARY TEXTS**

(3 cr; limited to 30 students; not open to students who have had 3-301 [70] or above; prereq 1-302 [5] or 1-301 [4] and # or 4 yrs high school German; II MTWThF; FolH 202) Lowry

**3-303 (72) LYRIC POETRY: TWENTIETH CENTURY**

(3 cr; limited to 25 students; prereq 3-104 [56A] or 1-301 [4] and #; II MTWThF; FolH 108) Taraba

**3-323 (77) GERMAN PROSE OF THE 20TH CENTURY**

(3 cr; limited to 30 students; prereq 3-104 [56A] or #; IV MTWThF; FolH 205) C Wood

**3-501 (68) CONTEMPORARY GERMANY**

Introduction to culture and civilization of present-day Germany. (3 cr; limited to 25 students; prereq 3-104 [56A] or 1-301 [4] and #; I MTWThF; FolH 207) Staff

**5-113 (159C) FUNDAMENTALS OF THE STUDY OF GERMAN LITERATURE: BIBLIOGRAPHY**

(3 cr; VI-VII MW; FolH 205) Duroche

**5-221 (170) ROMANTICISM**

(3 cr; III-IV MW; FolH 208) Duroche

**8-451 (254A) 19TH CENTURY: NIETZSCHE**

(3 cr; limited to 20 students; III-IV TTh; FolH 207) Taraba

## History (Hist)

**1-001 (1) INTRODUCTION TO MODERN EUROPEAN HISTORY, PART I**

Development of western European civilization to 1715. (3 cr; II MTWThF; BlegH 5) Noonan

**1-052 (15) ANCIENT CIVILIZATION, PART II**

Greek civilization, 750 to 323 B.C. (3 cr; II MTWThF; BlegH 245) Kelly

**1-432 (31) HISTORY OF AFRICA**

From 1500 to the 19th century establishment of European rule. (3 cr; IV MTWThF; BlegH 225) Kaba

**1-453 (19) HISTORY OF ASIA, PART III**

Modern Asia: impact of Europe, nationalism. (5 cr; IV-V MTWThF; AndH 350) Marshall

**3-001 (53) INTRODUCTION TO MODERN EUROPEAN HISTORY, PART I**

Same as 1-001. (3 cr; II MTWThF; BlegH 5) Noonan

**3-453 (61) HISTORY OF ASIA, PART III**

(5 cr; IV-V MTWThF; AndH 330) Farmer

**5-062 (104B) GREECE TO 200 B.C., PART II**

(3 cr; IV MTWThF; BlegH 260) Kelly

**5-135 (119E) HISTORY OF EARLY RUSSIA, PART II**

(4 cr; III MTWThF; BlegH 150) Noonan

**5-243 (120C) HISTORY OF GERMANY, PART III**

Since 1871. (3 cr; I MTWThF; BlegH 220) Pflanze

**5-317 (133E) AMERICAN HISTORY 1850-1900, PART I**

Compromise of 1850 to Appomattox. (3 cr; II MTWThF; AndH 230) Loehr

**5-403 (147A) SURVEY OF LATIN-AMERICAN HISTORY, PART III**

Recent Latin-American history. (3 cr; VI-VII TTh; BlegH 110) Wagner

**5-420 (145C) TOPICS IN LATIN-AMERICAN HISTORY**

Detailed treatment of historical themes common to the entire Latin American area. (3 cr; prereq #; IV MTWThF; BA 837) Wagner

**5-432 PROBLEMS IN CONTEMPORARY AFRICA**

Advanced course in contemporary African history with a special emphasis on Africa south of the Sahara. (3 cr; VI MTWThF; BlegH 115) Kaba

**5-468 (151E) TWENTIETH-CENTURY CHINA, PART II**

The People's Republic. (3 cr; I MTWThF; BlegH 215) Farmer

**5-472 (149F) HISTORY OF JAPAN, PART II**

Since 1700. (3 cr; II MTWThF; BlegH 260) Marshall

**5-612 (164A) MEDIEVAL HISTORY, PART II**

(3 cr; VI MTWThF; SocSci 628) Hoyt

**5-970 (101B) DIRECTED STUDY**

(3 cr; prereq #) Staff

## Humanities (Hum)

**1-101 (1A) HUMANITIES IN THE MODERN WORLD**

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, \$1-001 [1] or \$3-001 [51H]; limited to 65 students; I MTWThF; Arch 15) Ramsland

**1-102 (2A) HUMANITIES IN THE MODERN WORLD**

The Industrial Revolution, liberalism, and socialism. Period from about 1776 to 1890. Authors: the classical economists, Marx, Mill, Ibsen, Dostoevski. (3 cr, \$1-002 [2] or \$3-002 [52H]; limited to 50 students; III MTWThF; Arch 135) Ramsland

**1-004 (4) HUMANITIES IN THE MODERN WORLD IV**

The humanities between two wars. 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, \$3-004 [54]; limited to 65 students; II MTWThF; Arch 45) Atkin

**3-003 (53) HUMANITIES IN THE MODERN WORLD**

From about 1840 to about 1914. Authors: Darwin, Nietzsche, Kierkegaard, and Mann. (3 cr, \$1-003 [3] or \$1-103 [3A]; limited to 65 students; I MTWThF; Arch 45) Hult

**3-004 (54) HUMANITIES IN THE MODERN WORLD**

(See Hum 1-004) (3 cr, \$1-004; each section limited to 65 students)  
Sec 1, IV MTWThF, Arch 60, Atkin  
Sec 2, II MTWThF, E 215, Chute

**3-005 (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; each section limited to 65 students)

Sec 1, IV MTWThF, E 305, Chute  
Sec 2, III MTWThF, E 305, Cranney

**3-112 (62A) THE CIVILIZATION OF THE ROMANS**

A survey of their literature and religion. An analysis of the social and political condition of the Empire. The philosophy of Stoics and Epicureans. (3 cr, \$1-012 [12] or \$3-012 [62]; limited to 65 students; III MTWThF; E 320) Hershbell

**3-970 (70) DIRECTED STUDY**

(Cr ar; prereq #) Staff

## Journalism and Mass Communication (Jour)

**1-001 (1) INTRODUCTION TO MASS COMMUNICATIONS**

Nature, functions, and responsibilities of communication agencies, examined from point of view of professional journalist. News, opinion, enter-

tainment, and persuasion functions. Specialized communication; aspects of advertising. Laboratory exercises in fact-gathering and journalistic writing. (3 cr; prereq 2nd qtr fr with B avg in English, 3rd qtr fr with C avg in English or soph . . . basic typing ability desirable; 2 lect, 1 lab per wk; IV MWF, IV-V TTh; MurH 212) Sim

**3-021 (90) MASS COMMUNICATIONS AND THE NEWS**

How news gets to and affects the public in print, on the air, by film. Evaluation of news gathering and presentation methods. Contemporary influences on media. (3 cr; not open to journalism majors; II MTWThF; MurH 308) Sim

**3-178 (78) PUBLICITY**

Publicity, external and internal communication, including use of company publications, institutional advertising, and trade journals. Projects and campaigns. (3 cr; open only to Upper Division majors in journalism; prereq #; II MTWThF; MurH 311) Lindsay

**5-601 (109) HISTORY OF JOURNALISM**

Development of American newspapers and periodicals, from early beginnings in Europe to present day; rise of radio and television; relation of communications developments to political, economic, and social trends. (3 cr; III MTWThF; MurH 308) Emery

**5-721 (121) MASS MEDIA IN A DYNAMIC SOCIETY**

Economic, political, and social determinants of character and content of mass communications. Patterns of operations, effect on content, and relative social utility. Theory of mass society. (3 cr; prereq 1-201 [18] or 3-121 [50] for journalism majors, # for others; IV MTWThF; MurH 308) Gillmor

**5-825 (125) COMMUNICATION SYSTEMS OF WESTERN WORLD**

Communications in other democracies as compared with United States and with totalitarian systems. Britain, Netherlands, Scandinavia, France, and Latin America emphasized; problems of reconstructing free press in Germany, Italy, Japan; prospects for developing areas. (3 cr; prereq 15 cr in social sciences...Upper Division course in international relations recommended; III MTWThF; MurH 311) Lindsay

**8-722 (222) COMMUNICATION AGENCIES AS SOCIAL INSTITUTIONS**

Influence of political, social, and economic forces upon national character and performance of mass media. (3 cr per qtr; prereq #; II MTWThF; MurH 207) Gillmor

## Library School (Lib)††

**5-102 (113) MEDIA CENTER ADMINISTRATION**

Organization and administration at the school building level of the library as the single agency that encompasses all forms of instructional materials; philosophy and objectives of service; administration and organizational plans, procedures, and relationships. (3 cr; limited to 45 students; II MTWThF; AH 350) Olson

**5-201 (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; I MTWThF; AH 350) Colberg

†† The graduate Library School is a professional school. Courses numbered 8-000 and above 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 8-000 are open to anyone who has been admitted to the Graduate School or to the Minimum Certification Program for School Librarians, and to any undergraduate in the College of Liberal Arts or the College of Education. A student who does not fall in one of the above categories must have his registration for a library science course approved by an adviser in the Library School office, 3 Walter Library.

**5-202 (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 50 students; V MTWThF; AH 350) Pankake

**5-301 (114) READING, LISTENING, AND VIEWING GUIDANCE FOR YOUTH IN LIBRARIES**

Philosophy and objectives of library service in schools and children's departments; guidance techniques; planning library programs. Review of relevant research related to reading, listening, and viewing, and a survey of professional literature from various fields pertinent to understanding children and adolescents. (3 cr; prereq 5-202 [104]; limited to 45 students; IV MTWThF; AH 350) Olson

**5-304 (173) LIBRARY SERVICES FOR ADULTS**

Selection and evaluation of materials in terms of adult learning, reading ability, and interests; programs of service for adults and reading guidance techniques. (3 cr; prereq 5-202 [104]; II MTWThF; WaLib 4B) Freeman

**5-401 (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 40 students; IV MTWThF; AH 150) Ar

**8-004 (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; VI MTWThF; WaLib 4B) McClaskey

**8-103 (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 28 students; prereq 5-101 [101]; IV MTWThF; WaLib 4B) McClaskey

**8-207 (266) REFERENCE II**

Continued discussion of the various types of general reference tools; research problems using these and other works appropriate to large general research collections. Problems of growth, control, accessibility of American library resources. (3 cr; limited to 28 students; prereq 5-201 [102]; I MTWThF; WaLib 4B) King

**8-209 (261) LITERATURE OF THE HUMANITIES**

Bibliographical and other reference sources including reviewing media. Developments and trends in the subjects covered. (3 cr; limited to 28 students; prereq 5-201 [102]; III MTWThF; WaLib 4B) King

**8-402 (283) ADVANCED CATALOGING AND CLASSIFICATION**

Advanced study of rules of entry, descriptive cataloging and subject analysis of library materials, administrative problems in cataloging. (3 cr; limited to 28 students; prereq 5-401 [103]; V MTWThF; WaLib 4B) Simonton

**8-970 (298) INDEPENDENT STUDY IN LIBRARY SCIENCE**

(3 cr; prereq #) Staff

**8-990\* (295, 296, 297) LIBRARY RESEARCH**

Graduate students under Plan B may register for at least 3 credits in library research with the approval of the professor who will guide the research paper. (3-9 cr; prereq #) Staff

## Linguistics (Ling)

**5-900 (190) APPLIED TRANSFORMATIONAL GRAMMAR FOR TEACHERS II**

(3 cr; prereq 5-900 first term; IV MTWThF; FolH 108) Hutchinson

## COURSES IN APPLIED MUSIC

Instrument	Applied: Elective				Applied			Applied: Performance			Instructor
	Non-Cr	Lower Div	Upper Div	Grad	Lower Div	Upper Div	Grad	Lower Div	Upper Div	Grad	
Piano	0-101	1-101	3-101	5-101	1-201	3-201	8-201	1-301	3-301	8-301	McNab
Harpichord	0-102	1-102	3-102	5-102	1-202	3-202	8-202	1-302	3-302	8-302	Ar
Organ	0-103	1-103	3-103	5-103	1-203	3-203	8-203	1-303	3-303	8-303	Fleischer
Voice	0-104	1-104	3-104	5-104	1-204	3-204	8-204	1-304	3-304	8-304	Ware, Wittich
Violin	0-105	1-105	3-105	5-105	1-205	3-205	8-205	1-305	3-305	8-305	Ar
Viola	0-106	1-106	3-106	5-106	1-206	3-206	8-206	1-306	3-306	8-306	Ar
Cello	0-107	1-107	3-107	5-107	1-207	3-207	8-207	1-307	3-307	8-307	Jamieson
Double Bass	0-108	1-108	3-108	5-108	1-208	3-208	8-208	1-308	3-308	8-308	Ar
Flute	0-109	1-109	3-109	5-109	1-209	3-209	8-209	1-309	3-309	8-309	Niosi
Oboe	0-111	1-111	3-111	5-111	1-211	3-211	8-211	1-311	3-311	8-311	Angelucci
Clarinet	0-112	1-112	3-112	5-112	1-212	3-212	8-212	1-312	3-312	8-312	Williams
Saxophone	0-113	1-113	3-113	5-113	1-213	3-213	8-213	1-313	3-313	8-313	Williams
Bassoon	0-114	1-114	3-114	5-114	1-214	3-214	8-214	1-314	3-314	8-314	Ar
French Horn	0-115	1-115	3-115	5-115	1-215	3-215	8-215	1-315	3-315	8-315	A.
Trumpet	0-116	1-116	3-116	5-116	1-216	3-216	8-216	1-316	3-316	8-316	Chenette, Hasselmann
Trombone	0-117	1-117	3-117	5-117	1-217	3-217	8-217	1-317	3-317	8-317	Ar
Baritone	0-118	1-118	3-118	5-118	1-218	3-218	8-218	1-318	3-318	8-318	Ar
Tuba	0-119	1-119	3-119	5-119	1-219	3-219	8-219	1-319	3-319	8-319	Walton
Percussion	0-121	1-121	3-121	5-121	1-221	3-221	8-221	1-321	3-321	8-321	Fine
Harp	0-122	1-122	3-122	5-122	1-222	3-222	8-222	1-322	3-322	8-322	Miller
Guitar	0-123	1-123	3-123	5-123	1-223	3-223	8-223	1-323	3-323	8-323	Pederson
Accordion	0-124	1-124	3-124	5-124	1-224	3-224	8-224	1-324	3-324	8-324	Hane

## Music (Mus)

### 1-001 (4) FUNDAMENTALS OF MUSIC

Study of basic musical symbols, vocabulary, rhythm, design, scale structures, intervals, chords. The development of basic piano skills; the playing of simple accompaniments. (2 cr; each section limited to 24 students; for nonmusic majors)

Sec 1, II MTWThF, MusEd 200, Lauritzen

Sec 2, III MTWThF, MusEd 200, Lauritzen

Sec 3, IV MTWThF, MusEd 200, Lauritzen

### 1-508 (8B) SURVEY OF MELODIC AND HARMONIC PROCEDURES

A study of the principles of melodic and harmonic structure. (3 cr; prereq #: I MTWThF, IV TTh; ScH 3) Humphries

### 1-518 (7B) EAR TRAINING AND SIGHT-SINGING

Development of aural skills with concentration on sight-singing, interval recognition, melodic and harmonic dictation, and vocal improvisation. (3 cr; prereq #: II MTWThF, IV MWF; ScH 3) Humphries

### 1-804 WORLD MUSIC

Survey of music in universal perspective. Fundamental traits, distinguishing styles, and cultural factors which influence musical creativity. Music from different cultures placed in juxtaposition to examine forms and traits, to develop listening abilities and an understanding of man's musical expressions. (3 cr; IV MTWThF; ScH 2) Kagan

### 3-541/3-542/3-543 (97-98-99) COUNTERPOINT

Strict 16th century and Bach-style counterpoint in two and three parts; writing of canons, motets, inventions, and fugues. This is a creative course. (2 cr each; prereq 1-506 [6T]; II MTWThF; ScH 103) Fetler

### 3-584 (84J) MUSIC: ITS MEANING AND STRUCTURE

Discussion, examination of selected works. Various periods, including recent developments. Purpose, meaning, continuity, direction in music. Relationship of spontaneity and theoretical principles. (3 cr; V MTWThF; ScH 103) Fetler

### 5-541/5-542/5-543 (197-198-199) ADVANCED COUNTERPOINT

Practice in technique of writing three- and four-voice fugues; contrapuntal devices and problems; analysis of polyphonic works of various periods from Ars Nova to the present day. (2 cr each; prereq 3-543 [99]; III MTWThF; ScH 103) Fetler

### 5-551, 5-552, 5-553 (127, 128, 129) COMPOSITION I

Original work in various forms. The student is exposed to a variety of techniques and styles of composition after which he is encouraged to develop his own original approach. (2 cr each; prereq 1-506 [6T]; hrs ar; ScH 203) Fetler

### 5-554, 5-555, 5-556 COMPOSITION II

Original works in various forms. (2 cr each; prereq 3-543 [99], 5-553 [129]; hrs ar; ScH 203) Fetler

### 5-863 (179) MUSICAL INSTRUMENTS OF THE WORLD

Organology; classification, comparative study of musical instruments in all cultures; history, distribution, structure, technology, acoustics. Instruments in literature, myths, iconography. (3 cr; VI MTWThF; ScH 2) Kagan

### 8-551, 8-552, 8-553 (227, 228, 229) COMPOSITION III

Original works in various forms. Emphasis on advanced work in composition. (3 cr each; prereq grads who have completed undergrad major sequence in music theory and composition incl 3-543 [99], 5-503 [123], 5-553 [129], 5-563 [143]; hrs ar; ScH 203) Fetler

## Courses in Applied Music

Offerings in applied music are classified according to three modes:

elective (with or without credit), applied, and performance; and four levels: Lower Division (prefix 1, or 0 for no credit), Upper Division (prefix 3), and two Graduate levels (prefixes 5 and 8). A student may not register for a course in applied music for credit until he has passed the required applied entrance examination. The examining committee will determine the mode(s) for which a student may register. Students should consult with the Music Department regarding the mode and level of applied music appropriate for fulfillment of specific requirements in each degree program. To register for Upper Division credit in applied music, the student must have completed 12 credits at the Lower Division level on the same instrument and must pass an Upper Division qualifying examination.

Courses in applied music carry either 2 credits (minimum of 10 private half-hour lessons) per quarter or 4 credits (minimum of 10 hour lessons) per quarter. A special fee of \$50 for 2 credits, or \$100 for 4 credits, per quarter is charged for individual lessons for all Lower Division students and nonmusic majors. See chart on page 264.

## Natural Science (NSci)

### 1-002†† (2) ORIENTATION IN THE NATURAL SCIENCES

(See NSci 1-001, First Term) The second quarter continues with chemistry, introduces geology, and finishes with physics and astronomy. (5 cr; each section limited to 14 students; prereq 1-001 [1]; III-IV MTWThF, Ph 133; 2 hrs lab, Ph 246) Staff

Lab 1, I MTh	Lab 7, VI MTh
Lab 2, I TF	Lab 8, VI TF
Lab 3, II MTh	Lab 9, VII MTh
Lab 4, II TF	Lab 10, VII TF
Lab 5, V MTh	Lab 11, VIII MTh
Lab 6, V TF	Lab 12, VIII TF

### 1-005 (5) PHYSICAL WORLD

Topics from chemistry selected to illustrate the methods of science and acquaint the student with the physical universe around him. (4 cr; equiv courses in chemistry; prereq 1-004 [4]; II MTWThF and 4 lab hrs per wk; SciCB 375) Ar

## Philosophy (Phil)

### 1-001 (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 120, Hanson  
Sec 2, V MTWThF, ForH 120, Lewis

### 1-002 (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; ForH 120) Hochberg

### 1-003 (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; I MTWThF; ForH 55) Potter

†† To receive credit, a student must complete both NSci 1-001 [1] and 1-002 [2], but not necessarily in the Summer Session.

- 3-002 (51) HISTORY OF WESTERN PHILOSOPHY**  
Stoicism, Epicureanism, and medieval Christian synthesis. (3 cr; III MTWThF; ForH 130) Lewis
- 5-201 (154) ELEMENTS OF SYMBOLIC LOGIC**  
Development of formalized language. Syntax and semantics of sentential and first-order predicate logic, deductive systems. (3 cr; prereq 1-001 [2] or #; IV MTWThF; ForH 349) Hanson
- 5-720 (141) STUDIES IN CONTEMPORARY PHILOSOPHERS: SARTRE AND CAMUS**  
Intensive studies of the works of selected individual philosophers. Usually a single philosopher studied each quarter, the philosophers studied varying from year to year. (3 cr; prereq 3-003 [52] or #; III MTWThF; ForH 349) Hochberg
- 5-801 (171) PROBLEMS OF INDIAN PHILOSOPHY**  
Introduction to problems of systematic inquiry in India, with special attention to analyses of causation, freedom, and knowledge in Buddhism, Jainism, Nay-Vaisesika, Purva-Mimamsa, Samkhya, and the various Vedantas. (3 cr; prereq 5 cr of philosophy and 3 cr Indian courses or #; II MTWThF; ForH 349) Potter

## Political Science (Pol)

- 1-002 (2) AMERICAN GOVERNMENT AND POLITICS**  
Analysis of principles, organization, processes, functions of government and the interplay of political forces in United States—national, state, and local. Attention given throughout to current issues. (3 cr; limited to 138 students; III MTWThF; AndH 330) Walcott
- 1-026 (26) AMERICAN FOREIGN POLICY**  
Introduction to institutions and processes which determine American foreign policy. (3 cr; limited to 72 students; II MTWThF; BlegH 215) Hopmann
- 1-041 (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; limited to 72 students; VI MTWThF; BlegH 215) Walcott
- 1-052 (8) THE STATE IN MODERN WORLD**  
Examination of principles, structure, operation of modern state. Emphasis on nation state: historical development, democratic government and totalitarian government. (3 cr; IV MTWThF; BlegH 215) Chase
- 5-307 (107) THE AMERICAN CHIEF EXECUTIVE**  
Constitutional powers and political roles of President and governors; chief executive and administration; executive relations with legislatures; party and popular leadership; presidential roles in crisis. (3 cr; limited to 54 students; prereq 1-002 [2] or #; V MTWThF; BlegH 420) Eyestone
- 5-441 (141) EUROPEAN GOVERNMENT AND POLITICS**  
Britain, France, Germany, and Italy. Political institutions in their social setting; problems of power and responsibility; governmental stability; political decision making, government and economic order. (3 cr; prereq 1-052 [B] or 12 cr in social science or #; I MTWThF; BlegH 420) Arnaud
- 5-443 (143) GOVERNMENT AND POLITICS OF SOVIET UNION**  
Analysis that seeks to explain rise of Bolshevism; sources and nature of its ideology; history of communist regime; institutional character; organization of power; role of the party. (3 cr; prereq 1-052 [B] or 12 cr in social science or #; II MTWThF; BlegH 130) Noonan
- 5-503 (103) PRINCIPLES OF AMERICAN CONSTITUTION III**  
Civil rights and civil liberties. (3 cr; prereq 5-501 [101] or 5-502 [102] or equiv; III MTWThF; BlegH 115) Chase

**5-662 (162) RECENT POLITICAL THOUGHT**

Main currents from Marx to present: including socialist, anarchist, liberal, and conservative thought; problems such as alienation, and political obligation. (3 cr; open to jr, sr only; prereq 1-052 [B] or 9 cr in social science or §; II MTWThF; BlegH 250) Arnaud

**5-736 (136) INTEREST GROUPS**

Formation, organization, and strategies of groups in pursuit of objectives in democratic political systems; the group approach to political analysis; evaluation of the varying approaches to the study of interest groups and their function in the polity. (3 cr; prereq 1-002 [2] or §; III MTWThF; AndH 230) Eyestone

**5-877 (177) U.S. FOREIGN POLICY**

Analysis of factors conditioning U.S. foreign policy; geographic and economic position, defense needs and dispositions, social structure, ideologies, public opinion; political parties, interest groups, bureaucracy; leadership. (3 cr; IV MTWThF; BlegH 330) Hopmann

**8-501 (285) RESEARCH SEMINAR: JUDICIAL PROCESS AND ADMINISTRATIVE LAW**

See section on 10-week courses, page 157.

## Psychology

### Personal Orientation (PO)

**1-001 (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 added to CLA grad requirement; limited to 30 students; I MTWThF; Ph 145)

### Psychology (Psy)

**1-001/1-002† (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)

**1-004/1-005† (4-5) INTRODUCTORY LABORATORY PSYCHOLOGY**

Experiments illustrating contemporary subject matter such as sensory psychology, psychophysics, perception, motivation, verbal behavior, animal and human learning, problem solving, and psychological measurement. (2 cr for each; each section limited to 40 students; prereq soph, 1-001/1-002 [1-2] or ¶1-001/1-002)

Sec 1, I-III MTWThF, WeH 101

Sec 2, IV-VI MTWThF, WeH 101

Sec 3, VII-IX MTWThF, WeH 101

**3-011 (75) INTRODUCTION TO PSYCHOLOGY OF LEARNING**

Basic methods in study of learning. Development of fundamental concepts and principles governing the learning process. (3 cr; prereq 1-002 [2]; II MTWThF; SciCB 175) Overmier

**3-801 (90) INTRODUCTION TO STATISTICAL METHODS**

Central tendency and variation, correlation methods, bivariate regression, introduction to problems of sampling and hypothesis testing. (3 cr, §Soc 3-801 [80]; prereq 1-001/1-002 [1-2] or equiv; III MTWThF; AH 150) Weiss

**3-990 (190) PROJECT IN PSYCHOLOGY**

Individual library study or empirical investigation. (Cr ar; prereq sr, §) Darley

**5-101/5-102† (120-121) PERSONALITY**

Presentation and discussion of several major theories and concepts. (3 cr for each; prereq 9 cr in psychology; I-II MTWThF; SciCB 125) Bradshaw

**5-125/5-126† (125-126) DIFFERENTIAL PSYCHOLOGY**

Introduction to methodology. Quantitative studies of nature of psychological traits and influence of age, sex, heredity, and environment in causation of individual differences in ability and temperament. (4 cr for each; prereq 3-801 [90], or 1-005 [5] and 5 cr statistics, honors cand, grad; I-II MTWThF; AH 150) Bouchard

**5-201 (140) SOCIAL PSYCHOLOGY**

Survey of theories of evidence. Effects of other persons, mass communications, social class, and group membership upon individual's attitudes and behavior. (3 cr; prereq 1-002 [2], 1-005 [5] and 9 cr in social science; I MTWThF; ForH 155) Pannen

**8-520 (230) FIELD WORK IN APPLIED PSYCHOLOGY**

(Cr ar; prereq §) Staff

**8-990\* (210) RESEARCH PROBLEMS**

(Cr ar) Warnken

## Public Affairs (PA)

**8-115 (214A) CURRENT ISSUES OF PUBLIC ADMINISTRATION AND POLICY DEVELOPMENT IN MINNESOTA**

Background study through lectures, panel discussions, and seminar sessions on selected public policy issues which currently confront Minnesota's governmental units. (3 cr; prereq Δ; 1:30-4:30 W, AndH 270; VI-VII TTh, BlegH 335) Staff

**8-881 (283B) RESEARCH SEMINAR: PUBLIC POLICY**

Selected policy area study. (3 cr; prereq Δ and §; II-III TTh; BlegH 360) Staff

## Scandinavian

### Swedish (Swed)

**1-101/1-102/1-103 (1-2-3) INTENSIVE BEGINNING SWEDISH**

See section on 10-week courses, page 157.

## Slavic and East European Languages

### Russian (Russ)

**1-101/1-102/1-103 (1-2-3) BEGINNING INTENSIVE RUSSIAN**

See section on 10-week courses, page 157.

**1-104/1-105/1-106 (4-5-6) INTERMEDIATE INTENSIVE RUSSIAN**

See section on 10-week courses, page 157.

## Social Science (SSci)

**3-503 (93) URBAN CRISIS**

An examination of the effects of white racism and projections of the image of white supremacy on the socio-economic and political life chances of Black people in America followed by an examination of the nature of and basis for social unrest in Minneapolis. Will combine classroom work and field experience. Resource persons from the Black community will be utilized, visits to agencies providing services to the Black community, and to selected Black families will be made in an effort to gain first-hand experience. (5 cr; limited to 35 students; prereq Δ; VIII-IX MTWThF; BlegH 330) Glover

### 3-981 SOCIETIES OF THE FUTURE

Application of disciplinary analysis to the problems of specialization and generalization of human understanding, with emphasis upon the future of formal and informal social systems. Aspects of the anticipated impacts of long-range social trends (such as computer controlled education systems, political, economic, social and moral structural changes). Interaction of the social sciences, business, and humanities and arts with basic facets of long-range social development. Long-range alternatives pertaining to human societies remain open to examination. (3 cr; I MTWThF; BlegH 155) Harkins

## Social Work (SW)

### 3-001 (90) AMERICAN SOCIAL WELFARE

Analysis of American social welfare as a basic social institution. (5 cr; prereq Soc 1-003 [3]; VI-VII MTWThF; BlegH 130) Wiebler

### 3-002 (124) GOVERNMENT AND SOCIAL WELFARE

Philosophy, policy development, and administration of federal, state, and local programs in the fields of social insurance, public assistance, welfare services, housing, and like public programs. (3 cr; prereq Pol 1-002 [2] or ♯; III MTWThF; BlegH 350) Compton

### 3-005 (91) INTRODUCTION TO SOCIAL WORK PROCESS

Analysis of the nature of social work helping processes through study of development of social work theory and its implementation in the field of practice. (4 cr; prereq 3-001 [90]; IV-V M, IV MTWThF; BlegH 404) Wiebler

### 3-010 (95) FIELD EXPERIENCE

Direct experience under supervision in a social welfare agency. (1-3 cr; prereq sr, 3-005 [91]; hrs ar) Broeker

### 3-970 DIRECTED STUDY

Independent study under tutorial guidance. (Cr and hrs ar; prereq ♯; SocSci 825) Chommie

### 3-990 DIRECTED RESEARCH

Under guidance, to conduct a research program. (Cr and hrs ar; prereq ♯; SocSci 825) Chommie

### 5-010 (101) SPECIAL TOPIC (A): The Deprived Child

A consideration of the problems of children suffering from various forms of deprivation. Review of pertinent literature; suggested societal problem solutions. Designed for teachers and others working with children. (3 cr; limited to 25 students; III MTWThF; BlegH 404) Liebenow

### 5-010 (103) SPECIAL TOPIC (C): Social Work Literature on Family Welfare

Analysis of pertinent literature on family welfare in the USA. (3 cr; limited to 24 students; prereq ♯; II MTWThF; BlegH 350) Compton

### 5-010 (104) SPECIAL TOPIC (D): Child Welfare Programs and Issues

Surveys the various child welfare programs offered under both public and private auspices. Some selected issues and societal value conflicts associated with child welfare programs. (3 cr; limited to 37 students; IV MTWThF; BlegH 340) Orfald

### 8-010 (212) FIELD INSTRUCTION IN SOCIAL WORK

Field practice in social work under supervision. (Cr and hrs ar; prereq admission as grad social work student, 8-100 [245] and ♯) Yesner and others

### 8-301 (260) ADMINISTRATION IN SOCIAL WORK

Study of the process of transferring social policy into services emphasizing theory and principles. (3 cr; II MTWThF; SocSci 860) Kidneigh

### 8-990 (287) SPECIAL STUDIES IN SOCIAL WORK

Selected projects previously approved by instructor. (Cr and hrs ar; open only to social work students in their 2nd grad yr; VII MTWThF; SocSci 860) Chommie

## Sociology (Soc)

### 1-001 (1) INTRODUCTION TO SOCIOLOGY

A survey of the main substantive fields of sociology for nonprospective sociology majors. Illustrative material drawn from current social problems areas. (3 cr; I MTWThF; BlegH 5) Rose

### 1-005 (48) PRINCIPLES OF SOCIOLOGY I

An integrated 2-quarter course (with Soc 1-006) required of prospective sociology majors usually taken during the freshman year. The course is focused upon the basic concepts and variables used in the analysis of individual-to-group relationships and the organization and structure of social groups. (4 cr; prereq prospective major or major in sociology; IV MTWThF; AndH 210) Fulton

### 3-101 (53) ELEMENTS OF CRIMINOLOGY

General survey of field of criminology. (3 cr; prereq 1-001 [1] or 1-005 [48], 1-006 [49] or #; III MTWThF; AndH 350) Pepinsky

### 3-801 (80) SOCIOLOGICAL METHODS I: DESCRIPTIVE STATISTICS

See section on 10-week courses, page 157.

### 3-802 (81) SOCIOLOGICAL METHODS II: STATISTICAL INFERENCE

See section on 10-week courses, page 157.

### 5-141 (118) DELINQUENT BEHAVIOR

Critical analysis of nature of delinquent behavior and its "causes"; consideration of help that understanding of causes can give to its modification and its prevention. (3 cr; prereq 3-101 [53]; I MTWThF; BlegH 235) Pepinsky

### 5-405 (144) SOCIAL STRATIFICATION AND MOBILITY

Analysis of form and content of hierarchical arrangements. Relationship of hierarchical arrangements to problems of social order and individual behavior. (3 cr; prereq 1-001 [1] or 1-005 [48], 1-006 or #; V MTWThF; BlegH 250) Fulton

### 5-951 (123) MINORITY GROUP RELATIONS

An analysis of systems of ethnic stratification with a special focus upon race relations in American society. (3 cr; prereq 1-001 [1] or 1-005 [48], 1-006 or #; II MTWThF; AndH 270) Rose

## South Asian Languages

### Bengali (Ben)

#### 1-101/1-102/1-103 (1-2-3) INTENSIVE BEGINNING BENGALI

See section on 10-week courses, page 157.

## Spanish and Portuguese

### Portuguese (Port)

#### 1-101, 1-102, 1-103 (1, 2, 3) BEGINNING PORTUGUESE

See section on 10-week courses, page 157.

### Spanish (Span)

#### 1-102 (2) BEGINNING SPANISH

(5 cr; limited to 140 students; prereq 1-101 [1] or 1 yr high school Spanish; I-II MTWThF; Arch 35)

- 1-104 (25) INTERMEDIATE SPANISH**  
(5 cr; limited to 25 students; prereq 1-103 [3] or 3 yrs high school Spanish; I-II MTWThF; ME 208)
- 1-105 (26) INTERMEDIATE SPANISH**  
(3 cr; limited to 25 students; prereq 1-104 [25] or 4 yrs high school Spanish; III MTWThF; FoIH 202)
- 3-011 (54) SPANISH COMPOSITION**  
(3 cr; limited to 20 students; prereq 1-104 [25] or equiv; II MTWThF; FoIH 105)
- 3-014 (55) SPANISH CONVERSATION**  
(3 cr; limited to 20 students; prereq 3-011 [54] or equiv; IV MTWThF; FoIH 104)
- 3-024 (58) ADVANCED SPANISH CONVERSATION**  
(3 cr; limited to 20 students; prereq 3-021 [57]; IV MTWThF; FoIH 105)
- 5-232 (135) DEVELOPMENT AND METAMORPHOSIS OF "DON JUAN" THEME**  
(3 cr; prereq 3-211 [65H], 3-212 [66], 3-213 [67] or #; V MTWThF; FoIH 302) Rundorff
- 5-269 NATURALISM: 19TH CENTURY SPANISH NOVEL**  
(3 cr; prereq 1 upper div lit course or #; IV MTWThF; FoIH 103) Rundorff
- 5-412 (132) CERVANTES: NOVELAS EJEMPLARES AND ENTREMESSES**  
(3 cr; prereq 3-211 [65H], 3-212 [66], 3-213 [67] or #; III MTWThF; FoIH 104) Jones
- 5-970 (189) INDEPENDENT READINGS FOR UPPER DIVISION STUDENTS**  
(1-3 cr; prereq # and consent of dept chmn; hrs ar) Rundorff, Jones
- 8-970 (260) DIRECTED READINGS IN ROMANCE LANGUAGES**  
(1-3 cr; prereq  $\Delta$ ; hrs ar) Staff

Note—The General Extension Division will offer Spanish for Graduate Students (Span 0-221). Please address all inquiries to the General Extension Division.

## Speech, Communication, and Theatre Arts

### Speech (Spch)

- 1-101 (5) FUNDAMENTALS OF SPEECH**  
Development of basic understanding of speech processes. Examines nature of speech and speech skills; provides opportunities for individual speaking and evaluation. (5 cr, §1-106 [6]; each section limited to 22 students) Scott and staff  
Sec 1, I-II MTWThF, FoIH 306  
Sec 2, III-IV MTWThF, FoIH 307
- 1-102 (2) COMMUNICATION IN THE MODERN WORLD: INTERPERSONAL COMMUNICATION**  
Description of structure of acts of communication and of factors influencing the occurrence, form, and effects of such acts. Analysis of the relationship of communication forms to social structure. (3 cr; limited to 100 students; II MTWThF; FoIH 308) Shapiro
- 1-106 (6) FUNDAMENTALS OF SPEECH**  
Emphasis on investigation and persuasion ranging from informal committee session to formal meeting requiring parliamentary rules. (3 cr, §1-101 [5]; limited to 22 students; prereq 1-102 [2]; I MTWThF; FoIH 305) Ar

- 3-190 (99) ATTAINING UNDERSTANDING OF SPEECH-COMMUNICATION THROUGH TEACHING OTHERS**  
Directed study through teaching others. Students will work with an instructor in planning and teaching in undergraduate course. (1-3 cr; may be repeated once) Staff
- 3-201 (65) INTRODUCTION TO BROADCASTING PRODUCTION**  
Fundamentals of practice and theory. Emphasis on projects and exercises in performance and scripting; introduction to studio equipment and procedures. (3 cr; each section limited to 16 students; prereq 1-101 [5])  
Sec 1, III MTWThF, MurH 302, Aero 309, Rarick  
Sec 2, V MTWThF, MurH 302, Aero 309, Bart
- 3-203 (68) RADIO PRODUCTION**  
An introduction to radio production. Equipment and staff organization; program design and presentation. Directed experience in organization, writing, production, direction, and performance of radio news, music, dramatic, and documentary programs. (3 cr; limited to 12 students; prereq 3-201 [65]; II MTWThF; MurH 302, Aero 309) Boyd
- 3-204 (69) TELEVISION PRODUCTION**  
Introduction to the problems of production. Equipment and staff organization; interrelationships with program design. Exercises in production. (3 cr; limited to 14 students; prereq 3-201 [65]; VI MTWThF; Aero 309, EdH Studio A) Bart
- 3-605 (51) ADVANCED PUBLIC SPEAKING**  
Preparation and delivery of speeches on current public issues. (3 cr; limited to 22 students; prereq 1-101 [5] or 1-106 [6]; I MTWThF; FoIH 307) Scott
- 3-641 (52) DISCUSSION AND CONFERENCE METHODS**  
Cooperative thinking in task-oriented groups. Planning, preparing for, participating in, and leading private and public meetings. (3 cr; limited to 25 students; prereq 1-101 [5] or 1-106 [6] or #; II MTWThF; FoIH 305) Ar
- 5-404 (169) SPEECH AND LANGUAGE IN HUMAN BEHAVIOR**  
Basic orientation on place of speech and language in human behavior. Individual projects and collateral reading. (3 cr; limited to 30 students; prereq 1-102 [2], 3-401 [61] or grad; IV MTWThF; FoIH 306) Piché
- 5-441 (116) COMMUNICATION IN HUMAN ORGANIZATIONS**  
Analysis of the functions of communication in organizational settings. Study of organizational structure and dynamics and their effect upon the communication process. Collateral readings and individual projects. (3 cr; prereq 1-102 [2] or 3-401 [61], 3-641 [52] or 5-411 [106] or grad; III MTWThF; FoIH 306) Shapiro
- 5-431 (101) THE PROCESS OF PERSUASION**  
Theories of modern motivational communication. Analysis of the process of social control through persuasive speech. (3 cr; prereq 1-101 [5] or 1-106 [6], Psy 1-002 [2], 10 cr in social sciences or #; IV MTWThF; FoIH 304) Howell
- 5-611 (109) CLASSICAL RHETORIC**  
Greek and Roman theories of speech making; historical and philosophic context and influence on education. (3 cr; prereq 1-101 [5] or 1-106 [6]; II MTWThF; FoIH 307) Scott
- 5-970 (181) READINGS IN SPEECH**  
Directed reading and preparation of reports on selected subjects. (Cr and hrs ar; prereq 9 cr in Upper Div speech and #) Staff
- 8-433 (209) SEMINAR: PERSUASION**  
Contemporary public address. Literature of persuasion, methods in study of persuasion. (3 cr; prereq 1-101 [5], 5-431 [101], 5-602 [102], 5-603 [103], Psy 1-002 [2], 5-201 [70], 10 cr social science; VI-VII MTh; FoIH 307) Howell

**8-611 (275) SEMINAR: RHETORIC**

History and critical study of rhetorical theory. Examination of research in rhetoric. (3 cr; prereq 5-611 [109] or #; V-VI MTH [first class meets on T]; FolH 305A) Scott

**8-990 (291) RESEARCH**

(Cr and hrs ar; open to grad students engaged in research on special problems) Staff

**Theatre (Th)****1-321 (21) BEGINNING ACTING: CREATIVE APPROACH**

Creation and presentation of original scenes and skits. Ability to respond to the imaginative situation with individuality and effectiveness stressed. (3 cr; limited to 18 students; prereq fr with  $\Delta$ , soph, 1-501 [12] or ¶1-501; II-III MTWThF; WeH 302) Ar

**1-501 (12) LABORATORY SECTIONS: INTRODUCTION TO THE THEATRE**

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 1-101 [11] or ¶1-101; VII first day, ScH 108; hrs and rm ar thereafter) Adey

**1-502 (24) STAGE MAKE-UP**

Theory and practice in the art of stage make-up. (1 cr; limited to 15 students; prereq 1-501 [12] or ¶1-501; VI-VII TTh; ScH 23) Jasorka

**1-503 (34) STAGECRAFT: CONSTRUCTION AND PAINTING**

Theory and practice in construction, painting, and shifting of stage scenery. (3 cr; limited to 22 students; prereq 1-501 [12]; II MTWThF; WeH 306) Josal

**3-707 (74) PLAY PRODUCTION IN THE SECONDARY SCHOOL**

Technical fundamentals: stagecraft, design, lighting, and costuming. (3 cr; limited to 25 students; prereq 1-501 [12]; III MTWThF; WeH 306) Adey

**3-801 (81) ORAL INTERPRETATION OF FICTION**

Study of selected short stories. Solo and group readings. (3 cr; limited to 20 students; prereq 1-313 [20] or 1-321 [21] or Spch 1-101 [5] or 1-106 [6], jr; II MTWThF; FolH 302) Thompson

**5-100 (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. (2-6 cr; limited to 15 students; prereq permission of theatre practicum committee, #) Josal and staff

**5-101 (100) INTRODUCTION TO RESEARCH**

Graduate research in theatre arts; selection of topics and methods of investigation. (3 cr; required of all majors in theatre arts except MFA candidates; limited to 20 students; prereq sr, or grad theatre major; III MTWThF; FolH 305) Thompson

**5-134 ADVANCED CREATIVE DRAMA**

In-depth study of philosophy, techniques, and materials; experience in creating, leading, and critiquing beginning and advanced sessions with classmates and children. (3 cr; limited to 15 students; prereq 5-131 [131], tchg exper and #; IV MTWThF; ShH 115) Graham

**5-335 (128) PRODUCTION FOR THE LYRIC STAGE**

Problems in acting, staging, and administration for the lyric stage. (3 cr; limited to 18 students; prereq Mus 5-470 [147] or #; II MTWThF; ScH 108) Balk

**5-514 (191) ADVANCED PROBLEMS IN SCENE DESIGN**

Theory and design of stage scenery. Special projects and reports. (3 cr; limited to 6 students; prereq 3-514 [91], 5-711 [111], or #; IV MTWThF; WeH 306) Josal

**5-711 (111) STAGE DIRECTION**

Theory of direction. Exercises in blocking and production of short scenes. (3 cr; limited to 14 students; prereq 1-321 [21], 6 cr from 3-512 [90], 3-514 [91], 3-516 [92]; I MTWThF; ShAn 128) Balk

**5-718 (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; prereq 1-501 [12] or ¶1-501 [12] or §; VI MTWThF; ScH 108) Loppnow

**5-970 (181, 182, 183) DIRECTED READINGS**

Directed reading and preparation of reports on selected subjects. (Cr and hrs ar; prereq 9 cr in theatre and §) Staff

**8-990 (281, 282, 283) RESEARCH**

(Cr ar; prereq §) Staff

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

See *Communication Disorders on page 254.*

## **Statistics (Stat)**

See *Applied Statistics on page 251.*

See *Theoretical Statistics below.*

## **Theoretical Statistics (Stat)**

**3-092 (90E) INTRODUCTION TO PROBABILITY AND STATISTICS**

(Separate section of 3-091) Elementary probability and probability distributions, sampling, elements of inference. (3 cr; prereq 2nd yr IT or §; III MTWThF plus 2 hrs ar; VH 203) Ar

**5-122 (122) THEORY OF STATISTICS**

Confidence intervals, testing hypotheses, regression, ANOVA, sequential and nonparametric methods. (3 cr; prereq 5-121 [121]; II MTWThF plus 2 hrs ar; VH 113) Ar

# Institute of Technology

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

## COLLEGE OF ENGINEERING

### Aerospace Engineering and Mechanics (AEM)

#### 3-016 (MM 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; limited to 40 students; prereq AEM 1-015 [MM 35], Math 1-240 [31] or ¶Math 1-240; III-IV MWF, III TTh; Aero 21)

#### 3-036 (MM 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 5-010 [100] or §Phys 5-020 [100A]; limited to 40 students; prereq Math 1-250 [32] or ¶Math 1-250 and Phys 1-210 [21]; I-II MWF, II TTh; Aero 21)

#### 5-841, 5-842 INDUSTRIAL ASSIGNMENT

See section on 10-week courses, page 157.

## Electrical Engineering (EE)

#### 1-501 (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; each section limited to 20 students; prereq 1-500 [30]; lect I-II MWF; Arch 40) Ar

Rec 1, I-II T, Aero 211

Rec 2, I-II Th, Aero 211

#### 1-701 (31A) ELECTRICAL ENGINEERING LABORATORY

Laboratory to accompany EE 1-501. (1 cr; each section limited to 18 students; prereq 1-700, ¶1-501) Ar

Lab 1, III-IV MW, EE 118

Lab 2, VI-VII MW, EE 118

Lab 3, VI-VII TTh, EE 118

#### 3-001 (47) ELECTRONICS

Network theorems, two-ports, active device models; vacuum diodes, semi-conductors; amplifiers, nonlinear devices; logic circuits. (4 cr; not for EE majors; each section limited to 18 students; prereq 1-501 [31] or 3-000 [46]; lect I-II MWF; Arch 50) Ar

Lab 1, VI-VII MW, EE 121

Lab 2, I-II TTh, EE 118

#### 3-402 (86) JUNIOR ELECTRICAL ENGINEERING LABORATORY

Experimental study of electromagnetic fields and linear systems. (2 cr; each section limited to 16 students; prereq 3-101 [75], 3-401 [85], ¶5-050 [66], 5-000 [107B] or ¶) Ar

Lab 1, V-VIII MW, EE 216

Lab 2, V-VIII MW, EE 205

Lab 3, V-VIII TTh, EE 205

**5-000 (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; limited to 25 students; prereq 1-501 [31], Math 3-061; III-IV MWF; Arch 55) Ar

**5-050 (66) NONLINEAR ELECTRONIC CIRCUITS**

Nonregenerative switching circuits, diode and transistor logic circuits; multivibrators, oscillators. (4 cr; limited to 60 students; prereq 3-051 [65], 5-000 [107] or ¶5-000; I-II MTWThF; Arch 55) Ar

## Mechanical Engineering

### Industrial Engineering (IE)

**5-100 (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 3-720 [99] or ¶; lect V MTWThF and 1 hr ar; ME 302) Arora

**5-420 (120) PROBABILITY MODELS IN INDUSTRIAL ENGINEERING AND OPERATIONS RESEARCH**

Concepts of compound statements, sets and functions, conditional probabilities and simple stochastic processes (including finite Markov chains) and their relation to selected problems in industrial engineering and operations research. Waiting line models, renewal and replacement models, dynamic programming, Markov processes with rewards; Monte Carlo methods. (3 cr; prereq ME 3-720 [99] or equiv; IV MTWThF and 1 hr ar; Arch 140) Arora

### Mechanical Engineering (ME)

**3-200 (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; limited to 30 students; prereq AEM 3-036 [36]; lect III MTWThF, 1 hr ar, ME 302; lab VI-VII MW, ME 321) Frohrib

**3-701 (34) MEASUREMENTS LABORATORY II**

Static and dynamic characteristics of generalized measurement systems. Electromechanical transducers. Measurement of temperature, pressure, vacuum, humidity, density, viscosity, heating valves, speed, power, force, stress, strain, and radioactivity. (2 cr; limited to 18 students; prereq 3-301 [30A] or ¶3-301; lect IV TTh, ME 302; lab VII-IX TTh, ME 370)

**3-740, 3-741, 3-742, 3-743 (90, 91, 92, 93) INDUSTRIAL ASSIGNMENT, Part II**

See section on 10-week courses, page 157.

**5-446 (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; limited to 30 students; prereq 5-320 [133] or ¶5-320; IV MTWThF, III TWTh; ME 321) Murphy

**5-280 (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 3-201 [23]; VI MTWThF and 1 hr ar; ME 302)

# SCHOOL OF ARCHITECTURE AND LANDSCAPE ARCHITECTURE

## Architecture (Arch)

- 1-021 (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 the ancient periods until the present time. (4 cr; 1-021 is prereq to all architectural history; II MTWThF; Arch 130) Winterowd
- 3-056 (56) MODERN ARCHITECTURE**  
The history of architecture in America and Europe from the late 19th century until the present time. (3 cr; prereq 1-021 [21] or #: IV MTWThF; Arch 130) Winterowd
- 3-081/3-082/3-083 (81-82-83) ARCHITECTURAL DESIGN I**  
See section on 10-week courses, page 157.
- 3-091/3-092/3-093 (91-92-93) ARCHITECTURAL DESIGN II**  
See section on 10-week courses, page 157.
- 5-111/5-112/5-113 (111-112-113) ARCHITECTURAL DESIGN III**  
See section on 10-week courses, page 157.
- 5-121/5-122 (121-122) ARCHITECTURAL DESIGN IV**  
See section on 10-week courses, page 157.

# SCHOOL OF CHEMISTRY

## Chemistry (Chem)

- 1-005 (GeCh 5) GENERAL PRINCIPLES OF CHEMISTRY**  
General laws of chemistry, principles of structure, and chemical behavior of matter. (5 cr, 1-004 [4], 1-005† [5]; for premedics, predentals, etc.; not open to College of Engineering students [see Chem 1-015]; prereq 1-004 [4]; lect I MTWThF, SciCB 325; rec V MWF, lab VI-VIII MWF, C ar) Staff
- 1-015 (GeCh 15) GENERAL PRINCIPLES OF CHEMISTRY**  
Basic principles and concepts of chemistry with a similar but more rigorous treatment than that of Chem 1-005. (4 cr, 1-014 [14], 1-015† [15]; limited to College of Engineering students; prereq 1-014 [14]; lect I MTWThF, SciCB 175; rec V MWF, lab VI-VIII MWF, C ar) Staff
- 1-032 (GeCh 32) GENERAL PRINCIPLES OF CHEMISTRY**  
Basic principles and concepts of chemistry with a similar but more rigorous treatment than that of Chem 1-005. (5 cr, 1-031 [31], 1-032 [32], 1-033† [33]; for chemistry and chemical engineering majors; prereq 1-031 [31]; lect I MTWThF, SciCB 175; rec V MWF, lab VI-VIII MWF, C ar) Staff
- 3-099 (OrCh 97) SENIOR THESIS**  
A written final senior thesis report is required. (Cr ar; prereq #, 4th yr) Staff
- 3-302 (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 3-301 [61]; lect I MTWThF, C 325; rec II TTh, C 325; lab II-IV MWF, C 390; lab conf III TTh, C 325) Ar

**5-120 (AnCh 111) PHYSICOCHEMICAL METHODS OF ANALYSIS**

Lecture. Optical and electrochemical methods and methods of separation. (3 cr; prereq elementary analytical chemistry and 5-501 [101]; V-VI MWF; C 325) Staff

**5-121 (AnCh 112) PHYSICOCHEMICAL METHODS OF ANALYSIS**

Laboratory. Quantitative application of electrochemical, optical, and other physical techniques. (3 cr; prereq 5-120 [111] or ¶5-120; I-III MTWThF; C 310) Staff

**5-510 (PCh 105) ANALYSIS OF DATA**

Statistical and numerical treatment of physicochemical measurements. (1 cr; prereq 5-501 [101], 5-502 [102], or 5-521 [108]; lect III TTh; C 111) Staff

**5-511/5-512 (PCh 106A-B) LABORATORY**

Measurement and interpretation of physicochemical properties. (1 or 2 cr; prereq 5-510 [105]; lab VI-VIII MTWThF; C 190) Staff

**5-521 (PCh 108) ELEMENTARY PHYSICAL CHEMISTRY**

Selected topics in physical chemistry, including chemical kinetics, statistical mechanics, and molecular structure. (3 cr; prereq 5-520 [107]; lect I-II MWF; C 111) Staff

**8-102 (AnCh 212) PHYSICOCHEMICAL METHODS OF ANALYSIS**

Laboratory. Quantitative application of electrochemical, optical, and other physical techniques. (4 cr; prereq 8-101 [211]; I-III MTWThF; C 310) Staff

**8-991 (AnCh 202) SPECIAL TOPICS**

Analytical topics not covered in regular courses are selected after discussion with instructor. (Cr and hrs ar; prereq  $\Delta$ ) Staff

**8-999 (AnCh 302, OrCh 302) RESEARCH IN CHEMISTRY**

(Cr and hrs ar; prereq  $\Delta$ ) Staff

## SCHOOL OF EARTH SCIENCES

### Geology and Geophysics (Geo)

**1-002 (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 1-001 [1] or 1-111 [11]; lect II MTWThF; P 110) Sloan

Lab 1, III-IV MWF, ForH 85

Lab 2, VI-VII MWF, ForH 85

**3-401 (62) INTRODUCTORY MINERALOGY**

Introduction to crystallography, crystal chemistry, and mineralogy, descriptive and determinative mineralogy. Study of minerals in natural rock systems. (5 cr; prereq 1-001 [1] or 1-111 [11] or  $\#$ , 1 term of college chemistry, Math 1-441 [15]; lect III MTWThF, P 110; lab VI-VIII MTWTh, P 100) Bartels

**5-004 (162) MINERALOGY**

Introduction to crystallography, crystal chemistry, and mineralogy. Descriptive and determinative mineralogy. Study of minerals in natural rock systems. (4 cr, §3-401 [62]; not open to geology, geophysics, geo-engineering or mineral resources engineering or metallurgy materials science majors; open to majors in College of Agriculture and postgrad students in education; prereq 1-001 [1] or 1-111 [11] or  $\#$ , a term of college chemistry, Math 1-441 [15]; lect III MTWThF, P 110; seminar V TTh, P 125; lab VI-VIII MTWTh, P 100) Rapp, Bartels

**5-052 (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, §Geo 1-002 [2], §Geo 1-112 [22]; only for students holding degrees in education; limited to 12 students; prereq 1-001 [1] or 1-111 [11] or 5-051 [109C] or §; lect II MTWThF, seminar V TTh, P 110; lab III-IV MWF, ForH 85) Sloan

- 5-099 (103) GEOLOGIC PROBLEMS**  
(Cr and hrs ar; prereq §)

## SCHOOL OF MATHEMATICS (Math)

- 0-009 (Z) PREPARATORY MATHEMATICS**  
Supplements the background in algebra for those students whose background is insufficient. Covers most of the material of high school elementary and higher algebra courses, with emphasis on the latter. (0 cr; limited to 36 students; I-II MTWThF; VH 203)
- 1-006 (5B) 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; limited to 100 students; prereq 1-005 [5A]; available for grad cr only for elementary education students in College of Education; III MTWThF; Arch 35)
- 1-008 (T) 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 1-443 [43], even to students with high school trigonometry]; limited to 60 students; prereq plane geometry and high school algebra, §1-111 [10]; II MTWThF; Aero 225)
- 1-141 (10A) ALGEBRA, PROBABILITY, AND PRE-CALCULUS**  
(First course of a 2-quarter sequence for students in pre-business administration curriculum and others requiring college algebra and a minimal amount of calculus; students who plan to take several quarters of mathematics should register for Math 1-441, 1-442, 1-443, 1-444 sequence) Inequalities, elementary set theory, functions and analytic geometry, general systems of linear equations, linear inequalities and programming, combinations, permutations, probability, sequences, limits, and continuity. (5 cr, §1-111 [10], §1-210 [21A], §1-441 [15]; limited to 36 students; prereq high school higher algebra, 1-008 [T] or high school trigonometry, and satisfactory mathematics placement score; III-IV MTWThF; VH 211)
- 1-142 (40A) INTRODUCTION TO CALCULUS OF ONE AND SEVERAL VARIABLES**  
(A second course of a 2-quarter sequence for students in pre-business administration curriculum and for other students requiring college algebra and a minimal amount of calculus; students who plan to take several quarters of mathematics should register for Math 1-441, 1-442, 1-443, 1-444 sequence) Limits, derivatives, and integrals, some calculus of several variables and differential equations, rates of change, maxima and minima, several applications to a variety of disciplines. (5 cr, §1-220 [22A], §1-442 [42]; limited to 100 students; prereq 1-141 [10A] and 1-008 [T] or high school trigonometry...may enter 1-443 from 1-142 if grade in 1-142 is A or B; I-II MTWThF; VH 16) Ar
- 1-210 (21A) ANALYSIS I**  
Review of high school algebra; analytic geometry, calculus of functions of one variable, applications. (5 cr, §1-111 [10], §1-141 [10A], §1-441 [15]; primarily for IT students; limited to 30 students; prereq 0-012 or 4 yrs high school mathematics including trigonometry; I-II MTWThF; VH 207)
- 1-220 (22A) ANALYSIS II**  
See Math 1-210 for course description. (5 cr, §1-142 [40A], §1-442 [42]; limited to 60 students; prereq 1-210 [21A]; I-II MTWThF; VH 1)

- 1-230 (23A) ANALYSIS III**  
See Math 1-210 for course description. (5 cr, §1-443 [43]; limited to 40 students; prereq 1-220 [22A]; IV-V MTWThF; VH 113)
- 1-240 (31) CALCULUS IV**  
Vector algebra, solid analytic geometry, elementary linear algebra, multi-dimensional differential and integral calculus, infinite series, elementary differential equations. (5 cr, §1-444 [44]; limited to 40 students; prereq 1-230 [22A]; I-II MTWThF; VH 2)
- 1-250 (32) CALCULUS V**  
See Math 1-240 for course description. (5 cr; limited to 40 students; prereq 1-240 [31]; III-IV MTWThF; VH 2)
- 1-260 (33) CALCULUS VI**  
Vector calculus; continuation of multidimensional calculus and of infinite series. (5 cr; limited to 70 students; prereq 1-250 [32]; III-IV MTWThF; Arch 45)
- 1-441 (15) COLLEGE ALGEBRA**  
A standard 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, §1-111 [10], §1-141 [10A], §1-210 [21A]; limited to 60 students; prereq high school higher algebra, 1-008 [T] or high school trigonometry, and satisfactory mathematics placement score; III-IV MTWThF; Aero 225)
- 1-442 (42) ANALYTIC GEOMETRY AND CALCULUS I**  
(Math 1-442, 1-443, 1-444 comprise full-year course) 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 integral. Infinite series. Taylor's theorem. Multiple integrals in two and three dimensions. (5 cr, §1-142 [40A], §1-220 [22A]; limited to 60 students; prereq 1-441 [15] and 1-008 [T] or high school trigonometry; may enter 1-443 from 1-142 if grade in 1-142 is A or B; III-IV MTWThF; VH 1)
- 1-443 (43) ANALYTIC GEOMETRY AND CALCULUS II**  
See Math 1-442 for course description. (5 cr; 1-443 and 1-444 available for Upper Div cr to all except mathematics and physics majors; limited to 100 students; prereq 1-442 [42] or 1-142 [40A] with grade of B; III-IV MTWThF; VH 16)
- 1-444 (44) ANALYTIC GEOMETRY AND CALCULUS III**  
See Math 1-442 for course description. (5 cr; 1-443 and 1-444 available for Upper Div cr to all except mathematics and physics majors; limited to 32 students; prereq 1-443 [43]; III-IV MTWThF; VH 6)
- 3-142 (63) LINEAR ALGEBRA**  
Vectors, system of linear equations, matrices, determinants. Groups of transformations, conics, normal forms of matrices. (3 cr, §5-211 [149]; limited to 40 students; prereq 1 qtr calculus; V MTWThF; VH 20)
- 3-445 (55) 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; limited to 30 students; prereq 1-444 [44]; IV MTWThF; VH 207)
- 5-209 (109) 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; limited to 55 students; prereq 1-240 [31] or 1-444 [44]; III MTWThF; VH 20)

**5-211 (149) DETERMINANTS AND MATRICES**

Determinants, matrices, linear equations, vector spaces, quadratic and bilinear forms, characteristic roots, applications to systems of ordinary differential equations. Mostly a technique course, intended mainly for students whose interests are not theoretical but who wish to learn the relevant mathematical facts and methods. (3 cr, §3-142 [63], §5-283 [131B], §5-242 [142]; limited to 32 students; prereq 1-250 [32] or 3-445 [55]; V MTWThF; VH 6)

**5-243 (143) MATRIX THEORY WITH APPLICATIONS**

Systems of linear equations, determinants, finite dimensional vector spaces, matrices, characteristic values and their numerical estimation, reduction to canonical forms, quadratic and bilinear forms. Applications. (3 cr, §5-211 [149], §5-283 [131B], §5-284 [131C]; limited to 100 students; prereq 1-240 [31] or 1-444 [44]; V MTWThF; VH 16)

**5-342 (181B) INTRODUCTION TO TOPOLOGY**

Metric spaces: completeness, compactness, uniform continuity. Abstract topologies: comparison of topologies, separation axioms, homeomorphisms. Product and function spaces. Connectedness. Local connectedness, Hahn-Mazurkiewicz Theorem, characterization of arc, Jordan curve theorem. Introduction to algebraic topology. (3 cr; limited to 50 students; prereq 1-250 [32] or 3-445 [55]; IV MTWThF; Arch 135)

**5-367 (117B) GEOMETRY**

Selected chapters of geometry, such as convex bodies, projective geometry, geometry and imagination, elementary algebraic geometry, geometry of transformation groups, axiomatic geometry, geometrical constructions. (3 cr; limited to 55 students; prereq 1-240 [31] or 1-444 [44]; I MTWThF; VH 20)

**5-569 (168B) APPLICATIONS OF COMPLEX VARIABLE**

Conformal mapping, Schwarz-Christoffel transformations, Laplace transforms, and applications. (3 cr; limited to 55 students; prereq 5-568 [168A]; IV MTWThF; VH 20)

**5-602 (107B) ADVANCED CALCULUS**

Line and surface integrals; Stokes' theorem; convergence of infinite series; orthogonal functions; uniform convergence; integration and differentiation of series. (3 cr; limited to 40 students; prereq 5-601 [107A]; II MTWThF; VH 6)

**5-607 (125B) CRITICAL REASONING IN MATHEMATICAL ANALYSIS**

Based on the elementary concepts of mathematical analysis; designed to develop in the student an understanding of mathematical rigor. (3 cr, §5-612 [130A], §5-613 [130B], §5-614 [130C]; limited to 55 students; prereq 1-240 [31] or 1-444 [44]; II MTWThF; VH 20)

**5-679 (178) 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; limited to 30 students; prereq 1-240 [31] or 1-444 [44]; III MTWThF; VH 207)

## COMPUTER, INFORMATION, AND CONTROL SCIENCES (CICS)

**1-102 (Math 14C) ALGORITHMS AND LANGUAGES III**

The construction of algorithms to solve problems. Methods of solution stated in the appropriate language. The languages of the computer, including Fortran. The use of computers and computer languages. Accompanying laboratory problems on the computer. (2 cr; limited to 65 students; prereq 1-101 [Math 14B] and Math 1-250 [32] or ¶Math 1-250; II MTThF; Ex 193) Ar

**1-103 (Math 14D) ALGORITHMS AND LANGUAGES IV**

See CICS 1-102 for course description. (2 cr; limited to 65 students; prereq 1-102 [Math 14C] or ¶1-102; V MTThF; Ex 193) Ar

**3-101 (Math 65) 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. Three lectures and nonscheduled laboratory. (4 cr; limited to 100 students; prereq Math 1-230 [23A]; IV MTWThF; Arch 40) Ar

**5-000 FUNDAMENTALS OF COMPUTERS AND PROGRAMMING**

See section on Special Programs, page 167.

**5-302/5-303 (Math 185-186) NUMERICAL ANALYSIS**

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 or matrices. Rayleigh-Ritz method. Integral equations. (6 cr for both courses; students must register for both 5-302 and 5-303; limited to 65 students; prereq 5-301 [184] or #; III-IV MTWThF; Ex 193) Ar

## SCHOOL OF PHYSICS AND ASTRONOMY

### Physics (Phys)

**1-020 (2) INTRODUCTORY PHYSICS**

Introductory lectures on the principles of physics and physical phenomena underlying these principles. Electricity and magnetism. (3 cr; prereq 1-010 [1] or #; lect I MTWThF; Ph 170) Ar

**1-025 (2A) INTRODUCTORY PHYSICS LABORATORY**

Laboratory course in conjunction with Phys 1-020. (1 cr; P-N grading only; prereq 1-020 [2] or ¶1-020) Ar

**1-030 (3A) INTRODUCTORY PHYSICS**

Introductory lectures on the principles of physics and physical phenomena underlying these principles. Wave motion and light. (3 cr; prereq 1-020 [2] or #; lect IV MTWThF; Ph 170) Ar

**1-035 (3A) INTRODUCTORY PHYSICS LABORATORY**

Laboratory course in conjunction with Phys 1-030. (1 cr; P-N grading only; prereq 1-030 [3A] or ¶1-030) Ar

**1-220 (22T) GENERAL PHYSICS**

See section on 10-week courses, page 157.

**1-225 (22A) PHYSICS LABORATORY**

See section on 10-week courses, page 157.

**1-230 (23T) GENERAL PHYSICS**

See section on 10-week courses, page 157.

**1-235 (23A) PHYSICS LABORATORY**

See section on 10-week courses, page 157.

**3-500 (50T) MODERN PHYSICS**

See section on 10-week courses, page 157.

**3-505 (50A) PHYSICS LABORATORY**

See section on 10-week courses, page 157.

**5-983 (107C) MODERN PHYSICS I**

See section on Special Programs, page 167.

**5-986 (123C) STATISTICAL PHYSICS**

See section on Special Programs, page 167.

**5-989 (180C) PHYSICS SEMINAR**

See section on Special Programs, page 167.

# College of Veterinary Medicine††

All classes scheduled by arrangement

## Veterinary Anatomy (VAna)

### 5-791\* (191) TOPICS IN ORGANOLGY

Lecture and laboratory presentation regarding selected organ systems of domestic and laboratory animals. (1-5 cr [regis for more than 1 term permitted]; prereq 8-261 [250] or equiv, #) Weber, Fletcher, Czarnecki, Vanden Berge, Heath

### 8-201, 8-202 (201, 202) COMPARATIVE VETERINARY NEUROLOGY

Correlated studies of the central nervous system of domestic animals. Emphasis on relating neuroanatomy to neurophysiology. (4 cr each; prereq 5-201 [101], #) Fletcher

### 8-203 EXPERIMENTAL COMPARATIVE VETERINARY NEUROLOGY

Principles, methods, and laboratory exercises in investigating the central nervous system of domestic animals. (3 cr; prereq 8-202 [202], #) Fletcher

## Veterinary Medicine (VM)

### 5-510, 5-511 (122A, B) CLINICS

Medical, obstetrical, radiological, surgical and laboratory examination of diseases of animals. (3 cr; for 4th yr VetMed; prereq 5-502) Mather and others

### 8-220\* (202) ADVANCED DIAGNOSIS AND THERAPEUTICS OF ANIMAL DISEASES

Detailed examination, discussion, treatment, and prevention of animal disease problems. (Cr ar; prereq 5-203, 5-303, #) Sorensen, Mather, Anderson, L Johnson, D Johnson, Larson, Gelatt, Osborne, Farnsworth

## Veterinary Microbiology and Public Health (VMic)

### 5-410 (128) PROBLEMS IN VETERINARY BACTERIOLOGY AND PUBLIC HEALTH

(Cr ar; prereq 5-103 [103] or equiv, #) Pomeroy, Anderson, Lindorfer, Loken, Diesch, Maheswaran

### 8-210 (201) ADVANCED POULTRY DISEASES

Investigations of specific infectious disease problems of poultry. (Cr ar; prereq 5-331 [131], #) Pomeroy, Higbee, Nelson, Barnes

### 8-205 (205) ADVANCED VETERINARY BACTERIOLOGY

Special topics, techniques, collateral reading, and conferences. (Cr ar; prereq #) Pomeroy, Anderson, Loken, Lindorfer, Diesch

## Veterinary Obstetrics (VObs)

### 5-105 (105) INFERTILITY CLINICS

Investigation of hospital cases and field problems of infertility of domestic animals. Includes clinical examination, discussion of diagnosis, prognosis, and therapy. Assignment of special study of certain reproductive disorders. (Cr ar; prereq 5-211 [102], 5-103 [103], or #)

### 8-600\* (204) SPECIAL PROBLEMS IN ANIMAL REPRODUCTION

(Cr ar; prereq #) Zemjanis

†† Tuition fees per term in College of Veterinary Medicine are \$208 for resident and \$516 for nonresident students; student services fee per term is \$20.50. Students taking less than a full program will pay at the summer rate or academic year rate whichever is higher.

## **Veterinary Pathology and Parasitology (VPaP)**

### **5-401x (157) VETERINARY NECROPSIES**

Necropsy techniques, examination of tissue sections, and preparation of records. (1.5 cr; prereq 5-203 [153] or equiv) Staff

### **5-402x (158) SURGICAL PATHOLOGY**

Preparation and interpretation of surgical and necropsy specimens. (3 cr; prereq 5-401 [157], #) Barnes and staff

### **5-404x (160) DIAGNOSTIC PATHOLOGY**

Interpretation of history, necropsy findings, laboratory findings and histopathology in the diagnosis of animal diseases. (5 cr; prereq 5-401 [157], #) Barnes and staff

### **8-803x (241) PROBLEMS IN VETERINARY PARASITOLOGY**

(Cr ar; prereq 5-102 [102] or equiv, #) Griffiths

## **Veterinary Physiology and Pharmacology (VPP)**

### **8-920\* (171) PROBLEMS IN VETERINARY PHARMACOLOGY**

(Cr ar; prereq 5-660 [152] or equiv, #) Staff

### **8-830\* (231) RESEARCH IN ANIMAL PHYSIOLOGY**

(Same as AnSc 8-830) 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 and hrs ar; prereq #) Staff

## **Veterinary Surgery and Radiology (VSR)**

### **8-401 (210) ADVANCED VETERINARY RADIOLOGY**

Lecture and laboratory. Radiological diagnostic procedures and interpretation as applied to veterinary medicine. (2 cr; prereq 5-401 [121] or equiv, #) Hanlon

### **8-121 (225) ADVANCED SMALL ANIMAL SURGERY**

Surgery of the various systems in small animals with preoperative and postoperative evaluation and treatment. (Cr ar; prereq 5-021 [103] or equiv, #) Piermattei

### **8-221 (230) ADVANCED LARGE ANIMAL SURGERY**

Surgery of the various systems in large animals with preoperative and postoperative evaluation and treatment. (Cr ar; prereq 5-021 [103] or equiv, #) Arnold, Usenik, Myers

## Duluth Campus



# University of Minnesota, Duluth

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, located near the center of Duluth, is but a short drive from parks, golf courses, swimming beaches, the famous Skyline Drive, Duluth's new Arena-Auditorium, and the Duluth International Harbor.

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 both the individual student and entire families. Bridge and golf lessons, family swimming, concerts, lectures, theatrical productions, group discussions, dances, tours, films, a steak cook-out, and a wilderness canoe trip are a few of the regularly scheduled activities.

Three hundred fifty courses are scheduled for both Summer Session terms at the undergraduate and graduate levels. Students may earn credits in 33 major fields toward the A.A., B.A., B.Ac., B.B.A., or B.S. degrees, in 12 areas of concentration for the M.A. or M.S. degrees, and the Specialist Certificate in Educational Administration.

*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.*

## Graduate Program

The Graduate School offers, on the Duluth Campus, a master of arts degree with majors in art, education (elementary-secondary), educational administration, and educational psychology (counseling). 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. In addition, majors in English and history are available. They provide advanced work for individuals now in teaching or those interested in progressing toward a general degree in the discipline. Students may complete all course work at Duluth.

Course work necessary for the completion of a master of science degree in biology, botany, chemistry (analytical, biochemistry, inorganic,

organic, or physical), geology, physics, and zoology is also available. These courses are for secondary and college teachers and those planning additional graduate study or careers in industry. A new offering, the Specialist Certificate in Educational Administration, may be obtained with emphasis in either elementary, secondary, or general school administration. 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 1970-72 *University of Minnesota, Duluth Bulletin*, which may be obtained by writing to the News Service office in the Communications Center.

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 Graduate School Office, 206 Science-Mathematics Building, University of Minnesota, Duluth, Duluth, Minnesota 55812. Information concerning selection of courses and other degree requirements can also be obtained from the Graduate School assistant dean.

Applications for admission must be submitted *complete in every detail*—two official transcripts 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 applicant 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.)

Students previously admitted to the Graduate School who have not registered within the last 2 years in the Graduate School must apply for readmission. Forms may be obtained from the Graduate School office.

Students taking course(s) or workshop(s) through the Extension Division must be admitted to the Graduate School and joint register before the course(s) will appear on the Graduate School transcript.

## **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 Biology, Botany, Zoology**

Plan A for the M.S. is available during the academic year in both botany and zoology; Plan B is available only in biology. In addition to course work, Plan A requires a research problem and a thesis. Botany majors may minor in zoology, and zoology majors may minor in botany. With either major, other minors such as chemistry, geology, and physics are also available.

The Plan B biology program is directed toward enrichment of the subject-matter area for high school biology teachers, as well as for others who might desire a broader base of course work in the life sciences rather than the research experience required by the Plan A approach. Biology majors may use any of the following as related fields: chemistry, education, geology, and physics.

## **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, biochemistry, 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 Education**

This program, available to elementary and secondary teachers, permits a student to major in courses from the following areas: Education (Educ), Elementary Education (ElEd) and Secondary Education (SeEd).

The work in related fields may include areas such as Educational Administration (EdAd), Psychological Foundations (PsyF), Psychological Applications (PsyA), Special Education (SpEd), Physical Education (PE), Industrial Education (Ind), Home Economics Education (HEEd), as well as courses in subjects which are ordinarily taught in the schools.

Inquiries should be addressed to: Director of Graduate Study in Education, Department of Elementary Education, or Director of Graduate Study, Department of Secondary Education, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Master's Degree in Educational Administration**

A master of arts degree with a major in educational administration is available to students desiring this program. A wide variety of courses

is offered during the summer. Inquiries should be addressed to: Director of Graduate Study in Educational Administration, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Specialist Program in Educational Administration**

Advanced graduate programs leading to the Specialist Certificate in School Administration have been developed for elementary and secondary school principals and superintendents. 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: Director of Graduate Study in Educational Administration, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Master's Degree in Educational Psychology**

A complete Master's degree program in school guidance and counseling is available on the Duluth Campus. Courses in psychological foundations and psychological applications as well as other 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 Graduate Study in Educational Psychology, 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. Two programs are provided: one designed primarily for secondary school English teachers, and a more general one suited to students preparing for doctoral studies. Courses carrying graduate credit are offered in all academic quarters and in both summer terms. Requirements for the degree can be completed in 5 or 6 regular terms or 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 Geology**

Plans A and B for the M.S. are offered in geology. Although no graduate level courses for the Master's degree program are offered in this field during the 1971 Summer Session, students interested in beginning their course work in the fall of 1971 are reminded that the applica-

tion deadline is August 27. Details concerning prerequisites for the geology M.S. degree may be obtained from: Director of Graduate Study in Geology, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **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.

## **Master's Degree in Physics**

A graduate major on Plan A requiring a research thesis is offered. Current departmental research interests include atmospheric physics, atomic physics, and solid state physics. Summer work on the Duluth Campus involves the research phase of the degree work.

## **Economic Education**

A special program in economic education for teachers is scheduled for the First Term of the 1971 Summer Session. Econ 5-020A and 5-020B (150A and 150B), Current Economic Issues (6 graduate or undergraduate credits), and SeEd 5-266 (EdCI 134), Materials and Methods in Economic Education (3 graduate or undergraduate credits), will be offered.

This program is intended to assist students in teaching economics at the elementary and secondary levels. Scholarships are available. Information may be obtained from: Center for Economic Education, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Special Education**

**Learning Disabilities (SLD)**—A program leading to endorsement as a certificated SLD teacher is conducted on the Duluth Campus. The program consists of course work and practicums during single 5-week terms over successive summers as well as of supervised field experiences during the academic year. Enrollments in certain courses will be limited. Students must obtain formal admission to the program prior to enrollment in course work. Due to anticipated heavy demands, persons planning to apply should communicate their interests as early as possible. For information, write Department of Special Education, University of Minnesota, Duluth, Duluth, Minnesota 55812.

**Mental Retardation (EMR)**—Undergraduate students and experienced teachers may obtain certification as special class teachers for the mentally retarded by successful completion of an approved program of studies. For information about admission to the program and program requirements, write Department of Special Education, University of Minnesota, Duluth, Duluth, Minnesota 55812.

**Speech Correction**—Opportunity is provided for observation at the annual clinic for children with speech and hearing disorders, held June

14 to July 23. 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.

## **Environmental Geology of Minnesota**

Geol 5-020 (Earth Science 105) is a Second Term course, designed for elementary and secondary science teachers who have had little background in geology and would find a knowledge of the geology of Minnesota valuable in their teaching. Enrollment will be limited to 30 students so that the numerous field trips can be investigative in nature. Further information can be obtained from Department of Geology, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **Special Courses in Beginning and Intermediate French, German and Spanish, and Advanced French**

**Beginning French, German, and Spanish**—Ten-week courses will be offered to provide the student with basic proficiency in the chosen language 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, Ger, or Span 1-101/1-102/1-103 [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, German, 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 divided between the language laboratory and the classroom. Upon completion of the course, the student will have earned 9 credits. This is equivalent to the regular second-year sequence (Fr, Ger, or Span 1-201/1-202/1-203 [7-8-9]). A student should plan to attend both summer terms.

**Advanced French**—A 10-week course will be offered to develop further speaking and reading skills with special emphasis on grammatical and stylistic refinement.

## **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.

## **Ceramic Workshop**

This workshop is designed to provide an intensive studio experience in an area of student interest; glaze experimentation, wheel work or ceramic sculpture, and firing techniques such as salt glaze or raku.

The workshop will be given for 6 credits during First Term from 9 a.m. to 1 p.m. (plus outside assignments); Art 3-401 (31) and 3-402 (98), or 5-450 (170) (Ceramics); prereq 1-400 (30) (Ceramics). The instructor will be Glenn C. Nelson.

## **Workshop in Advanced Painting**

The 23rd annual workshop in advanced painting will be conducted by a nationally recognized painter.

A list of distinguished American artists including Charles Burchfield, Max Weber, Philip Evergood, Yasuo Kuniyoshi, and Morris Kanter have taught on this campus during the past 22 years.

Again, this painting workshop will be offered during the Second Term. Enrollment will be limited, and interested students should write to: Art Department, University of Minnesota, Duluth, Duluth, Minnesota 55812.

## **General Extension Division Program**

All workshops and institutes will be taught on the University of Minnesota, Duluth Campus. For further information and brochures contact: Director of Continuing Education and Summer Session at Duluth, 2205 East Fifth Street, Room 106, Duluth, Minnesota 55812.

Unless stated otherwise, these courses may be taken for graduate credit or undergraduate credit or as a noncredit workshop. Participants who wish to receive Graduate School credit from the University of Minnesota must be enrolled in the Graduate School or be working toward a graduate degree elsewhere. Application for admission must reach the Graduate School Office, 206 Science-Mathematics Building, University of Minnesota, Duluth, Duluth, Minnesota 55812, at least 30 days prior to the workshop.

Accommodations during the workshop period should be made by participants through the Housing Office, University of Minnesota, Duluth (see "Housing" in this bulletin).

### **FIRST TERM WORKSHOPS**

#### **String Clinic, Advanced Topics in Music Education**

*Two weeks, June 7-18, 8 a.m.-3 p.m.—3 credits—Mu 5-605 (MuEd 105)  
Instructors: James R. Murphy, Ann C. Anderson, Eugenia A. Slezak;  
guest violist, John V. Tellaisha*

The workshop will focus upon various problems of individual and group instruction on string instruments, especially at the secondary and

collegiate levels. An emphasis will be placed upon solving individual problems as these relate to program development for all seasons of the year. Prerequisite: teaching experience. Enrollment limited to 30. Advance registration required.

### **Simulation Strategies in Teaching Junior and Senior High School Social Studies**

Three weeks, June 14-July 2, 8 a.m.-4 p.m.—4 credits—Educ 5-400 (EdCI 100)

Instructors: Frederick T. Witzig, John Pichotta, Leonard N. Ojala

The workshop will focus upon the problems approach to social studies teaching. Instructors will utilize innovative simulation techniques developed in the Cloquet High School geography project.

The emphasis is intended to help the student understand and use effectively recently developed innovative techniques and materials designed for use in the social studies curriculum, grades 9-12. These materials emphasize the geography of the cities (urban geography) and the interaction of man in his natural environment.

The simulation techniques and curriculum materials were developed in the social studies department of Cloquet High School using the HSGP curriculum materials. Enrollment: secondary school teachers. Advance registration required.

### **Creative Photography Workshop**

Four weeks, June 21-July 16, 9 a.m.-3 p.m.—6 credits—Art 5-600

Instructor: James H. Brutger

The workshop will stress the use of various photographic equipment and media as a means toward a Fine Arts expression. The various areas of black and white, color, movie, and chemical influence will be explored. Individual direction leading to a final in-depth photographic study will form the climax of the workshop.

Course work will be conducted through the use of demonstrations, laboratory, field work, and discussions. Amount of prior photo experience is of little importance because each student will be expected to perform at his own level. Enrollment open. Advance registration required.

### **Sex and Family Life Workshop**

Two weeks, June 21-July 2, 2:30-9 p.m.—3 credits—Educ 5-400 (EdCI 100)

Instructor: Thomas H. Little

The workshop is aimed at those persons who work with young people in any capacity and therefore must be both "comfortable and

knowledgeable" with the subject of sexual behaviors and patterns. An emphasis will be placed on understanding and appreciating man as a sexual creature and the younger generation's view of the place of sex in the dating, engaged-to-be-married, and married game. Enrollment open. Advance registration required.

### **Studies in Environmental Conservation**

*Three weeks, July 6-23, 8 a.m.-4 p.m.—5 credits—IS 5-200*

*Instructors: Frederick T. Witzig, director; Andrew F. Robinson, Jr., co-director; Dale W. Olsen, George Starr, Philip C. Campbell, J. Clark Laundergan*

The interdisciplinary approach to study the environment will be unique. The workshop will examine some of the basic issues central to an understanding of man and his place in the earth ecosystem. Current problems in the earth ecosystem are related to changes produced by the way humans, particularly those of industrialized nations, function in that system. A central objective of this workshop would be to develop a more complete understanding of how man alters his environment and the consequences of these actions. Enrollment open. Advance registration required.

### **SECOND TERM WORKSHOPS**

#### **Creating Music With Children Workshop**

*One week, August 2-6, 9 a.m.-4 p.m.—2 credits—Mu 5-606*

*Coordinator: Jean P. Swanson; Instructor: Margaret Galloway, Institute of Child Study, University of Toronto*

An elementary education workshop will be offered on creating music with children. Emphasis will be placed on making and playing simple instruments, and using other techniques and materials in the classroom. Enrollment open to all interested in the musical education of children. Advance registration required.

#### **Special Programs for Development of Occupational Skills Workshop**

*Three weeks, July 19-August 6, 8 a.m.-4 p.m.—6 credits—Ind 5-952 (106) or Educ 5-400 (EdCI 100)*

*Coordinators: Edward G. Hill, Industrial Education, and Vernon L. Simula, Special Education, and resource people*

The workshop is applicable to special education instructors in secondary and postsecondary special education vocational adjustment programs. Opportunities are planned for developing insight and understanding of the handicapped person, deviant behavior management techniques, special education program development and modification, vocational guidance and occupational information applicable to vocational adjustment programs, and community involvement and public relations.

Enrollment: workshop participants will be selected by the coordinating staff from applicants having backgrounds in industrial or vocational education and/or current or proposed employment in the special education vocational adjustment programs. Advance registration required.

### **Teaching of Productive Thinking**

Two weeks, July 12-23, 9 a.m.-4 p.m.—3 credits—Educ 5-400 (EdCI 100)

Instructors: William M. Clark, Norma Trowbridge, Joseph Milland, Marl E. Ramsey—Project Impact, Polk County, Des Moines, Iowa

Teaching for productive thinking implies that the thinking processes experienced by the students are as important as the content to be taught. Those people attending the workshop will be exposed to rationale, theory, and practical application relating to the teacher's role in fostering productive thinking. To enhance the teacher's skill in fostering student thinking, stress will be placed on: (1) effective classroom questioning, (2) developing a facilitating learning climate, (3) identification and production of teaching-learning strategies dealing with a variety of intellectual processes, and (4) small-group discussion techniques which help implement a "thinking curriculum."

The procedure of the workshop will allow for maximum participation among members. A structure will be arranged enabling teachers to interact face-to-face with colleagues and staff alike. Enrollment open to elementary and secondary education teachers and administrators. Advanced registration required.

### **Substitute Teaching**

Two weeks, August 9-20, 9 a.m.-4 p.m.—3 credits—Educ 5-400 (EdCI 100)

Instructor: Donna M. Wolean

This workshop for elementary and secondary substitute teachers will include an overview of modern methods and educational practices with a special section on the participant's level of teaching. The workshop will stress teaching techniques and development of innovative planning "kits" to help the substitute teacher. Attention will be given to the selection, guidance, and evaluation of substitute teachers. Enrollment open. Advance registration is required.

### **Teaching Shakespeare in Secondary Schools and Junior Colleges**

Two weeks, August 2-13, 8:30 a.m.-4 p.m.—3 credits—Engl 5-229

Instructor: Louis D. Levang

This is a workshop designed primarily for teachers of Shakespeare at the junior high school, the senior high school, and the junior college levels. The course will be offered at both undergraduate and graduate levels.

The course will treat four plays of Shakespeare. Two of these will be discussed intensely within the class; the other two will be assigned but not studied directly within the class. There will be reading assignments related to certain critical problems in Shakespeare, theories of the drama, and the methods of teaching Shakespeare.

The procedure of the class will be that of intense involvement with Shakespeare. There will be short introductory lectures, but most of the class will be devoted to critical discussion. Students will make brief oral and written reports. Films, phonographic records, and slides will be used to supplement the teaching and discussion. Enrollment open to secondary education and junior college English instructors. Advance registration required.

A number of additional workshops are planned for the Summer Session. For brochures and information contact: Director of Continuing Education and Summer Session at Duluth, 2205 East Fifth Street, Room 106, Duluth, Minnesota 55812.

## Morris Campus



# University of Minnesota, Morris

## FIRST TERM

### Division of Humanities

#### Art 1-003 WORKSHOP IN STUDIO ART

An introduction to various media and the problems of creativity in the studio. A general education course without prerequisites. Designed for interested people with little or no previous experience in studio art. Although the student will be involved in the practice of drawing, designing, print-making (woodcuts), and ceramics, he will not be expected to develop particular competence in any area. For this reason it is recommended that the course be taken on the P-N option. (3 cr; limited to 18 students; III MTWThF; Hum 6) Ingle

#### Engl 1-100A (10A) WRITING FROM EXPERIENCE

A composition course conducted under seminar-workshop conditions. The student is encouraged to write about his own experience. As a result, the course functions as an excellent introduction to campus activity while offering the student an opportunity to experiment with a variety of written forms and styles—including creative writing, journalism, and exposition. Short films, tapes, and other media components are used to supplement the experience a student brings with him to the classroom. Classes are small with ample opportunity for discussion and close interaction with instructors. (3 cr; I MTWThF; SSci 136) Comprone

#### Engl 3-005 BLACK WRITING SINCE 1945

Centers around novels by Wright, Ellison, and Baldwin, but will include poems, several plays, and recent polemic writings by Cleaver, Claude Brown, and others. (3 cr; II MTWThF; Hum 105) Grant

#### Ger 1-001 (A) BEGINNING GERMAN

Basic principles of grammar and syntax; reading and writing of simple German prose; correct pronunciation and rudimentary conversation. (7½ cr; limited to 25 students; II-IV MTWThF; SSci 124) Wood

#### Span 1-001 (A) BEGINNING SPANISH

Designed to give the student control over basic grammar, reading, and writing, and to teach him to handle a simple conversation in Spanish. (7½ cr; limited to 25 students; II-IV MTWThF; SSci 130) Badding

#### Thea 3-001 THE CONTEMPORARY AMERICAN THEATRE

The major forms of drama and staging on the contemporary American stage, including realistic, experimental, black and musical drama with some background on their predecessors. Playwrights include, among others, Thornton Wilder, Elmer Rice, Arthur Miller, Tennessee Williams, Edward Albee, Eugene O'Neill, Lorraine Hansberry, and LeRoi Jones. Also included: an examination of the process involved in staging a play on Broadway today. (3 cr; IV MTWThF; Hum 105) Fosgate

### Division of Social Sciences

#### Econ 3-007 (69) CONSUMER AND THE AMERICAN ECONOMY

The place of the consumer in the economy; family budgeting and the principles of personal financial management. The overall working of the American economy; money and banking; the use and cost of various con-

sumer credits. Inflation, recession, unemployment, and the behavior of the consumer; government protection of consumers. (3 cr; open to high school grads; II MTWThF; SSci 244) Kahng

**Hist 3-260 (75F) AFRO-AMERICAN HISTORY**

History of the Afro-American from the African origins to the present. Afro-American history serves as a case study of the distinctive cultures within the United States and the significance which the interaction between them has had for United States history. (3 cr; I MTWThF; SSci 245) Ahern

**Psy 1-200 INTRODUCTION TO CHILD PSYCHOLOGY**

An introduction to current theories, research methods, and findings in child psychology including prenatal development, cognitive development, social development, learning in young children, and language acquisition. (3 cr; III MTWThF; SSci 136) Flamer

**Soc 3-200 SOCIAL PSYCHOLOGY**

Lecture and laboratory course surveying the research and theory regarding the relation of the individual to social groups. Emphasis will be placed on social interaction (cooperation, competition, conflict, and communication), and group processes (social differentiation and group performance). Of particular interest to those concerned with the process of socialization. (3 cr; IV MTWThF; SSci 245) Zeller

## Division of Science and Mathematics

**Geol 1-001 (1A) INTRODUCTORY PHYSICAL GEOLOGY**

A coordinated laboratory-lecture approach to the study of earth's materials, its structure, surface features, and geologic processes involved in their development. One or two field trips. (5 cr; I-II MTWThF; Sci 312) Brauer

**Math 3-001 MAN AND THE COMPUTER**

A survey of the present relationship between the computer and society. Projections will be given of the possible directions this relationship may take. How will these projections affect our living habits (shopping, banking, housekeeping, etc.)? Introduction to computer operation and devices (optional field trip). A survey of computer languages available and their applications. Detailed study of a scientific language, such as FORTRAN, and its application to problems of interest to the students. Computer programs will be written and run using the University computer terminal facilities. (5 cr; one 3-hr lab by ar; \$15 lab fee; VI-IX MWF; Sci 150) Lopez

**PSci 1-001 (10) BASIC CONCEPTS IN PHYSICAL SCIENCE**

Survey of some of the major concepts or physical laws in the areas of astronomy, chemistry, physics, and earth sciences, analysis of physical laws by relating common experiences to physical phenomena, principles of the scientific method. (5 cr; 5 hrs lect and lab; IV MTWThF; Sci 150) Burkey

## Division of Education

**Ed 3-003 INDIVIDUALIZED INSTRUCTION IN THE ELEMENTARY SCHOOL—PROBLEMS OF DEVELOPING PROGRAMS**

Assessment of achievement, writing behavioral objectives, developing materials for individualized instruction, i.e., preparing programmed materials, contracts, etc. (3 cr; III MTWThF; Sci 259) Classen

**SeEd 5-105 (EdCI 105) AUDIO-VISUAL MATERIALS IN EDUCATION**

Characteristics, advantages, limitations, and practical schoolroom use of audio-visual materials of nonprojected and projected types. Practice in operation of accepted audio-visual equipment such as slide projectors, opaque projectors, filmstrip projectors, tape recorders, 16mm projectors,

and overhead projectors. Opportunity to operate newer media such as teaching machines and closed circuit television equipment. Designed for both elementary and secondary students. (3 cr [students interested in grad cr should inquire at time of regis]; limited to 25 students; prereq sr; II MTWThF; SSci 45) Henjum

**PE 1-110/1-111 (PE 2A-B) BEGINNING AND INTERMEDIATE SWIMMING**

Basic fundamentals of swimming through the intermediate level. (2 cr; IV MTWThF; Pool) Simpson

## SECOND TERM

### Division of Humanities

**Ger 1-002 (B) BEGINNING GERMAN**

(Continuation of Ger A, First Term) Basic principles of grammar and syntax; reading and writing of simple German prose; correct pronunciation and rudimentary conversation. (7½ cr; limited to 25 students; II-IV MTWThF; SSci 124) Sibul

**Span 1-002 (B) BEGINNING SPANISH**

(Continuation of Span A, First Term) Designed to give the student control over basic grammar, reading, and writing, and to teach him to handle a simple conversation in Spanish. (7½ cr; limited to 25 students; II-IV MTWThF; SSci 130) Turner

## Workshops

**Ed 3-005 INDIVIDUALIZED INSTRUCTION IN THE ELEMENTARY SCHOOL—CLASS ROOM ORGANIZATION**

Curricular planning for individualized instruction, types of organization, utilization of staff, time, and facilities. (3 cr; prereq Ed 3-003 recommended; July 19-30; 8:00-10:10; SSci 45) Curtis

**Spch 3-001 (80) UNDERSTANDING MASS MEDIA**

A consideration of the artistic and nonartistic uses of mass media systems of communications; the element of mass media; the study of the interaction between media and audience and the resulting social and cultural effects. (3 cr; July 19-30; 10:30-12:30; MH 109 and 210) Lammers

**SeEd 5-371 (EdCI 171) WORKSHOP: CURRICULUM LABORATORY PRACTICE**

For school principals, superintendents, and teachers who are responsible for secondary school instructional programs. Current practices including multi-units, differentiated staffing, individualized and independent study, nongraded flexible scheduling, etc., will be emphasized. Faculty will consist of supervisory personnel from public schools that are leaders in innovative and modernized practices. (3 cr [participants interested in grad cr should inquire at time of regis]; limited to 30 students in teams of five administrators and teachers from six local secondary schools; July 19-23; 9:00-3:00 MTWThF; Sci 150 and Sci 275) Ar





# Summer Arts Study Center

## A LIVING ARTS EXPERIENCE

### One-Week Courses of Study and Creativity in a Total Arts Environment

Nestled in the hills of Sugar Towne in northern Minnesota near Grand Rapids, the Summer Arts Study Center provides the ideal environment for intensive study and creative activity in all areas of the arts. Offering one-week workshops and courses in humanities, theatre, dance and movement, early music, creative writing, poetry, drawing and painting, sculpture and art aesthetics, the Study Center is conducted by a faculty of leaders in the academic and professional worlds.

The two-month session, sponsored by the University of Minnesota in cooperation with the Grand Rapids Performing Arts Council, opens June 13. The Study Center has exclusive use of the rustic, secluded Sugar Hills resort, creating an "arts community" in which the faculty and students can share ideas and discussions outside the classroom on a full-time basis in an atmosphere of total involvement. Recreational facilities include swimming (both indoor-outdoor pools and lakes), sailing, golf, water-skiing, horseback riding and sauna. There will be special activities each week, including open-air barbecues, chairlift and professional entertainment in the evenings. Individual lessons in arts and crafts are also available. Recreational programs for grade-school age children are available at nearby Sugar Lodge and babysitting can be arranged. Arts Center workshops are planned both for people with a general background in the arts as well as those seeking advanced work with an expert in their field. Courses are open to high school, undergraduate and graduate students, and to non-students of any age. They are designed to stimulate the student to discover and learn about the arts creatively, through participation in them.

#### **HUMANITIES • June 14-18**

A seminar conducted by Professor George Kliger on the meaning of self-realization, the nature and function of education in a free society, and the kind of education necessary to further the students' goal of self-realization. During morning and afternoon sessions each day, the group will discuss topics based on specific readings which are to be read in advance of the course. A reading list will be provided to registered students prior to the course opening. Each student is also expected to complete a paper dealing with a topic discussed in the seminars.

\$50.00 — 3 credits

#### **TECHNICAL THEATRE • June 21-25**

A workshop conducted by Professor Robert Scales, formerly Technical Director of the Guthrie Theatre in Minneapolis and currently Production Director at the new Annenberg Theatre at the University of Pennsylvania. Utilizing specialists in various areas of technical theatre, the course will cover everything from the use of plastics, dyes, glues and new paints to techniques in lighting and sound including the actual planning and preparation of sound tapes. James Backum, Property Master at the Guthrie Theatre, will assist Professor Scales. Herbert Pihhofer, composer, Music Director of the Guthrie Theatre and Creative Director of Sound 80, Inc. will conduct a session with the staff of Sound 80 in the use of recording equipment, electronic synthesizers and audio equipment for the theatre.

\$50.00 — 2 credits

#### **MOVEMENT AND DANCE • July 5-9**

A workshop in dance and body movement conducted by Professor Marge Maddux of Macalester College in St. Paul and Judy Brin, dance consultant, formerly with "Dance Magazine" — students of Bessie Schoenbaum and Merce Cunningham. The course will investigate various styles of dance, particularly those of Martha Graham and Merce Cunningham, in their historical context and as related to theatre. Sessions will include dance "walks" out of doors. The workshop will culminate in a performance, for the benefit of other workshop participants only.

\$50.00 — 3 credits

#### **EARLY MUSIC • June 28-July 2**

A workshop in baroque and rococo music taught by the Philidor Trio, former members of the New York Pro Musica. The Trio, which is well-known for its rare musical skill and sensitivity in performance, will open the week with a concert Sunday evening, June 27th. Shelley Gruskin will teach beginning, intermediate and advanced recorder and renaissance band. Elizabeth Humes will present courses in renaissance and baroque solo song repertoire and madrigal literature and performance, small group practice and combined vocal and instrumental repertoire. Edward Smith will teach harpsichord, recorder and renaissance reed and coach keyboard, chamber music and solo voice. All classes will meet daily. Extensive lists of music, combining both familiar standard of baroque and renaissance repertoire and rarely heard music drawn from sources available to the Trio, will be made available to registrants in advance so they may obtain and study many of these before the workshop. Library copies of all music will be available at the workshop.

\$50.00 — 2 credits

#### **PUPPETRY AND CREATIVE DRAMATICS • July 12-16**

The creative aspects of both puppetry and creative dramatics form the core of this workshop. George Latshaw (puppeteer of NBC's "Quillo and the Giant" and the CBS series "Look Up and Live") will lead the sessions. Mr. Latshaw is also known in Children's Theatre circles as a consultant for the Junior League and the U.S. representative at the International Puppet Festivals in Great Britain. The course will include translating human action into puppet movement, various types of puppet figures and their use, building a character, voice characterization and sound effects, story development, the potential of combining human and puppet actors, construction techniques, and staging and performance. Mr. Latshaw will be assisted by Mr. Tim Palkovic, instructor at Moorhead State College. Mr. Palkovic has worked extensively with creative dramatics and puppetry, both in the college classroom and as a workshop leader. Creative dramatics sessions dealing with approaches to children's senses of space, color, form, rhythm, and ways of building a story with well-defined characters will be included. The interrelationships between these arts of the theatre for children will be developed in sessions centering upon unlocking the imagination — for both teachers and students.

\$50.00 — 2 credits

#### **INSTITUTE ON CREATIVE WRITING FOR AND BY CHILDREN • July 19-23**

The seventh annual Institute, in its first year at the Study Center, will be conducted by Professors Naomi Chase and Noreen Odland and will draw upon a staff from across the United States. Lloyd Alexander, a master story teller (his book, *High King*, won the Newbery Award); Anthony Amato, Professor of Elementary Language Arts and Literature; Natalie Savage Carlson with her vast experiences as a basis for vivid stories (her recent, distinguished book, *Half-Sisters*); Ezra Jack Keats, an artist par excellence who recently completed a book with Lloyd Alexander. The Institute brings together a relatively small group of teachers who inspire children to express their ideas and a larger group of persons who write books and prepare other media for the use of children. The format of the conference varies, but the informal interchange between faculty and students is constant. The theme draws together the aspects of creativity that are expressed mainly through writing by amateur and professional, young and old.

\$50.00 — Certificate Program — non-credit

#### **CONTEMPORARY AMERICAN POETRY • July 26-30**

A seminar on recent American poetry conducted by Chester G. Anderson, Professor of English at the University of Minnesota and author of *James Joyce and His World*, and Michael Dennis Browne, young British-American poet now teaching at

Bennington, whose book *The Wife of Winter* has been called "the best first book of poetry published in the United States since Wallace Stevens' 'Harmonium.'" The course, which will include the use of recordings and at least one film, will explore a variety of poetry, with some emphasis on Theodore Roethke and Sylvia Plath. Students may be asked to write some poems.

\$50.00 — Certificate Program — non-credit

#### **THEATRE • July 26-30**

A workshop conducted by stage, television and film director Ezra Stone (professional commitments permitting), represented on Television by such shows as *Julia*, *The Flying Nun*, *Tammy and the Millionaire*, and others. Morning sessions — coaching sessions and acting, voice and movement exercises. Afternoon and evening — development of scenes involving workshop participants as both actors and directors under the coaching and advice of Mr. Stone. Professional practices, including prepared auditions and cold readings will be covered in evening sessions. Each workshop participant is asked to bring at least one scene on which he wishes to work.

\$50.00 — 2 credits

#### **DRAWING AND PAINTING • August 2-13**

A workshop in the techniques of drawing and painting, conducted by Professor H. Herman Somberg of the University of Minnesota. Daily sessions, beginning at 4:00 p.m. will provide individual instruction in pencil, charcoal, crayon, acrylic and oils. There will be a 6:00 p.m. supper break with class finishing at 10:00 p.m.

\$50.00 — 3 credits

#### **SCULPTURE • August 2-13**

A studio sculpture course, conducted by Professor Katherine Nash of the University of Minnesota, focusing on development of visual sensitivity and deepened perception in the study of sculptural form. The workshop, in two parts, fundamental and advanced, will deal with problems relating to the three-dimensional use of space, line, plane and mass while simultaneously exploring the relationship between two and three dimensions. The student will approach problems of form and content through construction in metal, and will work in plaster, soft stone, clay or some other medium of his choice. Class will involve individual criticism, group discussion and slide presentations.

\$50.00 — 3 credits

#### **CONTEMPORARY ART AESTHETICS • August 2-6**

A lecture-discussion course, conducted by Professor H. Kappel of the Minneapolis College of Art and Design. Using creative style-forming factors such as controlled accident or chance, coupled with intended design, the students will explore major works by the masters of modern art — Picasso, DeKuning, Pollock, Rothko, Hoffman, Kline, Guston, Rivers and others. Their work as well as their written comments on their art will be used as a base for discussion. Classes will be in two 2-hour sessions; slides will be included.

\$50.00 — 2 credits

### **SPECIAL FEATURE**

#### **NORTHERN MINNESOTA ART EXHIBITION • August 13, 14, 15**

An exhibition of paintings, graphics and sculpture open to all non-professional artists beyond high school age in a 24 county area of Northern Minnesota. A two-man jury will select approximately 200 works for display from those submitted and will choose first, second and third place awards. Study Center participants may wish to enter the competition or participate in other activities of the Art Exhibition. The exhibition and a program of workshops is sponsored by Continuing Education in Art, Agricultural Extension Service/General Extension Division, University of Minnesota; the Grand Rapids Performing Arts Council; the Itasca Art Association; and the Itasca State Junior College. For further information, contact County Extension offices.



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## COURSE APPLICATION FORM

Please enroll me in the following courses:

Humanities\_\_\_\_\_ Technical Theatre\_\_\_\_\_ Early Music\_\_\_\_\_ Dance/Movement\_\_\_\_\_

Theatre\_\_\_\_\_ American Poetry\_\_\_\_\_ Creative Writing\_\_\_\_\_ Puppetry/Creative Drama\_\_\_\_\_

Sculpture\_\_\_\_\_ Art Aesthetics\_\_\_\_\_ Drawing and Painting\_\_\_\_\_

Name: \_\_\_\_\_ Tel: ( ) \_\_\_\_\_ Female ( )  
Area Code Male ( )

Street address: \_\_\_\_\_ City \_\_\_\_\_  
State, zip

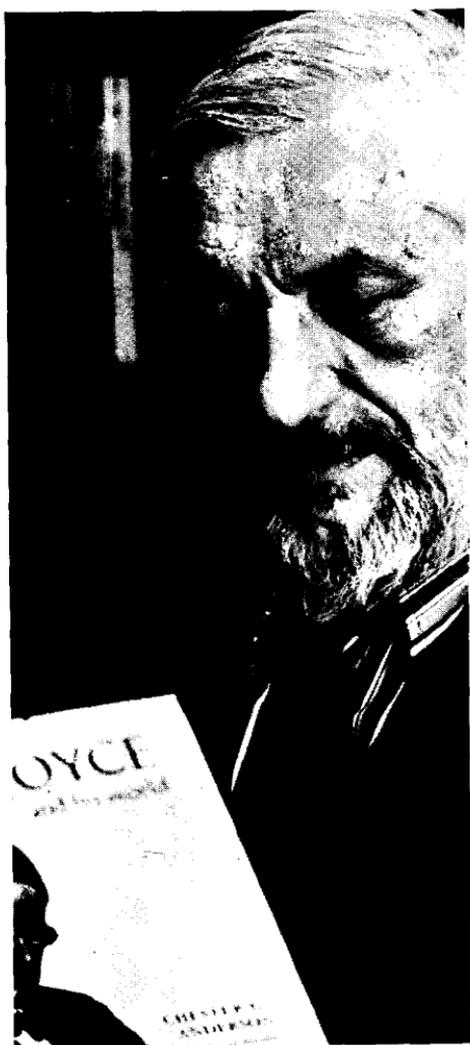
Position: \_\_\_\_\_ Firm or Institution \_\_\_\_\_

Please make checks for tuition payable to UNIVERSITY OF MINNESOTA and mail to:

**Prof. Dale Huffington, Director**  
**Summer Arts Study Center**  
**320 Wesbrook Hall**  
**University of Minnesota**  
**Minneapolis, Mn 55455**

**Tel: (612) 373-4947**

**Tuition enclosed \_\_\_\_\_**





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(double occupancy)

Mr. Philip Helmer

Telephone: (218) 326-3473

Mail to: Sugar Hills Resort, Box 280, Grand Rapids, Minnesota 55744

**Please reserve rooms for the following:**

	<b>No. Persons</b>
( ) Humanities — June 13 through June 19, 1971	_____
( ) Technical Theatre — June 20 through June 26, 1971	_____
( ) Early Music — June 27 through July 3, 1971	_____
( ) Dance/Movement — July 4 through July 10, 1971	_____
( ) Puppets/Creative Dramatics — July 11 through July 17, 1971	_____
( ) Creative Writing Inst. — July 18 through July 24, 1971	_____
( ) American Lit — July 25 through July 31, 1971	_____
( ) Theatre — July 25 through July 31, 1971	_____
( ) Art Aesthetics — August 1 through August 7, 1971	_____
( ) Drawing and Painting — August 1 through August 14, 1971	_____
( ) Sculpture — August 1 through August 14, 1971	_____
<b>TOTAL</b>	_____

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# INSTRUCTIONS

1. Who should file a Statement of Intent to Register?  
Summer-only students as defined on pages 13-14.
2. Students with previous college work who were dropped by their previous college for any reason or are not in good standing should apply directly to the Office of Admissions and Records, 6 Morrill Hall.
3. If you are in doubt about your status, see Admissions and Registration section of this bulletin.
4. Fill in form completely (please print) except for boxes in bold outline. Incomplete forms will not be processed. Do not send in more than one form. Do not use nicknames.
5. Do not use this form to request other information.
6. Filing of this Statement of Intent to Register does not imply any obligation on the part of the student.
7. Return the form to Office of Admissions and Records, 105 Morrill Hall, University of Minnesota, Minneapolis, Minnesota 55455. If you plan to register during the advance registration period, the Intent to Register *must* be received by May 1. If you plan to register on June 14, the Intent to Register *must* be received by May 20. Failure to submit an Intent to Register or failure to receive a Confirmation of Intent to Register does not prevent qualified students from registering. Additional copies of this form may be obtained upon request.
8. No registrations accepted by mail.

## DO NOT FILE INTENT CARD IF YOU ARE ATTENDING SECOND SUMMER SESSION ONLY

<b>Appl. No.</b>	<b>STATEMENT OF INTENT TO REGISTER</b>				<b>FILE NO.</b>						
	<b>SUMMER 1971</b>				<b>A-82</b>						
<b>Name ↓</b>	LAST	FIRST	MAIDEN	MIDDLE							
<b>Current Mailing Address ↓</b>	STREET						CITY				
	COUNTY	STATE	ZIP	S	C	Date of Birth		MO	DAY	YEAR	
<b>Last School Attended:</b>	High School or College	NAME	CITY	STATE							
<b>C</b>	Plan on Summer Term	1 _____ 2 _____	Minnesota Resident Non-Resident	1 _____ 2 _____	Sex:		Male _____ Female _____				
<b>NH</b>	NA	PR	Have you ever been registered in University of Minnesota day classes, including summer?		Yes _____ No _____ When _____	Last College _____ (Inc. Duluth, St. Paul, Morris, Crookston)					
1	2	3	College of the U of M in which you plan to register _____								
Do you expect to earn a degree from the University of Minnesota?			Yes _____ No _____ College _____								
Are you in a "dropped" status from any college?			Yes _____ If yes Where _____ No _____ When _____								
Are you eligible to return to last college attended?			Yes _____ No _____		U.S. Social Security No. _____						

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